

NATIONAL DEFENCE UNIVERSITY

RESEARCH REPORT

ON

BODA-BODA INFORMAL TRANSPORT SECTOR AND NATIONAL SECURITY

A COMPARATIVE ANALYSIS OF THE EVOLUTION OF SECURITY THREATS IN KENYA

AUGUST 2026

MANDATE

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Foreword by the Vice Chancellor

The regional security environment is profoundly challenged and characterised by high levels of youth unemployment and frustration. Across many states in the region, these conditions have contributed to security threats and criminal activities that include, petty crime, illicit trade, human trafficking, xenophobia, organized crime due to youth vulnerability and the ease of exploitation through political patronage and corruption. This regional situation is reflected in Kenya where the number of unemployed youths is exponentially rising annually, creating despair and frustrations due to limited economic opportunities, unmet personal and social milestones. The 2008 zero rating of motorcycle import duty created an opportunity for the youth to engage in meaningful source of income in the informal transport sector that was being embraced by the society with a far-reaching enthusiasm. The motorcycle transportation commonly referred to as boda-boda is quick, easy, affordable and capable of penetrating into the local communities where roads infrastructure is not conducive for motor vehicles. Despite its social economic imperatives, the sector has been associated with many criminal activities, political manipulation and corruption. This has created a policy dilemma, on one hand the sector is not indispensable and provide essential transport services and livelihoods, while on the other it is vulnerable to infiltration by organised criminal gangs that could be local or external. Unless appropriate interventions are undertaken, these security dynamics, could pose an increasingly serious threat to Kenya's national security.

The University therefore considered the emerging security concerns posed by the boda-boda informal transport sector, sufficient for empirical research. The main aim was not to criminalise the sector but to understand the conditions under which isolated or opportunistic criminal use of motorcycles has evolved into more recurrent, coordinated, organised and into a level likely to threaten national security. Specifically, the study was to examine manifestations and patterns of boda-boda-related crime, indicators distinguishing incidental criminal use from organised criminal activity, associated socio-economic factors, institutional and contextual conditions facilitating organised criminal evolution and the spatial distribution, concentration, and hotspot patterns of boda-boda-related crimes in the country.

The University recognises and acknowledges the commitment, professionalism, efforts and knowledge of the researchers of this study, despite their primary responsibilities. They showed dedication, attention to details and resilience when faced with various challenges during the data collection process. Notably, the dialogue engagement with government officials, scholars, experts and selected sector leaders were intensive and productive. The Researchers further demonstrated true commitment to the University's mandate. Analysing the substantial volume of data in a short period of time and compiling the research report is highly commendable. The University appreciates the commitment and results driven approach employed by the Division of Research Innovation and Security Studies (RISS) and the lead researchers comprising:

Brig (Dr) David N Ngari PhD the Principal investigator and overall coordinator, Col (Dr) Emmanuel P Kondoltiony PhD the Team Leader of Migori and Marsabit Research Team, Dr

Edward N Masibayi PhD the Team Leader of Migori and Busia Research Team, Dr Lilian W Macharia PhD the Team Leaders of Nairobi and Mombasa Research Team, Dr Zedekia Sidha the Team Leader of Migori and Bomet Research Team, Lt Col Esther W Kahiri (PhD Candidate) the Team Leader of Nairobi and Machakos County and, Ms Jacqueline Njeru (Senior Researcher and Advocate) the Team Leader of Nairobi, Nyeri and Kirinyaga Research Teams assisted by Col (Fr) G Maingi (University Chaplain). Additionally, we recognise the efforts and commitment of all the university assistant researchers and the research clerks involved in this study.

The study's key findings demonstrate that boda-boda-related crime is not evenly distributed across counties. Instead, it is informed by county-specific socio-economic conditions, institutional capacity, regulatory practices, local opportunity structures, mobility systems and spatial environments. Consequently, boda-boda-related insecurity should not be treated as a uniform national problem requiring one standard response. It is a differentiated security issue that requires context-sensitive interventions through legal and policy frameworks, institutional strengthening and concerted society at large efforts.

The study's recommendations explicitly call for the findings to be applied to address this emerging national security threat. In particular enactment of the boda-boda bill on the floor of the National Assembly. Specific policy briefs emanating from the empirical research will be directed to relevant MDAs for further consideration and action. It is an imperative to ensure Kenya as a sovereign state remains secure, peaceful and maintains its economic resilience as it strives to be a prosperous nation into the future.

Signature …… Date …….

David K C Tarus (PhD Candidate)
Lieutenant General
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Executive Summary

The boda-boda informal transport sector is a vital livelihood and mobility system in Kenya, employing thousands of young people and connecting communities to markets and services. However, the sector has also been associated with insecurity, including motorcycle theft, robbery, assault, smuggling, drug transportation, political intimidation and other criminal activity. This creates a policy dilemma: the sector is economically indispensable, yet parts of it are vulnerable to criminal misuse and, in some contexts, organised criminal infiltration.

This study examined boda-boda informal transport and national security in Kenya through a comparative analysis across seven counties including; Bomet, Busia, Kirinyaga, Machakos, Marsabit, Mombasa and Nyeri. The study was guided by five objectives: to analyse the manifestations and patterns of boda-boda-related crime; to examine indicators distinguishing incidental from organised criminal activity; to evaluate socio-economic drivers; to assess institutional and contextual conditions; and to examine the spatial distribution and hotspot patterns of crime.

The study adopted a mixed-methods comparative design. Quantitative survey data were collected from 2,631 respondents. Qualitative data were obtained from key informant interviews and focus group discussions across all seven counties, yielding verbatim community voices on the lived experience of crime, institutional failure and effective interventions. Archival records from police stations, law courts and a health facility in four counties provided independent documentary evidence. GIS-based spatial analysis was used to map the geographical distribution of crime-risk sites and hotspot clusters.

Key findings show that boda-boda-related crime is unevenly distributed across counties. Marsabit, Busia and Nyeri recorded the highest levels of witnessed crime, while Mombasa and Bomet showed lower general exposure. Busia recorded the strongest crime-pattern index (0.96), followed by Marsabit (0.78) and Bomet (0.51), indicating that crime in these counties was not merely visible but structurally pronounced. The crime-frequency score was highest in Marsabit (70.2%), Busia (63.8 %) and Machakos (57.6 %), while Mombasa recorded the lowest frequency at 53.0 %.

Under Objective One, the study found that crime manifests in multiple forms including motorcycle theft, robbery, assault, theft from passengers, smuggling, drug transportation, extortion, bribery, kidnapping-related risks and political intimidation. Witnessed crime was consistently more common than personal victimisation, indicating that boda-boda-related crime affects communities

through public visibility and fear as much as through direct harm. Qualitative voices confirmed these patterns portray that in Mombasa, respondents described how matatus deliberately slow down near bumps to enable snatching from passenger windows, while FGD participants in Machakos reported that riders are very united and protect one another even in criminal activities. In Busia and Marsabit, respondents identified cross-border smuggling and human trafficking as the most serious threats.

Under Objective Two, the study found that boda-boda-related crime exists on a continuum from incidental and opportunistic offending to semi-organised and organised criminal activity. Indicators of organisation included repeated similar crimes, coordination among riders, territorial control over stages and routes, protection systems, illicit market linkages and fake registration. The logistic regression analysis confirmed that criminal control over stages and routes more than doubled the odds of organised criminal activity (odds ratio ≈ 2.30, $p < 0.001$). Busia, Bomet and Nyeri showed stronger indicators of organised or semi-organised criminality, while other counties presented more mixed patterns. Participants in Busia reported that criminal networks operate on both sides of the Kenya-Uganda border, facilitating the movement of stolen motorcycles, contraband goods and offenders.

Under Objective Three, the study established that socio-economic vulnerability is a significant but moderate factor associated with crime. Youth unemployment, poverty, low income, debt pressure, family financial obligations, substance abuse and peer influence were the most reported drivers. Marsabit and Busia recorded the highest socio-economic vulnerability scores. Qualitative evidence revealed that riders describe daily struggles for survival and that drug-dependent youth resort to phone snatching to fund addiction. However, socio-economic hardship alone does not explain crime; it becomes criminogenic when it interacts with weak regulation, peer networks, political manipulation and illicit-market opportunities.

Under Objective Four, the study found that institutional and contextual conditions play a decisive role. Weak registration systems, ineffective licensing, inconsistent enforcement, poor inter-agency coordination, corruption, political interference, weak stage leadership and low trust between riders and security actors facilitate crime. In Mombasa, respondents reported that suspects are released because of phone calls from powerful offices; in Kirinyaga, institutions were described as very ineffective, with no justice in court. Yet positive examples also emerged: in Nyeri, structured

registration and direct communication between stage chairmen and police were credited with a 70% improvement in sector security.

Under Objective Five, the study confirmed that boda-boda-related crime is spatially patterned. Remote roads emerged as the most consistent reported crime location across counties. Mombasa displayed an urban and nightlife-related risk pattern; Marsabit showed a frontier, remote-route and smuggling-corridor pattern, while Busia reflected border-related mobility risks. Court records in Mombasa showed boda-boda-related cases rising from 189 in 2022 to 321 in 2025, while Marsabit court registers documented a decade-long shift from motorcycle theft (2016-2019) to immigration and human-trafficking offences (2020-2026). Hospital records from Machakos documented 39 crime-related admissions in January 2026 alone.

The overall conclusion is that boda-boda-related insecurity is produced by the interaction of mobility, livelihood vulnerability, weak regulation, institutional gaps, criminal opportunity and spatial conditions. The sector is not inherently criminal, but its informal nature, mobility advantages, weak traceability and uneven regulation create opportunities for exploitation that, in some counties, evolve from incidental misuse into semi-organised or organised forms of criminal activity with implications for community safety and national security.

The study recommends: first, strengthening boda-boda registration, rider identification, stage mapping and route-level accountability; second, intelligence-led and spatially targeted policing focused on identified hotspots; third, improved stage governance through structured rider associations, transparent leadership and cooperation with police; fourth, socio-economic interventions including youth livelihood programmes, rider training and substance-abuse prevention; fifth, strengthened anti-corruption and accountability mechanisms; sixth, integrated cross-border security strategies in border counties; and seventh, a differentiated enforcement approach that distinguishes legitimate riders from organised criminal actors rather than applying blanket crackdowns. Archival and qualitative evidence corroborates the quantitative findings, demonstrating that place, governance, economic pressure and spatial opportunity together shape the security trajectory of the boda-boda sector in Kenya.

In summary, boda-boda-related crime in Kenya should be understood as a dynamic and context-dependent security issue. It is shaped by who controls routes and stages, how riders are registered and regulated, where motorcycles operate, what economic pressures riders face, how institutions

respond and how criminal opportunity is distributed across space. The most effective response is therefore not the criminalisation of the boda-boda sector, but the strengthening of governance, accountability, livelihood support, spatial intelligence and targeted security intervention.

Abstract

The boda-boda informal transport sector provides mobility, employment and livelihoods in Kenya yet has increasingly been associated with robbery, theft, assault, smuggling and other criminal activity. This study comparatively examined the evolution of security threats linked to the sector across seven counties, guided by five objectives: analysing crime manifestations and patterns; distinguishing incidental from organised criminal use; evaluating socio-economic drivers; assessing institutional conditions; and examining spatial distribution and hotspots. A mixed-methods comparative design integrated quantitative survey data from 2,631 respondents, qualitative evidence from key informant interviews and focus group discussions, archival records from police stations, law courts and health facilities and GIS-based spatial analysis. Quantitative data were analysed using descriptive and inferential statistics; qualitative data were thematically analysed; archival records were reviewed documentarily, while spatial data were mapped. Findings show that boda-boda-related crime is unevenly distributed across counties and exists on a continuum from incidental to organised, driven by socio-economic vulnerability and weak institutional conditions, and concentrated in identifiable hotspots. Court records in Mombasa documented rising boda-boda-related cases from 189 in 2022 to 321 in 2025, while Marsabit court registers traced a shift from motorcycle theft to human-trafficking offences. The study contributes a county-comparative framework for understanding how boda-boda-related insecurity evolves and provides evidence for proportionate, context-sensitive interventions that protect livelihoods while disrupting criminal misuse.

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List of Abbreviations and Acronyms

ANOVA	-	Analysis of Variance
CCTV	-	Closed-Circuit Television
CSO	-	Civil Society Organisation
DBSCAN	-	Density-Based Spatial Clustering of Applications with Noise
FGD	-	Focus Group Discussion
GIS	-	Geographic Information System
GPS	-	Global Positioning System
ICT	-	Information and Communication Technology
IPSTC	-	International Peace Support Training Centre
KDE	-	Kernel Density Estimation
KII	-	Key Informant Interview
KIPPRA	-	Kenya Institute for Public Policy Research and Analysis
KMA	-	Kenya Military Academy
NACADA	-	National Authority for the Campaign Against Alcohol and Drug Abuse
NCPD	-	National Council for Population and Development
NCRC	-	National Crime Research Centre
NDC	-	National Defence College
NGAO	-	National Government Administrative Officers
NGO	-	Non-Governmental Organisation
NNI	-	Nearest Neighbour Index
NNA	-	Nearest Neighbour Analysis
NTSA	-	National Transport and Safety Authority
QGIS	-	Quantum Geographic Information System
SACCO	-	Savings and Credit Cooperative Organisation
SD	-	Standard Deviation
TVET	-	Technical and Vocational Education and Training
UNODC	-	United Nations Office on Drugs and Crime

Operational Definition of Terms

Term	Operational Definition
Boda-boda	A motorcycle-based commercial transport service that provides passenger and/or goods transportation in both urban and rural areas.
Boda-boda informal transport sector	The motorcycle-based transport system operating largely within the informal economy and is characterised by flexible routing, low entry barriers, limited regulation and reliance on stages, routes, and market-based networks for the movement of people, goods, and information.
Boda-boda-related crime	Criminal acts committed through, within, or around the boda-boda transport sector.
County clusters	The analytical grouping of the selected counties into urban/metropolitan, rural/hinterland, and border categories for purposes of comparison.
Hotspot patterns	Areas or corridors where boda-boda-related crime is concentrated at relatively higher levels than in surrounding areas.
Incidental criminal use	Isolated, opportunistic and uncoordinated use of boda-boda transport in the commission of crime without evidence of sustained organisation, repeated collaboration, structured roles, or continuity over time.
Organised crime	Structured or semi-structured criminal conduct involving repeated coordination, continuity over time, role differentiation, concealment, protection mechanisms, or linkage to broader illicit markets for material or strategic gain.
Criminal network	A web of relationships with specialized roles, territorial control and linkages to illicit markets
Institutional and contextual conditions	The governance, regulatory, administrative and environmental factors that may enable or constrain the evolution of criminal activity within the boda-boda sector.
Manifestations of crime	The observable forms in which boda-boda-related criminality appears in specific contexts.
National security	The protection of the state and its people against internal and external threats to sovereignty, territorial integrity, rights and freedoms, property, peace, stability and prosperity.
Security threat evolution	The process through which isolated, opportunistic, or localised criminal acts within the boda-boda sector develop into more recurrent, coordinated, organised, and disruptive forms of insecurity with wider implications for governance, public order, and national security.
Socio-economic factors	The social and economic conditions that may influence the emergence or persistence of boda-boda-related crime.
Spatial distribution	The geographical spread or location pattern of boda-boda-related crime across the selected counties.
Unit of analysis	The boda-boda transport sector as a linked system of riders, routes, stages, market nodes and enforcement touchpoints across the selected counties.

CHAPTER ONE

1.0 **Introduction**

This chapter introduces the study by presenting the background, statement of the problem, objectives, research questions, and research hypotheses. It further outlines the significance and justification of the study, the context and scope, the limitations and assumptions, and the operational definition of key terms. This chapter introduces the study by presenting the background, statement of the problem, objectives, research questions, and research hypotheses. It further outlines the significance and justification of the study, the context and scope, the limitations and assumptions, and the operational definition of key terms.

1.1 **Background to the Study**

The boda-boda informal transport sector has become one of the most visible and economically significant components of Kenya's informal economy. Over the past close to two decades, and after the government zero rated motorcycle acquisition in 2008, the sector expanded rapidly in response to rising youth unemployment, inadequate formal public transport systems, poor last-mile connectivity, and growing demand for flexible and affordable mobility in both urban and rural areas (Mutiso & Behrens, 2011). In many parts of Kenya, boda-boda transport now serves as a critical link between homes, markets, schools, health facilities, and commercial centres. As a result, the sector has become an important source of employment and livelihood, especially for young people excluded from formal labour markets. It also plays a central role in connecting peri-urban settlements and remote rural areas to wider local and regional economies (Mutiso & Behrens, 2011).

Despite its socio-economic importance, the boda-boda sector remains largely informal and unevenly regulated. Many operators function outside fully formalized employment, licensing, and accountability systems. This informality has contributed to the sector's rapid growth, but it has also created governance challenges. Weak registration systems, inconsistent rider identification, limited monitoring, and fragmented enforcement have made it difficult for state institutions to regulate the sector effectively. In this context, the very features that make boda-boda transport efficient speed, flexibility, low entry barriers, and penetration into poorly served areas also make it vulnerable to misuse by criminal actors (Opondo & Kiprop, 2018).

International comparative experience illustrates the security value of formal operator identification and enforceable operating rules. In Europe, France established a specific legal framework for the paid transport of passengers using two- and three-wheeled motor vehicles, requiring such services to operate under defined professional and regulatory conditions, including prior reservation of journeys, professional driver identification, specified licensing and medical requirements, and vehicles meeting prescribed age, maintenance and identification standards (Ministère de l'Intérieur, 2010; Ministère de la Transition écologique, 2026). Italy similarly provides a formal regulatory framework through Article 86 of the Italian Highway Code, which recognises taxi and passenger services involving automobiles, motorcycles and bicycles, requires operators to obtain the appropriate licence, and subjects unauthorised operation to substantial administrative penalties, vehicle confiscation and suspension of the driving licence (Automobile Club d'Italia, 2026). These European cases demonstrate how operator licensing, vehicle identification, professional standards and enforceable sanctions can reduce regulatory ambiguity and strengthen accountability.

South-East Asian experience offers additional comparative lessons, given the extensive regulatory arrangements developed for motorcycle-based passenger transport. Indonesia provides a significant example of progressive formalisation: although motorcycles are not classified as conventional public transport under Law No. 22/2009, the government subsequently developed specific rules for motorcycles used for public purposes, particularly app-based motorcycle taxis, through Minister of Transportation Regulation PM 12/2019, which covers passenger safety, service standards and operational arrangements (Ministry of Transportation, Indonesia, 2019). The Indonesian experience demonstrates how governments can progressively formalise an economically embedded motorcycle transport sector through identifiable operators, safety standards, operational rules, data systems and enforceable accountability mechanisms. Thailand similarly maintains ministerial regulations governing the registration of public motorcycles and their provincial operating committees (Department of Land Transport, Thailand, 2017, 2021). The Philippines, by contrast, presents a transitional case: motorcycle taxis have long served urban and rural mobility needs, but their formal legal status has remained contested, with government relying on pilot and regulatory arrangements while legislation for a permanent framework continues to evolve (Philippine Competition Commission, 2020; House of Representatives of the Philippines, 2026).

Within Africa, motorcycle taxis have expanded rapidly alongside urbanisation, limited formal employment and deficiencies in public transport, generating comparable regulatory, safety and security challenges (UN-Habitat, 2013; World Bank, 2012, 2022). Nigeria illustrates the more severe end of the security spectrum: motorcycle taxis have been associated in some areas with robbery, kidnapping, banditry and armed attacks within broader environments of organised criminality and insecurity (Ezeibe et al., 2017; European Union Agency for Asylum, 2026). The Nigerian experience should not be equated with the Kenyan situation; it serves instead as a comparative warning of how governance weaknesses and wider insecurity can increase the vulnerability of transport systems to criminal exploitation. In East Africa, Rwanda provides a best-practice model, having formalised the sector through registration, operator identification, cooperatives, licensing and sustained enforcement, thereby enhancing traceability and reducing opportunities for criminal misuse (Rwanda National Police, 2019, 2022). Uganda presents a mixed experience: although registration systems, digital platforms and rider associations have improved traceability, weak implementation and enforcement continue to undermine compliance (Goodfellow & Mukwaya, 2021; International Labour Organization, 2024). Across the region, porous borders and transnational crimes, including drug trafficking, firearms trafficking, human trafficking and migrant smuggling, further heighten security risks (United Nations Office on Drugs and Crime, 2013).

In Kenya, growing concern has emerged over the relationship between boda-boda transport and insecurity. Existing studies and institutional reports indicate that the sector has been associated with robbery, theft, assault, kidnapping, smuggling, drug-related offences, bribery, and facilitation of illicit trade. In some settings, motorcycles have been used as tools for quick escape, covert movement, and transportation of contraband or offenders. These patterns suggest that the boda-boda sector can be exploited not only for incidental criminal acts but also, under certain conditions, for more coordinated and sustained forms of criminal activity (Opondo & Kiprop, 2018). Such developments raise important questions about whether parts of the sector may be evolving into organised security threats rather than remaining limited to isolated offences.

Kenyan institutional assessments reinforce these concerns. The National Crime Research Centre identified robbery, murder, kidnapping and abduction, drug-related offences, sexual offences, firearms and contraband smuggling and public-order violations among the security concerns

associated with boda-boda transport, attributing them to weak regulation, inadequate identification and monitoring, and operator-related vulnerabilities (National Crime Research Centre, 2018). Recent research in Nakuru indicates that motorcycles may facilitate surveillance, rapid escape and the movement of stolen property and drugs, while unregistered motorcycles and false number plates frustrate identification and tracing (Kiplagat et al., 2024). The threat may also extend beyond crimes committed using motorcycles to the organised theft and trafficking of motorcycles themselves: evidence from northern Kenya has documented organised networks allegedly recruiting prospective boda-boda operators and facilitating the movement of stolen motorcycles towards Ethiopia through the Moyale corridor (Institute for Security Studies, 2022). Although Kenya has established a regulatory basis for motorcycle operations through the National Transport and Safety Authority (Operation of Motorcycles) Regulations, 2015, the persistence of unregistered motorcycles, identification challenges and enforcement gaps suggests that regulation alone does not eliminate opportunities for criminal exploitation. Socio-economic vulnerabilities, including unemployment, poverty, indebtedness and livelihood insecurity, may further expose some operators to exploitation, although such conditions do not make riders inherently criminal (Riisgaard et al., 2024; International Labour Organization, 2021; World Bank, 2020).

This study is informed by the broader constitutional understanding of national security in Kenya. Article 238 of the Constitution of Kenya defines national security as the protection of the nation and its people against internal and external threats, including threats to rights and freedoms, property, peace, stability and prosperity (Constitution of Kenya, 2010, art. 238). From this perspective, the issue is not simply whether crime occurs within the boda-boda sector, but whether some forms of criminal activity become sufficiently organised, disruptive, and widespread to undermine public order, economic life, and institutional legitimacy. Once criminal activity reaches that threshold, it becomes a matter of national security rather than only local crime control.

The problem is further complicated by the geographical and contextual diversity of Kenya. The manifestations of boda-boda-related crime are unlikely to be the same across all counties. In densely populated urban centres, motorcycles may facilitate robbery, extortion, and rapid delivery of illicit goods. In rural and hinterland areas, they may be linked to theft networks, retaliatory violence, and weakly monitored transport routes. In border counties, motorcycles may support smuggling, informal crossings, and movement across porous frontiers. These differences suggest

that boda-boda-related insecurity is shaped by county-specific socio-economic, institutional, and spatial conditions (Opondo & Kiprop, 2018). A comparative county approach is therefore necessary to understand how and why security threats evolve differently across settings.

Although previous studies have examined boda-boda transport, most have focused on its economic role, transport significance, road safety issues, or general crime concerns. Limited attention has been given to the comparative evolution of security threats within the sector across different counties in Kenya. There is insufficient empirical work distinguishing between incidental criminal use of motorcycles and more organised criminal activity embedded in boda-boda systems. There is also little integration of socio-economic drivers, institutional weaknesses, and spatial patterns into a single comparative framework. This gap limits both academic understanding and policy response (Opondo & Kiprop, 2018).

It is against this background that the present study sought to comparatively examine the evolution of security threats within the boda-boda informal transport sector across selected counties in Kenya. The study is premised on the understanding that the boda-boda sector is fundamentally a lawful socio-economic system, but one that may be infiltrated or exploited by organised criminal actors under enabling conditions. By examining the manifestations of crime, the indicators of organised criminality, the socio-economic and institutional drivers, and the spatial distribution of threats, the study aimed to generate evidence that can support more precise, proportionate, and context-sensitive responses to insecurity in the sector.

1.2 **Statement of the Problem**

The boda-boda informal transport sector in Kenya has grown rapidly and become an important source of mobility, employment and livelihood for many people, especially youth operating within the informal economy (Mutiso & Behrens, 2011). Despite its socio-economic value, the sector has increasingly been associated with insecurity, including robbery, theft, assault, kidnapping, smuggling and facilitation of illicit trade (Opondo & Kiprop, 2018). While these concerns are widely acknowledged, the existing body of research has not adequately explained how criminal activity within the sector evolves from incidental and opportunistic offending into more organised and security-relevant forms.

A major gap in current scholarship is that much of the literature treats boda-boda-related crime as isolated incidents or general disorder within the transport sector, without clearly distinguishing

between ordinary criminal misuse of motorcycles and structured criminal activity that may threaten public order, economic stability, and institutional legitimacy (Opondo & Kiprop, 2018). Yet this distinction is critical. Under Kenya's constitutional understanding of national security, threats extend beyond conventional violence to include disruptions to rights, property, peace, stability, and prosperity (Constitution of Kenya, 2010, art. 238). Similarly, Kenyan law defines organised crime in terms of structured groups acting in concert over time to commit serious offences for material benefit (Prevention of Organised Crimes Act, 2010). This means that the central problem is not merely the presence of crime in the boda-boda sector, but whether some patterns of criminality have evolved into organised formations with wider national security implications.

The empirical problem is equally significant. Existing studies have not provided a rigorous comparative county-level framework for examining how boda-boda-related crime manifests across different environments such as urban, rural, and border counties, or how these manifestations are shaped by socio-economic vulnerability, institutional weakness, and spatial opportunity structures (Opondo & Kiprop, 2018). As a result, there is limited evidence on the precise conditions under which the sector shifts from a lawful livelihood system occasionally exploited by offenders into a platform for organised criminal activity. This gap limits effective policy and may encourage either over-criminalization of the sector or underestimation of the security risks embedded within it.

It is this conceptual and empirical gap that the present study sought to address. The study comparatively examined the evolution of security threats within the boda-boda informal transport sector across selected counties in Kenya, with a view to distinguishing incidental criminal use from organised criminal activity and identifying the forms, drivers, institutional conditions, and spatial patterns associated with that evolution.

1.3 **Objectives of the Study**

The study was guided by the following objectives. The general objective was to comparatively examine the evolution of security threats within the boda-boda informal transport sector across the regions represented by the sampled counties in Kenya, taking cognisance of their forms, determinants, institutional drivers and spatial patterns. The specific objectives were to:

1. Analyse the manifestations and patterns of boda-boda-related crime across the sampled counties in Kenya.
2. Examine the conceptual and empirical indicators that distinguish incidental criminal use of boda-boda transport from organised criminal activity.
3. Evaluate the socio-economic factors associated with boda-boda-related crime in the sampled counties.
4. Assess the institutional and contextual conditions that facilitate the evolution of organised criminal activity within the boda-boda sector; and
5. Examine the spatial distribution, concentration and hotspot patterns of boda-boda-related crime across the sampled counties.

1.4 **Research Questions**

The study was guided by the following research questions:

1. What are the main manifestations and patterns of boda-boda-related crime across the sampled counties in Kenya?
2. What conceptual and empirical indicators distinguish incidental criminal use of boda-boda transport from organised criminal activity?
3. What socio-economic factors are associated with boda-boda-related crime in the selected counties?
4. What institutional and contextual conditions facilitate the evolution of organised criminal activity within the boda-boda sector?
5. What are the spatial distribution, concentration and hotspot patterns of boda-boda-related crime across the sampled counties?

1.5 **Research Hypotheses**

This study tested the following null hypotheses:

H01: There is no significant difference in the manifestations and patterns of boda-boda-related crime across the selected counties.

H02: There is no significant relationship between socio-economic factors and boda-boda-related crime in the selected counties.

H03: Institutional and contextual conditions do not significantly influence the evolution of organised criminal activity within the boda-boda sector.

H04: There is no significant spatial variation in the distribution and concentration of boda-boda-related crime across the selected counties.

1.6 **Significance and Justification**

This study is significant because it addresses an issue located at the intersection of transport governance, informal livelihoods, crime, and national security. The boda-boda sector is a major component of Kenya's socio-economic life and provides employment and mobility for large segments of the population, especially youth (Mutiso & Behrens, 2011). At the same time, the sector has increasingly been associated with insecurity and criminal misuse, including robbery, smuggling, and organised violence (Opondo & Kiprop, 2018). This dual character makes the sector both socially indispensable and strategically important for security research and policy.

First, the study is significant to policymakers and security agencies because it generated evidence on when and how boda-boda-related criminality becomes a matter of national security rather than only routine law enforcement. This is particularly important in Kenya, where national security is constitutionally understood to include protection of people, rights, freedoms, property, peace, stability, and prosperity (Constitution of Kenya, 2010, art. 238). By examining the evolution of security threats within the sector, the study helped decision-makers develop more precise and proportionate responses grounded in both constitutional and legal thresholds.

Second, the study is significant to county governments, transport regulators, and local administrators because it provided empirical evidence on the institutional and contextual factors that facilitate criminal exploitation of the boda-boda sector. Understanding the role of weak registration systems, poor regulation, corruption, limited enforcement, and uneven local governance helped improve policy design, regulatory reform, and inter-agency coordination. In this way, the findings may support more targeted interventions that strengthen accountability without undermining lawful livelihoods.

Third, the study is important to the academic community because it fills a major gap in the literature. Existing studies on boda-boda transport in Kenya have focused largely on mobility, livelihoods, safety, and general crime concerns, with limited emphasis on comparative county

analysis or the distinction between incidental offending and organised criminal activity (Mutiso & Behrens, 2011; Opondo & Kiprop, 2018). By integrating manifestations of crime, socio-economic drivers, institutional conditions, and spatial patterns within one framework, the study contributes original knowledge to scholarship on informal transport, organised crime, and national security.

Fourth, the study is justified because it avoids the danger of treating the boda-boda sector as uniformly criminal. The sector is fundamentally a lawful socio-economic system that supports many households and local economies. Broad, undifferentiated crackdowns may therefore damage livelihoods, deepen distrust between communities and the state, and inadvertently create the very governance vacuums that organised criminal actors exploit. A study that identifies where, how, and under what conditions organised criminal threats emerge is therefore essential for designing proportionate and evidence-based interventions.

Finally, the study is justified on methodological and policy grounds because it adopts a comparative multi-county approach. By examining urban, rural, and border counties together, the study is better positioned to identify both common and context-specific pathways through which insecurity evolves in the boda-boda sector. This makes the findings more analytically robust and more useful for national and county-level security planning.

1.7 **Context and Scope**

This study was designed as a national field-based inquiry into the evolution of security threats within the boda-boda informal transport sector in Kenya. The original field protocol focused on six sampled counties: Bomet, Busia, Machakos, Marsabit, Mombasa and Nyeri. However, due to some research variables considerations, the sample size had to be expanded in the central region, and therefore Kirinyaga county was considered during data cleaning and integration. The same tools were retained including; the questionnaire, observation, qualitative and spatial datasets. The final analytical coverage was therefore harmonised around seven counties: Bomet, Busia, Kirinyaga, Machakos, Marsabit, Mombasa, and Nyeri. The main unit of analysis was the boda-boda transport sector, understood as a linked system of routes, stages, market nodes and enforcement touchpoints through which riders move people, goods, and information.

The sapmled counties were organised into three analytical clusters. The first is the urban/metropolitan cluster, comprising Mombasa and Machakos. This cluster focused on forms of

insecurity associated with dense transport activity and urban mobility, including organised stage capture, robbery facilitation, protection and extortion markets, corruption-linked last-mile movement, political violence brokerage and the distribution of illicit commodities enabled by rapid motorcycle mobility. The second is the rural/hinterland cluster, comprising Bomet and Nyeri. This cluster examined issues such as motorcycle parts markets, sustained theft, coercive dispute enforcement, illicit alcohol and drug distribution, informal taxation at markets and stages, and cycles of retaliation and vigilantism that may create local governance vacuums. The third is the transnational/border cluster, comprising Busia and Marsabit. This cluster focused on insecurity linked to borderland and frontier conditions, including brokerage and smuggling facilitation, cross-border corruption, extortion, illicit movement, arms-risk ecologies and other criminal activities that may reach the threshold of national security concern.

The study drew respondents from the key actors and institutions that shape, regulate, experience, or respond to boda-boda-related insecurity. These included boda-boda riders, stage and market leaders, SACCO or association officials, county transport and licensing officers, National Government Administrative Officers, law enforcement and prosecution personnel, community leaders, security-related officials, civil society or non-governmental organisation representatives, and where ethically appropriate, victims or survivors of boda-boda-related crime. This broad respondent base is intended to ensure that the study captures perspectives from the operational, institutional, regulatory, and community levels.

In scope, the study is limited to the regional sampled counties and to issues directly related to the evolution of security threats within the boda-boda transport sector. It focuses specifically on manifestations of crime, indicators of organised criminal activity, socio-economic drivers, institutional and contextual enablers, and spatial patterns of insecurity. The study does not treat the boda-boda sector as inherently criminal. Rather, it proceeds from the assumption that the sector is fundamentally a lawful socio-economic system that has, in some contexts, been infiltrated or exploited by criminal actors posing as genuine riders or transport operators. The study therefore seeks to identify the presence, forms and conditions of such organised criminal activity and to propose policy-relevant responses grounded in a national security perspective.

1.8 **Limitations and Assumptions of the Study**

This study faced several limitations. First, because the subject of boda-boda-related crime and organised criminal activity is sensitive, some respondents were sometimes unwilling to share complete information or withheld details out of fear, suspicion, or concern for personal safety. This is particularly likely where the study touches on issues such as criminal networks, corruption, smuggling, political interference, or collusion. To reduce this limitation, the study emphasised confidentiality, voluntary participation, and ethical handling of information throughout the research process.

Second, the study covers seven analytical counties with distinct social, geographical, and security contexts. Conducting fieldwork across these counties presented logistical challenges related to distance, transport, time, cost and coordination. These challenges affected access to some respondents or sites, especially in remote or security-sensitive areas. The study addressed this limitation through careful planning, phased fieldwork and use of locally appropriate data collection arrangements where necessary.

Third, access to official crime records, institutional reports and administrative data was limited or uneven across counties. Some institutions may not keep complete records, while others may restrict access to sensitive information. As a result, the study may need to rely partly on respondent accounts, institutional perceptions, and triangulation across multiple data sources. This limitation was managed by combining questionnaires, interviews, focus group discussions, document review, observations and spatial analysis to strengthen data validity.

Fourth, because the study is cross-sectional in design, it captured the state of boda-boda-related insecurity at a particular point in time rather than through long-term follow-up. This means that while respondents may reflect on trends and changes over time, the study did not directly observe the full historical development of criminal evolution in the sector. Nevertheless, the comparative design and use of multiple data sources still allowed the study to generate meaningful insights into patterns, conditions, and trajectories of insecurity.

The study is also guided by several assumptions. First, it assumes that the boda-boda transport sector is fundamentally a lawful socio-economic system that plays an important role in mobility and livelihoods in Kenya. Second, it assumes that criminality within the sector is not uniform and

that only some segments, actors, or operational spaces may be infiltrated or exploited by organised criminal groups. Third, the study assumes that the evolution of security threats within the sector is shaped by a combination of socio-economic pressures, institutional weaknesses, contextual conditions and spatial dynamics rather than by a single factor. Finally, it assumes that the selected counties provide sufficient contextual variation to support meaningful comparison of how boda-boda-related insecurity manifests and evolves across urban, rural, and border settings.

CHAPTER TWO
LITERATURE REVIEW

2.0 **Introduction**

The boda-boda informal transport sector has become a major feature of mobility, livelihood, and local commerce in Kenya and across East Africa. Its growth has been driven by unemployment, inadequate formal public transport, low entry barriers, and demand for flexible last-mile transport, especially in urban, peri-urban, rural, and border settings (Mutiso & Behrens, 2011). At the same time, the sector has increasingly been associated with insecurity, including robbery, theft, violence, smuggling, and facilitation of illicit markets (Opondo & Kiprop, 2018). The challenge for scholarship is that the sector is both socially useful and potentially criminogenic.

This study is concerned not merely with crime within the boda-boda sector, but with the evolution of security threats in the sector to levels that may undermine public order, economic stability, and institutional legitimacy. The literature shows that this problem has not been adequately addressed through comparative county-level analysis. Existing studies tend either to emphasise the sector's livelihood contribution or to document criminal incidents without systematically examining how opportunistic offences may evolve into organised criminal activity with national security implications (Opondo & Kiprop, 2018).

This chapter reviews literature relevant to the study under four broad sections. The first presents a conceptual review of key terms and ideas. The second discusses the theoretical perspectives informing the study. The third provides an empirical review organised around the study objectives. The final section identifies the knowledge gaps that justify the present research.

2.1 **Conceptual Review**

The Boda-Boda Informal Transport Sector, refers to motorcycle-based informal public transport systems that operate within flexible, lightly regulated, and highly adaptive mobility environments. In Kenya, the sector has become one of the most visible forms of informal transport and a major source of livelihood for many young people. It plays a critical role in linking rural producers to markets, connecting peri-urban settlements to urban centres, and providing transport where roads or formal systems are weak (Mutiso & Behrens, 2011). Yet the same characteristics that make the sector economically valuable, namely speed, low capital requirements, flexible routing, and deep

penetration into hard-to-reach areas, also make it vulnerable to misuse by criminal actors (Opondo & Kiprop, 2018).

The informal character of the sector is central to this study. Informality implies weak institutional regulation, uneven licensing, inconsistent rider identification, variable association control, and fragmented accountability. These conditions create both livelihood opportunities and governance vulnerabilities (Opondo & Kiprop, 2018).

National security in this study is understood in the broad constitutional sense rather than the narrow military sense. It includes protection of territorial integrity, sovereignty, people, rights and freedoms, property, peace, stability, and prosperity (Constitution of Kenya, 2010, art. 238). Under this approach, threats to national security are not limited to armed conflict or terrorism. Organised violence, illicit economies, coercive criminal networks, and destabilising forms of insecurity may also fall within the national security domain when they become systematic, disruptive, and multi-jurisdictional (Constitution of Kenya, 2010, art. 238).

This broader framing is important because it provides the threshold for assessing whether boda-boda-related criminality remains within the realm of ordinary crime or rises to the level of organised security threat.

Organised crime refers to criminal activity undertaken by structured or semi-structured groups acting in concert over time to commit serious offences for material or strategic benefit. Such activity typically involves continuity, coordination, role differentiation, concealment, and protection from accountability, often through corruption, intimidation, or collusion (Prevention of Organised Crimes Act, 2010; Shelley, 2014). For this study, the concept is important because it helps distinguish ordinary criminal misuse of motorcycles from patterned, networked criminal activity embedded in transport systems.

Security threat evolution refers to the process by which isolated or incidental offences develop into recurrent, coordinated, and more disruptive criminal formations. In the context of this study, it refers to how the boda-boda sector may shift from being used opportunistically in crime to becoming an infrastructure or cover for organised criminal activity. This process is shaped by local conditions, including economic pressure, weak regulation, political interference, social networks, and transport geography (Opondo & Kiprop, 2018).

2.2 **Theoretical Review**

Routine Activity Theory is a lens applied to examine crime. Thus, the theory application enables to explain crime as occurring when a motivated offender, a suitable target and the absence of capable guardianship converge in time and space (Cohen & Felson, 1979). This theory is relevant to the boda-boda sector because motorcycles provide mobility advantage, access to targets, and rapid escape, especially in congested urban areas, poorly monitored rural corridors and border environments. It helps explain why motorcycles become attractive tools for robbery, snatching, couriering contraband, and other mobility-enabled crimes. However, while useful for explaining opportunity, the theory is less adequate in explaining how repeated offending becomes organised and networked.

Social Disorganisation Theory is another lens applied to examine crime from a social disorganisation perspective. Thus, crime is viewed to be linked to weak informal social control, unstable economic conditions, mobility, weak institutions and fragmented regulation. This line of thinking is relevant because many boda-boda environments are characterised by rapid urban growth, unemployment, informal settlements, uneven state presence, and local governance weaknesses (Abrahamsen & Williams, 2011). The theory helps explain why some county settings may produce more permissive environments for criminal activity than others, and why county comparisons matter in understanding the evolution of insecurity in the sector.

Organised crime and criminal network perspectives are central to this study because they focus on continuity, coordination, hierarchy or network structure, specialised roles, territorial control, and links to illicit markets (Shelley, 2014). These perspectives help explain when transport systems become embedded in structured criminal activity rather than remaining neutral or opportunistically misused. They are especially useful for analysing corridor effects, county linkages, protection systems, and the gradual shift from isolated incidents to organised criminal enterprise.

Taken together, these theories provide a layered explanation of the study problem: Routine Activity Theory explains criminal opportunity, social disorganisation perspectives explain enabling context, and organised crime perspectives explain criminal evolution and network formation.

2.3 **Empirical Literature Review**

Manifestations and Patterns of Boda-Boda-Related Crime. Existing studies show that boda-boda-related criminality is not uniform. It includes robbery with violence, assault, theft of motorcycles and parts, abduction, smuggling, fraud, bribery, illicit delivery, and facilitation of escape after offences. National-level studies and security reports have documented these manifestations and linked them to weak traceability, corruption vulnerabilities, and regulatory failure. Opondo and Kiprop (2018), in a National Crime Research Centre study, identified a wide range of offences associated with the sector and emphasised that such crimes are intensified by weak regulation and poor accountability.

Urban studies generally associate motorcycles with quick theft, snatching, extortion and facilitation of violence in congested settings. Rural studies tend to emphasise theft networks, and ambushes on weakly monitored routes. Border studies point more strongly to smuggling, informal crossing and cross-jurisdictional criminal movement. This suggests that manifestations vary according to settlement density, law-enforcement reach, transport corridors and market geography (Opondo & Kiprop, 2018).

However, much of the existing literature remains descriptive and localised. Few studies compare counties systematically within a single analytical design. As a result, there is limited evidence on how manifestations differ across metropolitan, hinterland and border counties in Kenya. This is the first major gap addressed by the present study.

Comparative African scholarship deepens this picture. Scholars of West Africa argue that the manifestation of crime results from interactions between informal mobility and local geography, describing the okada (motorcycle taxi) as a tool of *spatial subversion* (Agbiboa, 2022; Olukoju, 2024). Research shows that in urban centres such as Lagos, manifestations are mainly predatory, including phone snatching and *one-chance* robberies, while in northern Nigeria they are insurrectionary; the use of motorcycles by Boko Haram for *hit-and-run* strikes in the Sambisa forest exemplifies what has been termed *terrain-specific tactical mobility* (National Crime Research Centre, 2025). This literature demonstrates that the same motorcycle platform produces radically different crime manifestations depending on geography, governance and the wider security environment.

Indicators distinguishing Incidental Criminal Use from Organised Criminal Activity. A major weakness in the literature is the tendency to treat all motorcycle-enabled crime as one category. Yet not all offences involving boda-boda transport amount to organised criminal activity. Some are incidental, opportunistic and uncoordinated; others involve planning, continuity, coordination, protection and links to wider illicit networks. Existing empirical discussions suggest several indicators for distinguishing the two.

First, organised activity tends to involve repeated coordination rather than isolated offending. Second, it included role specialization, leadership structures and persistent group involvement. Third, it may display territorial control, protection arrangements, concealment strategies and repeated financial gain patterns. Fourth, organised activity is often linked to collusion with local power structures, corrupt actors, or illicit market systems (Prevention of Organised Crimes Act, 2010; Shelley, 2014).

The existing proposal correctly identifies the conceptual and empirical gap here: there is still no rigorous county-level comparative framework for separating motorcycles as tools of crime from the evolution of structured and coercive criminal groups. The present study therefore goes beyond documenting crime by examining the indicators that mark the threshold between incidental use and organised criminality.

Scholarship from Nigeria outlines empirical signifiers of organised criminal use, including leadership hierarchies within transport associations that coordinate illicit activities, routine use of transport networks for smuggling contraband, and systematic protection mechanisms through which riders pay for *security* and, in return, participate in rackets. Nigerian transport unions have been implicated as logistical enablers for oil-bunkering networks, with documented patterns of coordination and regular meetings resembling organised crime structures (Okoye & Oladipo, 2020).

Empirical research from Tanzania suggests that SACCOs and stage committees, while intended for welfare, can provide the *skeleton* for organised crime: these structures offer a ready-made command-and-control system, and if the stage chairman is co-opted, the entire fleet can become an organised criminal unit (Kibwana & Mnyanyi, 2023). Dar es Salaam's experience with biometric rider registration further demonstrates that technological identification criteria can serve

as a practical instrument for distinguishing compliant operators from criminal misuse of the sector (Kibwana & Mnyanyi, 2023).

Socio-Economic Factors Associated with Boda-Boda-Related Crime. The literature strongly associates insecurity in the boda-boda sector with socio-economic pressures. The sector absorbs large numbers of unemployed or underemployed youth and often operates under precarious income conditions. Riders may work under unstable hiring arrangements, high daily repayment demands, low savings, and uncertain earnings. In such settings, crime may emerge as a survival strategy, supplementary livelihood, or pathway into more organised illicit activity (Opondo & Kiprop, 2018).

Empirical discussions commonly cite poverty, livelihood insecurity, youth unemployment, weak education outcomes, substance abuse, peer influence, and migration-related instability as risk factors. Opondo and Kiprop (2018) found that weak law enforcement, corruption and socio-economic pressure were among the major contributors to boda-boda-related insecurity in Kenya. This provides empirical support for the argument that socio-economic stress matters. Yet the study did not model these factors comparatively across counties or link them specifically to organised criminal evolution.

Even so, the existing literature has two notable limitations. First, many studies mention socio-economic factors descriptively without testing their relationship to crime outcomes. Second, most do not distinguish whether these factors are associated with incidental offending or more organised criminality. The current study addresses this gap by explicitly examining socio-economic variables across counties.

Ugandan studies observe that entry into the boda-boda profession is mainly driven by economic necessity, with financial pressures pushing individuals to seek immediate income sources, a form of what has been termed *survivalist entrepreneurship* (Agaba & Ambe, 2018; Chen, 2012). Survey evidence indicates that over 78 per cent of riders cite economic necessity as their primary motivation for joining the sector (Uganda Bureau of Statistics, 2023), while analyses of transport labour in urban Nigeria show how *debt bondage* and *extortion* can push riders towards organised crime (Agbiboa, 2022).

Youth unemployment is a well-established structural condition across African cities. According to Oucho and Bosco (2020), African youth unemployment rates remain among the highest globally, pushing many young people into informal sectors such as transport, while structural economic marginalisation contributes to susceptibility to criminal co-optation as individuals seek alternative or supplementary income streams. The intersection of political processes and informal transport systems provides further fertile ground for criminal evolution: studies on electoral violence in West and East Africa highlight how informal youth networks are instrumentalised for vote mobilisation, coercion and logistics, and when political elites co-opt transport groups into patronage systems, the informal sector becomes embedded in hybrid political-security economies that reinforce organised crime (Adele & Mensah, 2020).

Institutional and contextual conditions are repeatedly identified as central to the evolution of insecurity in the boda-boda sector. Studies point to weak licensing systems, ineffective regulation, poor rider identification, incomplete enforcement, corruption, collusion, and inconsistent law-enforcement response as key drivers. Where registration is weak and monitoring is inconsistent, anonymity increases and accountability declines. Under such conditions, criminal actors can more easily hide within a broader lawful livelihood system (Opondo & Kiprop, 2018).

The literature also highlights the importance of informal governance structures such as stage committees, associations, SACCOs, local administrators and market leadership. These structures can either constrain criminality through discipline and self-regulation or facilitate it through capture, silence and collusion. In politically sensitive periods, weak governance and overlapping formal and informal authority may also link transport systems to broader political-security dynamics (Abrahamsen & Williams, 2011).

Despite these insights, existing research rarely compares how institutional weakness operates differently across urban, rural and border counties. Nor does it sufficiently explain how governance gaps interact with criminal opportunity, social networks, and corridor structures to facilitate organised criminal evolution. The present study fills this gap by examining institutional and contextual conditions comparatively across selected counties.

Research in Uganda highlights the crucial role of social structures in facilitating market entry, providing mutual aid and addressing systemic issues such as police harassment and inconsistent regulatory enforcement (Mawejje et al., 2016; Oketch, 2018). However, many riders lack formal

business registration, which hampers governments' ability to implement safety and quality control measures effectively; the absence of regulatory support also leaves riders vulnerable to exploitation, fluctuating fuel prices and market competition (Kamara, 2023). These findings reinforce the observation that informal governance structures can either stabilise the sector or, when captured, facilitate its criminal misuse.

Spatial Distribution, Concentration and Hotspot Patterns. Spatiality is one of the most underdeveloped but most important dimensions in the literature. Existing discussions suggest that boda-boda-related crime is strongly shaped by transport geography. In urban areas, hotspots tend to emerge along congested roads, busy market centres, transport terminals, and dense commercial corridors. In rural areas, crimes may cluster along poorly monitored highways, isolated roads, and market linkages. In border areas, hotspots are often associated with formal and informal crossing points, smuggling corridors, and trade nodes (Opondo & Kiprop, 2018).

The literature further suggests that county linkages matter. Criminal flows may move from one county to another through trade routes, market channels, and weak inter-county enforcement coordination. This means that crime should not always be treated as a local isolated event; it may be distributed across transport systems and corridor networks. Yet very few studies apply GIS or other spatial techniques systematically to boda-boda-related crime in Kenya. Most simply refer to "high-risk areas" without rigorous hotspot analysis.

This is a major empirical gap. The present study addresses it by incorporating geo-referenced incidents, transport nodes, border points, density mapping, and hotspot analysis to examine the spatial organisation of crime across counties.

High-accessibility environments such as transport hubs, arterial corridors and market areas are frequently associated with elevated crime risks due to increased pedestrian traffic, anonymity and the temporal concentration of activities (Felson & Boba, 2010; Ceccato & Uittenbogaard, 2014). Empirical studies of metro systems, bus terminals and railway stations across Europe, North America and Asia show that crime hotspots often cluster around nodes of intense movement rather than along entire networks (Newton et al., 2013; Loukaitou-Sideris et al., 2002). This spatial co-location explains why motorcycles are implicated in crime narratives without functioning as causal agents.

The spatial literature further cautions that perceptions of crime and insecurity are socially constructed and frequently diverge from recorded crime patterns, varying across socio-economic groups, gender and spatial context (Skogan, 1990; Farrall et al., 2009). Research consistently shows that fear of crime is often concentrated in highly visible public spaces, including transport corridors, markets and informal nodes, even when actual crime rates are moderate (Jackson & Gray, 2010; Pain, 2000).

2.4 **Synthesis of the Literature**

The reviewed literature demonstrates that the boda-boda sector is a complex social and economic system that can also serve as a platform for insecurity. Existing studies establish that motorcycles are useful tools of crime because of their mobility, speed, affordability, and concealment potential (Mutiso & Behrens, 2011; Opondo & Kiprop, 2018). They also show that boda-boda-related criminality is shaped by socio-economic stress, weak regulation, governance gaps, and transport geography (Opondo & Kiprop, 2018). However, the literature remains fragmented in four important ways.

First, much of it is descriptive and localised rather than comparative. Second, there is no sufficiently clear operational distinction between incidental criminal use and organised criminal activity. Third, socio-economic and institutional drivers are often discussed broadly without being tied to county-specific comparative evidence. Fourth, spatial and corridor-based analysis remains underdeveloped even though the phenomenon is inherently geographical.

These weaknesses make it difficult to assess when and how boda-boda-related insecurity crosses the threshold into national security relevance. They also limit the ability of policymakers to design proportionate interventions that target criminal networks without criminalizing the broader livelihood system.

2.5 **Research Gap**

The literature reviewed reveals both conceptual and empirical gaps. Conceptually, there is insufficient clarity in distinguishing three related but different phenomena: use of motorcycles as tools of crime, evolution of boda-boda groups into structured coercive formations, and the broader emergence of organised criminal systems that threaten national security. Empirically, there is no adequate county-comparative framework for examining how these manifestations vary across urban, rural and border contexts in Kenya.

More specifically, the gaps include limited comparative analysis of manifestations and patterns of boda-boda-related crime across counties, insufficient empirical criteria for separating incidental from organised criminal use, weak testing of socio-economic correlates of crime in the sector, inadequate analysis of institutional and contextual facilitators of organised criminal evolution, and limited spatial analysis of crime concentration, corridor effects, and hotspot patterns. This study fills these gaps by comparatively examining the evolution of security threats within the boda-boda informal transport sector across selected Kenyan counties, focusing on forms, determinants, institutional drivers, and spatial patterns.

2.6 **Chapter Summary**

This chapter has reviewed the literature relevant to the boda-boda informal transport sector, national security, organised crime, and security threat evolution. The review has shown that the sector is simultaneously a livelihood system and a potential arena for criminal exploitation. Conceptually, the chapter has clarified the meaning of boda-boda informality, national security, organised crime, and threat evolution. Theoretically, it has shown the usefulness of routine activity, social disorganisation, and organised crime perspectives. Empirically, it has demonstrated that current literature documents important manifestations of crime and its drivers, but remains weak in county-comparative analysis, differentiation of organised criminality, and spatial examination. The chapter therefore establishes the need for the present study.

2.7 **Conceptual Framework**

The conceptual framework for this study assumes that the evolution of security threats within the boda-boda informal transport sector is influenced by a combination of crime manifestations, organised criminal indicators, socio-economic factors, institutional and contextual conditions, and spatial dynamics. The study proceeds from the view that the boda-boda sector is primarily a legitimate socio-economic transport system, but one that may be infiltrated, exploited, or gradually shaped by criminal actors under certain enabling conditions.

The dependent variable in this study is the evolution of security threats within the boda-boda informal transport sector. This refers to the process through which ordinary or incidental criminal misuse of motorcycles develops into more recurrent, coordinated, disruptive, and in some cases organised forms of criminal activity that may threaten public order, economic stability, and

national security. In this study, the dependent variable is reflected in the nature, intensity, continuity, and security significance of boda-boda-related crime across the selected counties.

The first set of independent variables comprises the manifestations and patterns of boda-boda-related crime. These include robbery, theft, assault, extortion, smuggling, kidnapping, facilitation of illicit trade, and other forms of insecurity associated with motorcycle transport. The study assumes that where these manifestations become frequent, patterned and geographically concentrated, they may signal a transition from isolated criminal acts to more systematized and security-relevant threats.

The second independent variable is the indicators distinguishing incidental criminal use from organised criminal activity. These indicators include repeated coordination, continuity over time, leadership or role differentiation, territorial influence, concealment mechanisms, protection arrangements, collusion, and links to broader illicit markets or criminal networks. The study assumes that the more these indicators are present, the greater the likelihood that the boda-boda sector is being used not merely opportunistically, but as part of a structured criminal system.

The third set of independent variables consists of socio-economic factors associated with boda-boda-related crime. These include youth unemployment, poverty, livelihood insecurity, debt pressure, limited economic alternatives, low education levels, substance abuse and peer influence. The study assumes that socio-economic vulnerability may increase the likelihood of criminal recruitment, collusion, or tolerance of unlawful activity within the boda-boda sector, especially where the sector functions as a survival economy for many young people.

The fourth independent variable relates to institutional and contextual conditions that facilitate the evolution of organised criminal activity. These include weak regulation, poor rider registration and identification systems, corruption, weak law-enforcement presence, limited inter-agency coordination, political interference, ineffective stage or SACCO governance, and weak local accountability structures. The study assumes that where governance is weak or inconsistent, criminal actors are more likely to exploit the sector, avoid detection, and operate with relative impunity.

The fifth independent variable is spatial and geographical dynamics. These include urban congestion, isolated rural corridors, border proximity, transport nodes, market centres, informal

crossing routes, and crime hotspot concentration. The study assumes that the geographical organisation of mobility shapes criminal opportunity and affects how boda-boda-related insecurity emerges, spreads, and concentrates across counties. In this sense, place and movement are not merely background conditions but active elements in the evolution of security threats.

The study also recognizes the role of intervening variables, which may strengthen or weaken the relationship between the independent variables and the dependent variable. These include county context, law-enforcement capacity, community oversight, effectiveness of stage leadership and SACCO regulation, infrastructure quality, technological traceability systems, and the broader political environment. These intervening factors are important because the same crime patterns or socio-economic pressures may produce different security outcomes depending on the strength of local governance and the specific context of each county.

The conceptual logic of the study is therefore that the evolution of security threats in the boda-boda sector does not arise from a single cause. Rather, it emerges from the interaction of criminal manifestations, organised criminal indicators, socio-economic pressures, institutional weaknesses, and spatial opportunity structures. Where these factors converge, the likelihood of organised criminal evolution and national security relevance increases. Conversely, where regulation, community oversight, and institutional accountability are strong, the criminal misuse of the sector may remain limited, fragmented, or easier to contain.

Figure 2.1 presents the conceptual framework guiding the study and shows how the independent, intervening, and dependent variables are related.

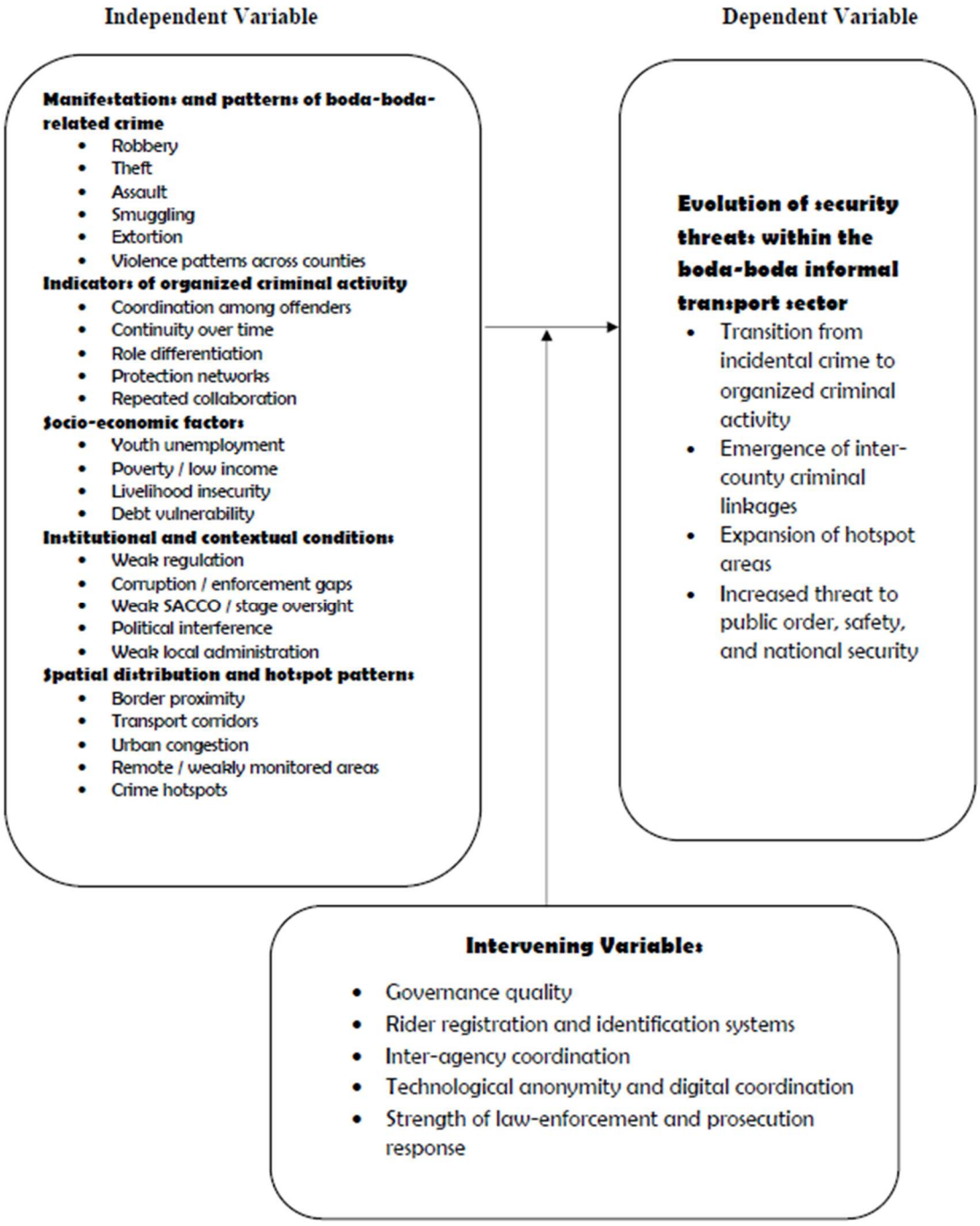


Figure 2.1: Conceptual framework:
illustrating the relationship between crime manifestations, indicators of organized criminal activity, socio-economic factors, institutional and contextual conditions, and spatial dynamics in explaining the evolution of security threats within the boda-boda informal transport sector in selected counties in Kenya.

CHAPTER THREE
RESEARCH METHODOLOGY

3.0 **Introduction**

This chapter presents the methodology that guides the study on boda-boda crime and its evolution into organised criminal activity in selected counties in Kenya. It outlines the research design, study sites, target population, sample size and sampling procedures, data collection methods and instruments, pilot study, validity and reliability of instruments, data analysis procedures, and ethical considerations. The chapter provides the methodological framework through which the study generated and analysed quantitative, qualitative, and spatial data to address the research objectives comprehensively. It begins with the research design, followed by the study sites and target population, and then discusses sampling procedures, data collection methods, instrument testing, data analysis, ethical considerations, and chapter summary.

3.1 **Research Design**

This study adopted a mixed-methods comparative research design. The mixed-methods design is suitable because the study seeks to examine boda-boda crime as both a measurable and a socially embedded phenomenon. Quantitative methods made it possible to determine the prevalence, patterns, and correlates of boda-boda-related crime across the selected counties, while qualitative methods helped explain the meanings, processes, perceptions, and contextual conditions associated with the emergence and evolution of such crime. In addition, GIS-based spatial analysis was incorporated to capture the geographical distribution and concentration of crime incidents, boda-boda operational points, and hotspot areas. Mixed-methods designs are commonly used where researchers need complementary quantitative and qualitative evidence collected and interpreted together. (Creswell & Plano Clark, 2018).

The comparative dimension of the design is equally important because the study is conducted across seven counties that represent different contextual settings, namely urban/metropolitan, rural/hinterland, and transnational/border environments. These settings differ in population density, economic activity, transport infrastructure, mobility patterns, law-enforcement reach, and exposure to security threats. A comparative design is therefore appropriate because it allows the study to examine how boda-boda crime manifests across different local contexts and whether the factors that enable its evolution into organised criminal activity vary across settings. Comparative

and context-sensitive designs are consistent with standard social science methodology where variation across sites is central to explanation. (Kothari, 2004; Mugenda & Mugenda, 2003).

The study employed a convergent mixed-methods logic, in which quantitative and qualitative data were collected within the same broad phase of the research process, analysed separately, and then integrated during interpretation. The quantitative strand focused primarily on boda-boda riders and produced data for statistical analysis. The qualitative strand drew on key informants, focus group participants, documents, and observation to explain institutional, social, and operational realities underlying the quantitative patterns. The GIS strand complemented both by adding a geographical dimension to the analysis of crime, mobility, and transport environments. This design supports triangulation and meta-inference across methods. (Creswell & Plano Clark, 2018).

The research design was also cross-sectional in nature, since data were collected from respondents and study sites at a specific period rather than through long-term follow-up. This is appropriate because the study seeks to examine current manifestations, patterns, and perceptions of boda-boda crime and organised criminal evolution across the selected counties. Although the study is cross-sectional, respondents were still asked, where relevant, to reflect on changes and trends over time. Cross-sectional designs are widely used where the objective is to describe or explain a phenomenon as it exists at a particular point in time. (Kothari, 2004).

Table 3.1: Summary of Research Design per Objective

Study objective	Type of data required	Respondents / sources of data	Data collection method / instrument	Data analysis technique	Output
i. Analyse the manifestations and patterns of boda-boda-related crime across the selected counties.	Quantitative and qualitative data	Boda-boda riders, stage leaders, victims/survivors, law-enforcement personnel, community leaders	Questionnaire, key informant interviews, focus group discussions, document review	Descriptive statistics, comparative analysis, thematic analysis	Frequency tables, percentages, charts, pattern descriptions, thematic narratives
ii. Examine the conceptual and empirical indicators that distinguish incidental criminal use of boda-boda transport from organised criminal activity.	Qualitative, quantitative, and contextual data	Boda-boda riders, SACCO officials, law-enforcement personnel, NGAO officers, community leaders, document sources	Questionnaire, key informant interviews, focus group discussions, document review	Thematic analysis, cross-tabulation, typology development, comparative analysis	Conceptual framework, classification indicators, analytical typologies, thematic explanations
iii. Evaluate the socio-economic factors associated with boda-boda-related crime in the selected counties.	Quantitative and qualitative data	Boda-boda riders, SACCO officials, county transport officers, community leaders, law-enforcement personnel	Questionnaire, key informant interviews, focus group discussions	Cross-tabulation, regression analysis, descriptive statistics, thematic analysis	Statistical tables, inferential results, socio-economic risk profiles, thematic interpretations
iv. Assess the institutional and contextual conditions that facilitate the evolution of organised criminal activity	Qualitative, quantitative, and contextual data	Boda-boda riders, law-enforcement personnel, NGAO officers,	Questionnaire, key informant interviews, focus group discussions, document review	Thematic analysis, triangulation, comparative	Contextual and institutional analysis, thematic narratives, integrated

within the boda-boda sector.		county transport officers, SACCO officials, community leaders, county records		analysis, integrated mixed-methods interpretation	discussion of findings, policy implications
v. Examine the spatial distribution, concentration, and hotspot patterns of boda-boda-related crime across the selected counties.	Spatial and quantitative data	GPS coordinates of boda-boda stages, crime locations, transport nodes, markets, border points; secondary spatial datasets	GIS spatial data collection sheet, GPS tools, document review, spatial layers/shapefiles	GIS mapping, Kernel Density Estimation, point pattern analysis, hotspot analysis, buffer and overlay analysis	Thematic maps, hotspot maps, density maps, spatial distribution models, spatial illustrations

3.2 **Research Sites**

The study was conducted in six purposively sampled counties in Kenya: Mombasa, Machakos, Nyeri, Bomet, Busia, Kirinyaga, and Marsabit. The purposive sampling of this counties reflected diverse political, economic, security, and geographical contexts while also ensuring representation from the country's former provinces. The selection follows a clustering approach in which two counties are drawn from each of three location categories: urban/metropolitan, rural/hinterland, and transnational/border. This clustering is intended to enhance diversity in the study sites and provide a stronger basis for examining boda-boda crime and its organised criminal dimensions across different settings. Purposive site selection is appropriate where the researcher intentionally chooses information-rich cases that fit the objectives of the study (Kothari, 2004; Mugenda & Mugenda, 2003).

The purposive selection of the counties is intended to ensure variation in key characteristics relevant to the study, including levels of urbanisation, poverty, transport infrastructure, mobility patterns, and exposure to security challenges. Such variation is important because boda-boda crime

does not occur in a uniform environment; rather, it is shaped by local socio-economic conditions, law-enforcement capacity, proximity to border areas, and the nature of transport systems. By selecting counties that differ along these dimensions, the study was better positioned to identify both common and context-specific manifestations of boda-boda crime and to assess the conditions under which organised criminal evolution emerges. The spatial distribution of the selected counties within Kenya is illustrated in Figure 3.1.

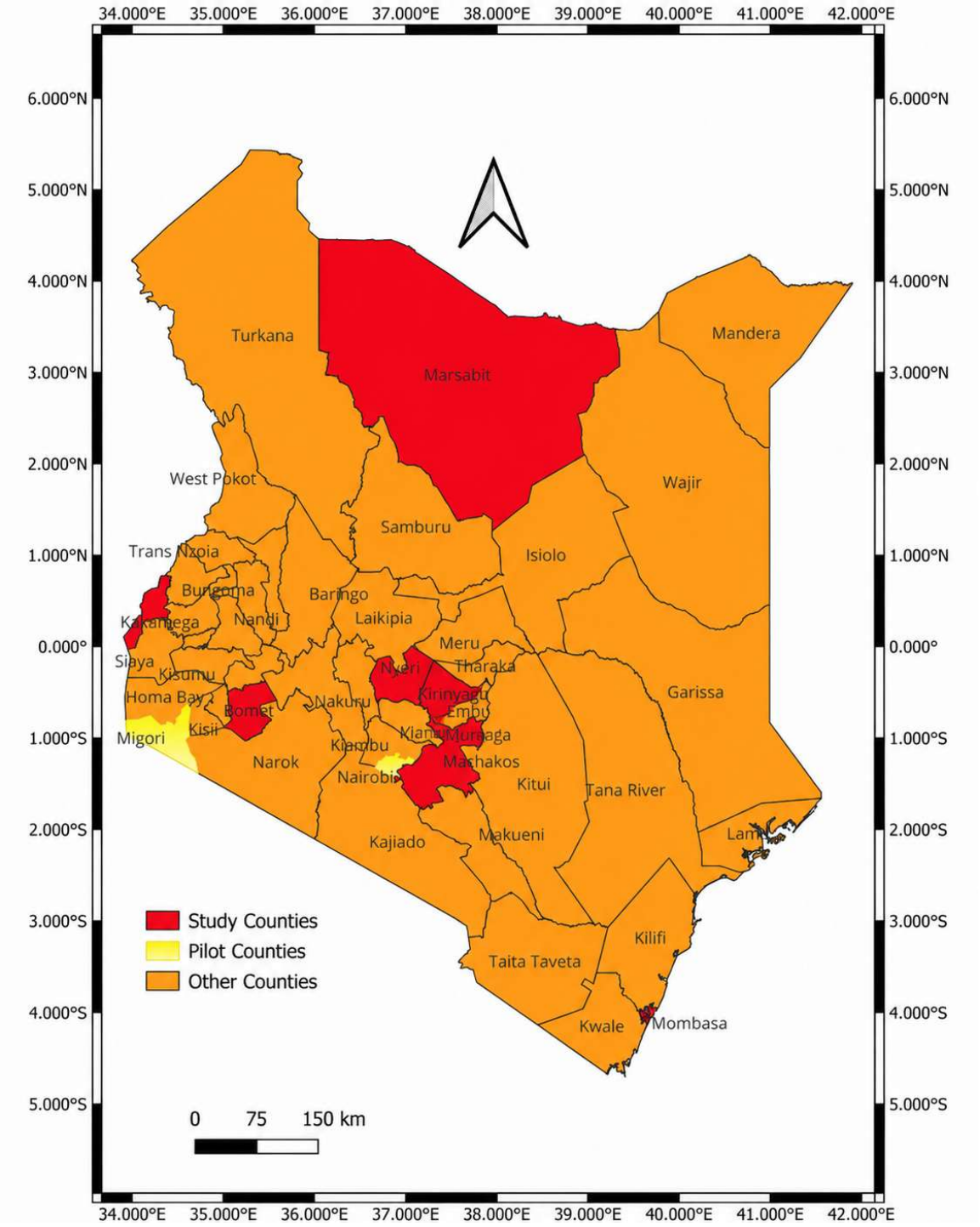


Figure 3.1: Location of the original protocol study counties and two pilot counties in Kenya:
Source: Compiled by the researcher from county boundary data and base map layers.

Table 3.2**:** Distribution of Original Protocol Counties by Location Cluster and Former Province

Ser.	County	Location Cluster	Former Province
1	Mombasa	Urban/Metropolitan	Coast
2	Machakos	Urban/Metropolitan	Eastern
3	Nyeri	Rural/Hinterland	Central
4	Kirinyaga	Rural/Hinterland	Central
4	Bomet	Rural/Hinterland	Rift Valley
5	Busia	Transnational/Border	Western
6	Marsabit	Transnational/Border	Northeastern

Mombasa County is included as an urban and metropolitan setting characterised by dense settlement, major commercial activity, and a complex transport environment. County planning documents describe Mombasa as a major commercial and transport hub, making it a suitable site for examining how boda-boda operations intersect with urban crime patterns, organised networks, and law-enforcement challenges. The geographical and administrative setting of Mombasa County is presented in Figure 3.2.

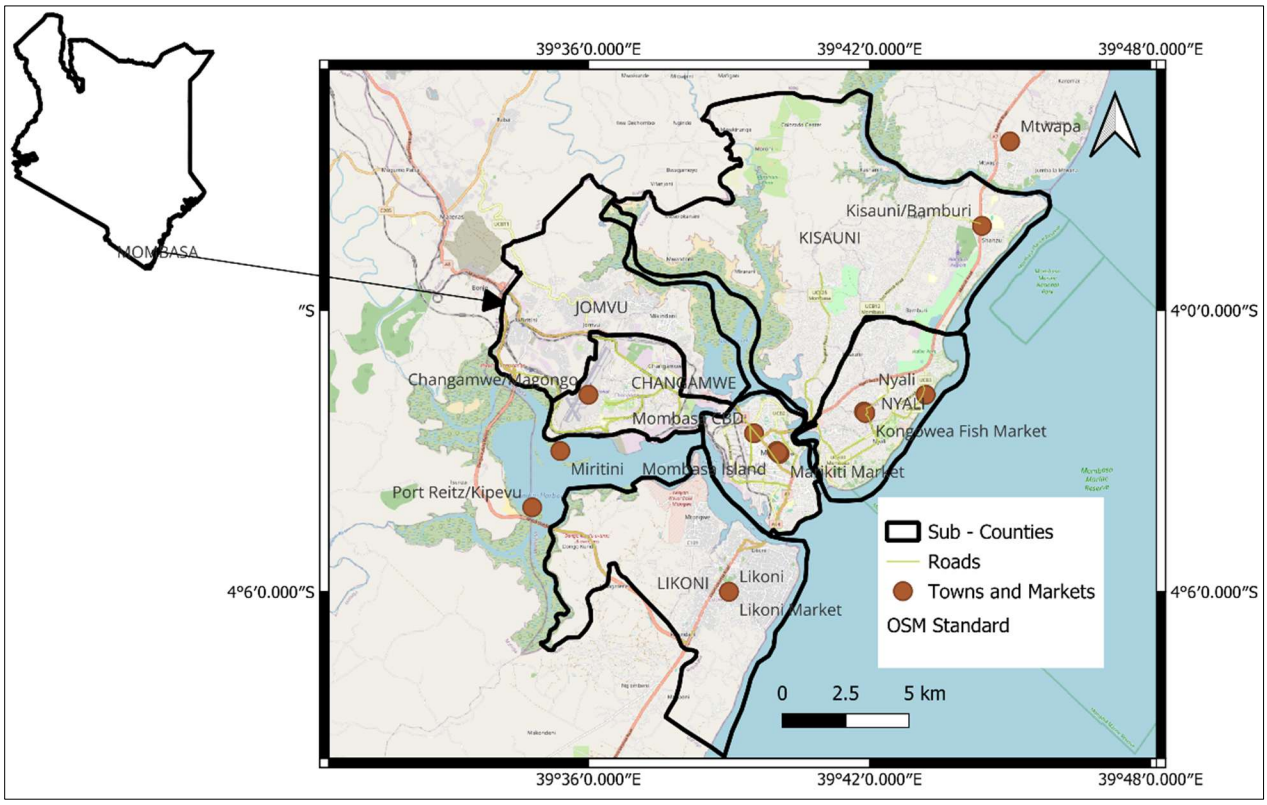


Figure 3.2: Map of Mombasa County

Machakos County also represents the urban/metropolitan cluster and provides an important contrast to Mombasa. County transport and mobility documents show a dense urban core, expanding peri-urban settlements, and significant transport activity, making it suitable for examining boda-boda crime in a different urban context shaped by distinct economic and social dynamics. The locational and transport context of Machakos County is shown in Figure 3.3.

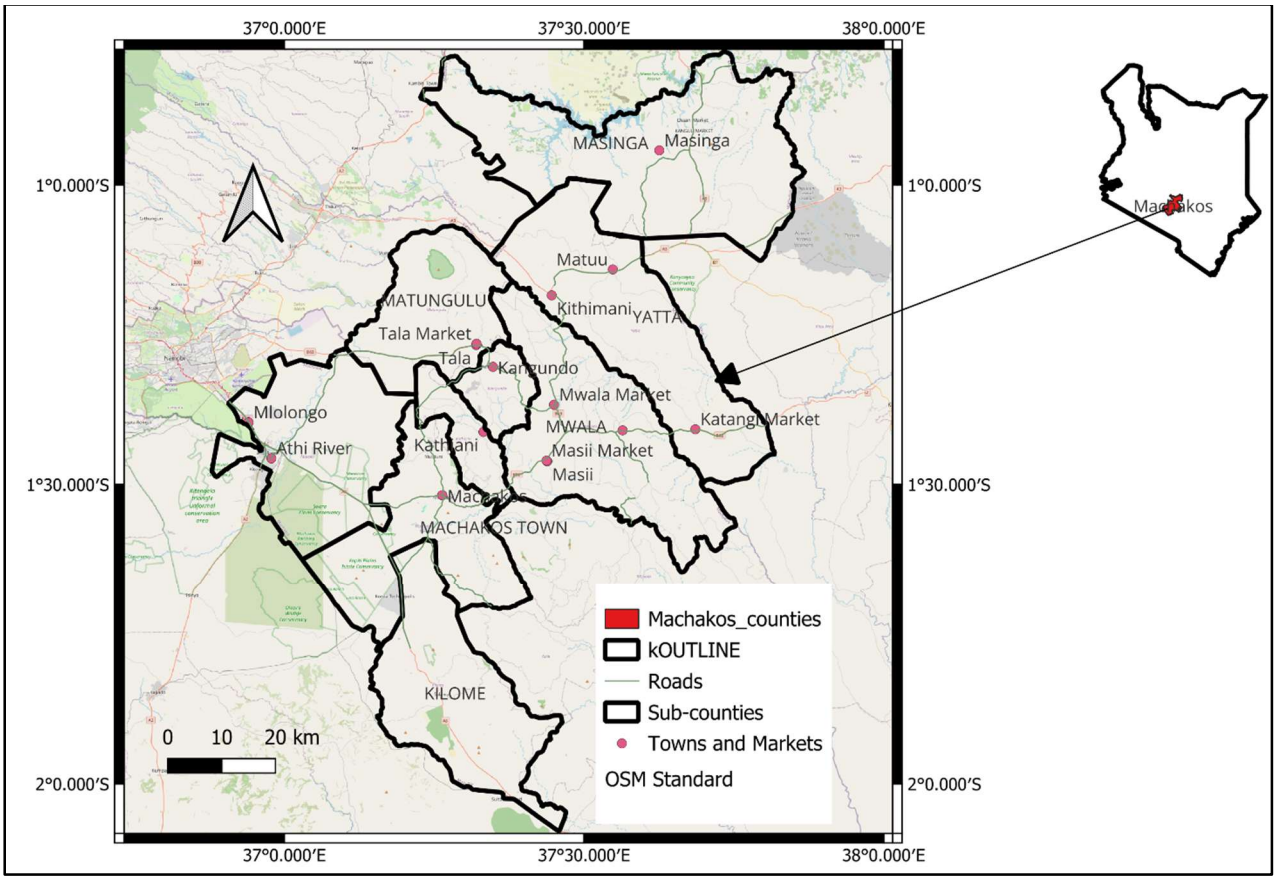


Figure 3.3: Map of Machakos County showing sub-counties

Nyeri County represents the rural/hinterland category and provides a setting characterised by agricultural activity, dispersed settlements, and smaller transport nodes than the major metropolitan counties. County spatial and development plans make it suitable for examining boda-boda crime in a setting where operations are more embedded in local community structures and everyday rural mobility. The geographical setting of Nyeri County is illustrated in Figure 3.4.

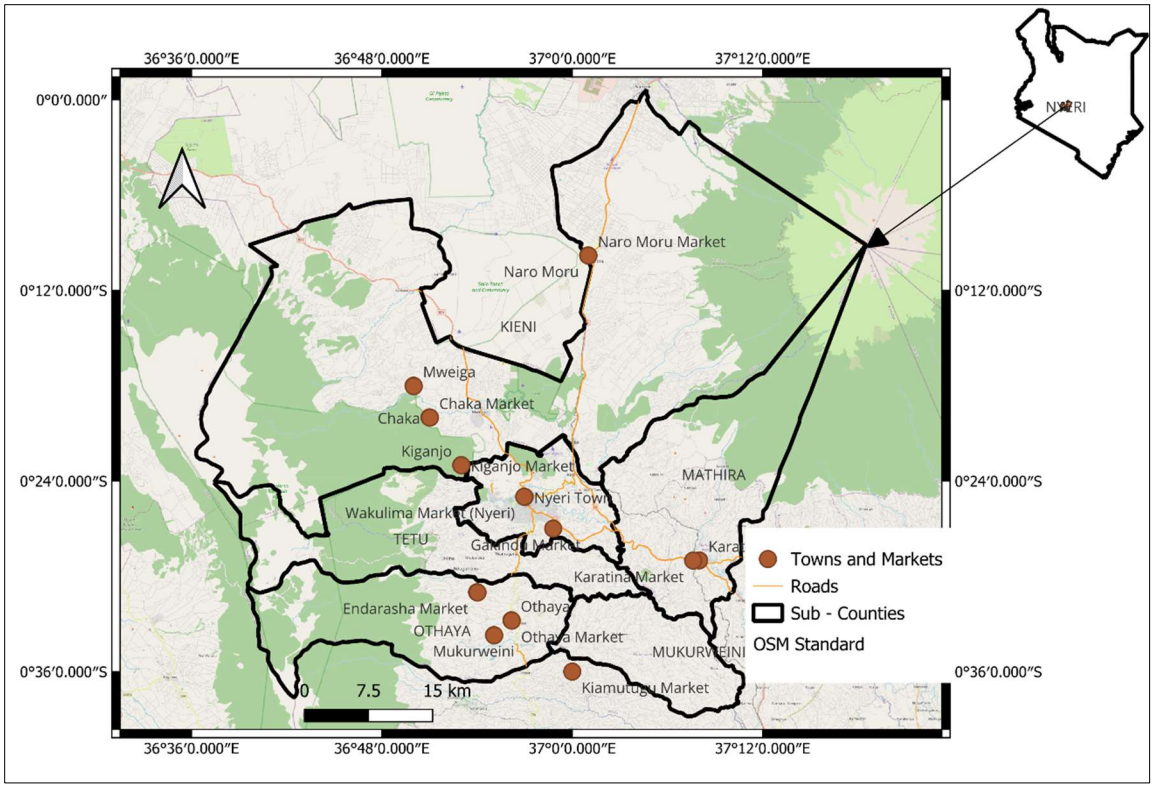


Figure 3.4: Map of Nyeri County showing sub-counties .

Bomet County is the second county in the rural/hinterland cluster. County spatial planning documents emphasise its agro-based economy, trading centres, and rural road networks, making it appropriate for examining boda-boda operations in an agriculturally oriented and predominantly rural setting. The spatial context of Bomet County is shown in Figure 3.5.

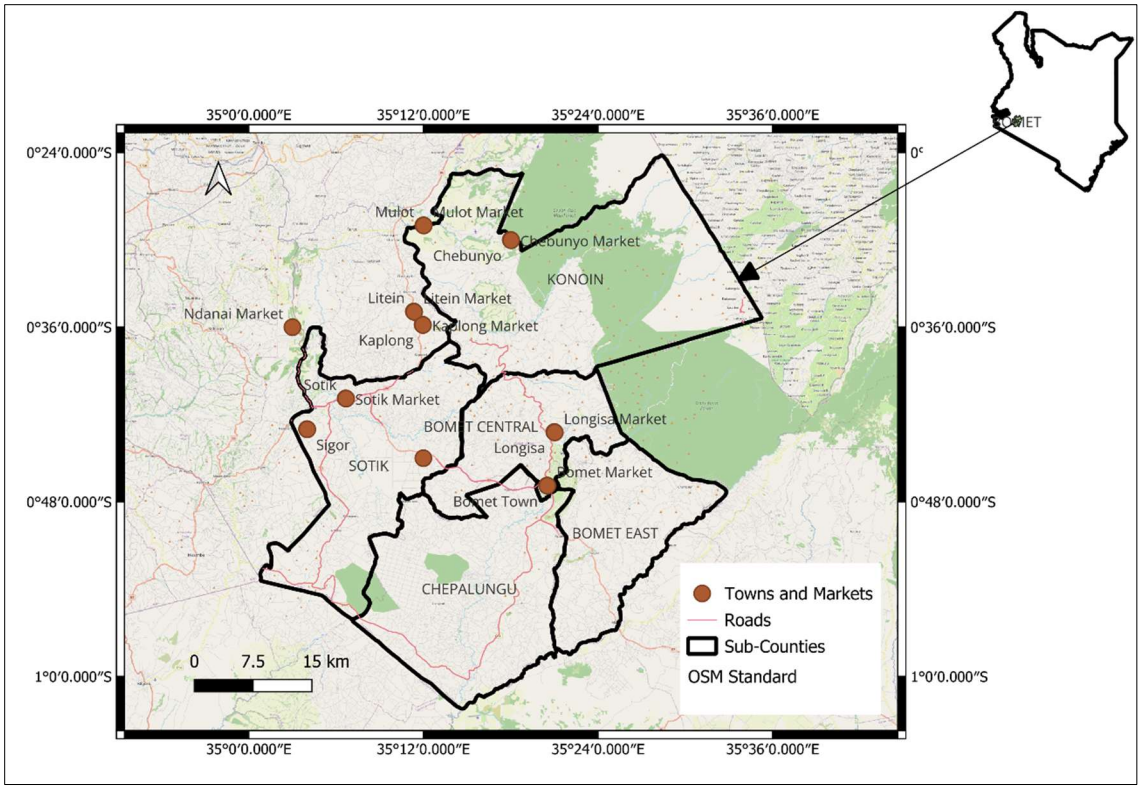


Figure 3.5: Map of Bomet County showing sub-counties

Busia County is included under the transnational/border cluster because of its strategic location along the Kenya–Uganda border. County planning documents repeatedly emphasise cross-border trade, mobility, and strategic border position, making it highly relevant for studying the relationship between boda-boda operations, informal mobility, and transnational criminal opportunity structures. The border and transport setting of Busia County is presented in Figure 3.6.

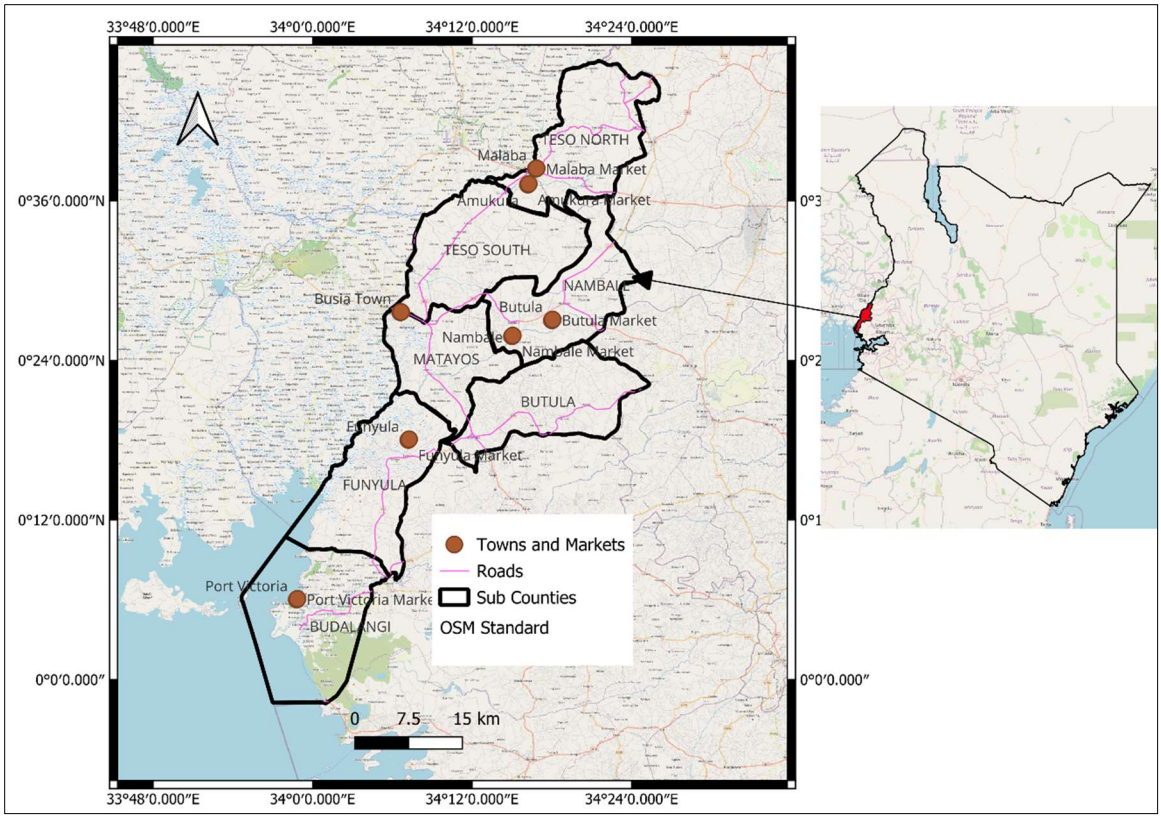


Figure 3.6: Map of Busia County showing sub-

Marsabit County is also classified under the transnational/border cluster, but it presents a very different setting from Busia. County planning documents describe it as geographically vast, sparsely populated, and constrained by large distances and uneven connectivity. This makes it a useful site for examining boda-boda operations in frontier-like environments where remoteness, weak infrastructure, and uneven state presence may shape crime and enforcement in distinctive ways. The geographical and transport context of Marsabit County is shown in Figure 3.7.

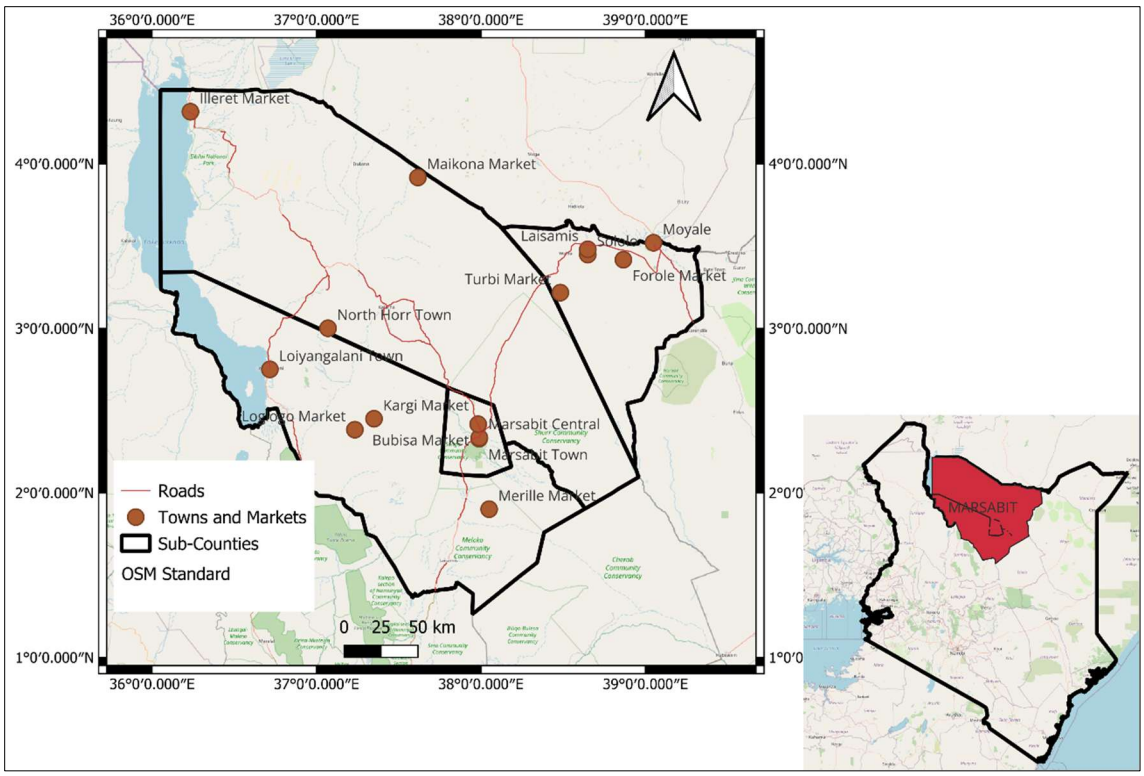


Figure 3.7: Map of Marsabit County showing sub-counties

Kirinyaga County is included as one of the seven study counties because it provides an important rural–peri-urban and agricultural-commercial context for examining boda-boda transport and security dynamics in Kenya. The county is characterised by a dense network of market centres, small towns, rural settlements, agricultural production zones, and road corridors that create strong demand for motorcycle transport. Boda-boda services in Kirinyaga support everyday mobility by linking households to markets, farms, schools, health facilities, shopping centres, administrative centres and public transport stages. In this sense, the sector plays a major livelihood and accessibility role, especially where formal public transport is limited or less flexible.

The inclusion of Kirinyaga strengthens the comparative design of the study because it introduces a county context that differs from the major urban/metropolitan counties, the frontier/border counties, and the more established rural/hinterland sites. Unlike Mombasa, where boda-boda operations are strongly shaped by urban density, night-life activity, and port-city mobility, Kirinyaga reflects a mixed rural–market economy in which boda-boda movement is closely tied to agricultural production, local trade, market days, shopping centres and inter-town connectivity.

Its main activity nodes, including Kerugoya, Kutus, Wang'uru, Kagio, Kianyaga, Mwea and Sagana, provide useful sites for examining how boda-boda operations concentrate around roads, markets, shopping centres, and transport nodes.

From a security perspective, Kirinyaga is important because rural and peri-urban boda-boda systems may generate different forms of risk from those found in urban or border counties. Crime and insecurity in such settings may be associated with motorcycle theft, robbery, passenger victimisation, movement of stolen goods, weak rider traceability, informal stage control, and opportunistic offending along less monitored routes. The county therefore helps the study examine whether boda-boda-related crime is primarily individual and opportunistic, irregularly group-based, or showing early signs of organised criminal activity. In the findings, Kirinyaga presents a mixed pattern, with evidence of repeated crimes and some coordination, but without the strongest indicators of fully established organised criminal structures. This makes it analytically useful for understanding transitional or semi-organised forms of boda-boda-related insecurity.

Kirinyaga is also relevant to the spatial objective of the study. The county's boda-boda nodes are expected to cluster around towns, markets, shopping centres, major roads, and rural service centres. Figure 3.9 therefore illustrates the spatial distribution of boda-boda nodes, markets, shopping centres, towns, roads, and sub-county boundaries in Kirinyaga. This spatial pattern helps show how motorcycle mobility follows local economic geography. Boda-boda activity is not randomly distributed; it is concentrated where people trade, travel, access services, and connect to wider transport routes. Such spatial concentration is important because it can reveal both legitimate transport demand and possible crime-risk locations.

Overall, Kirinyaga enhances the study by broadening the comparative county framework. It allows the research to capture boda-boda security dynamics in a Central Kenya rural–peri-urban economy where transport demand is shaped by agriculture, trade, small towns and market connectivity. Its inclusion helps demonstrate that boda-boda-related insecurity is not confined to large cities or border counties, but may also emerge in agriculturally productive counties where mobility, informal regulation, livelihood pressure, and spatial opportunity interact.

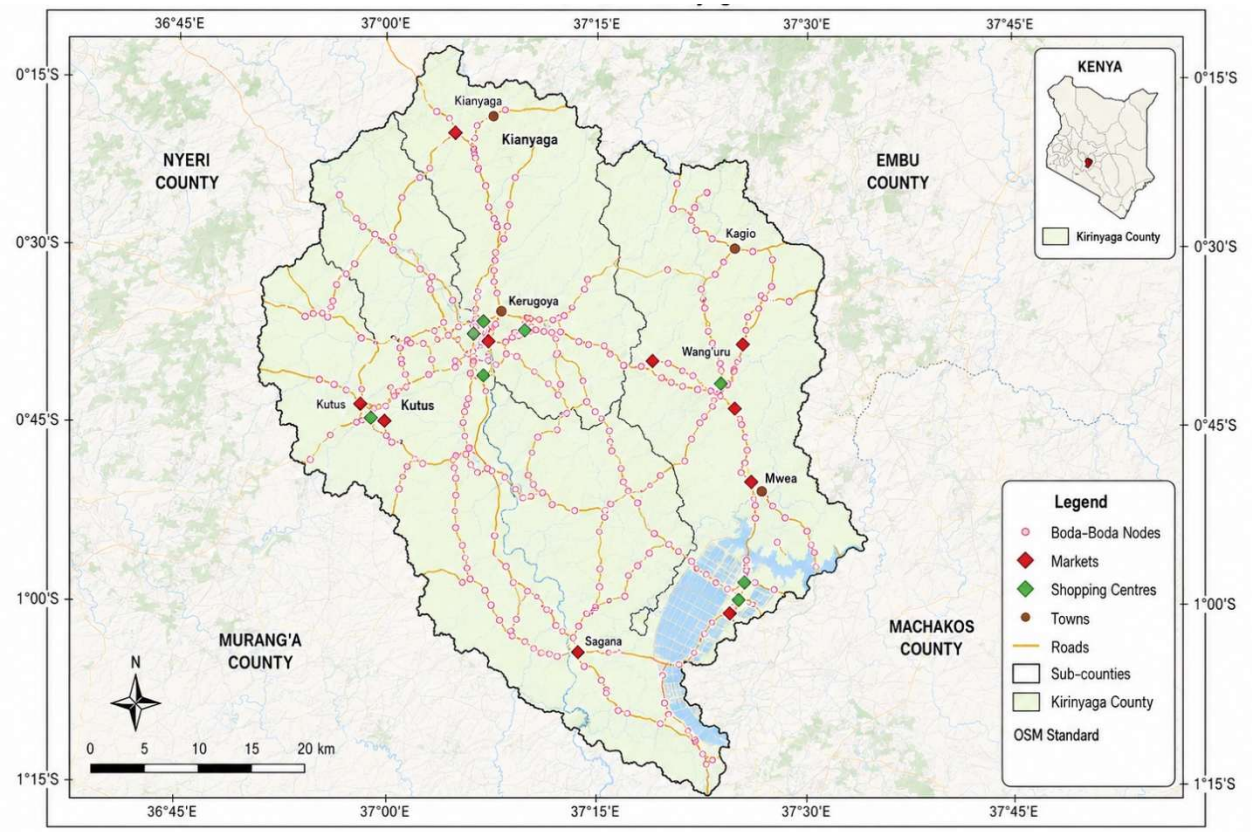


Figure 3.8: Spatial distribution of boda-boda nodes and sub-counties in Kirinyaga

Taken together, these seven protocol counties provide a suitable and balanced set of research sites. The final analysis is harmonised with the seven-county dataset described in Chapter Four, which includes Kirinyaga as an additional analytical county. They capture variation across urban, rural, and border contexts and allow the researcher to examine boda-boda crime in settings that differ in terms of population density, economic structure, transport infrastructure, and exposure to security risks. This diversity strengthens the study by making it possible to compare manifestations of boda-boda crime across counties, distinguish between incidental and organised criminal use, and identify the contextual conditions that enable organised criminal evolution within the boda-boda sector in Kenya.

Nairobi County is a suitable pilot study area for boda-boda transport because it presents the full range of conditions that shape motorcycle taxi use in rapidly growing African cities. As Kenya's capital and major economic centre, Nairobi has a large and diverse population, intense daily movement of people and goods, and persistent pressure on its transport system. These features create strong demand for flexible, affordable, and fast mobility options, especially where

conventional public transport does not fully meet local needs. In this context, boda bodas have become an important part of the urban transport network.

One of the main reasons Nairobi is ideal for such a study is the role boda bodas play in solving first- and last-mile transport problems. Many residents depend on them to connect homes, workplaces, markets, shopping centres, and bus stages. In areas where roads are narrow, poorly connected, or difficult to access by larger vehicles, boda bodas provide a practical alternative. Their ability to move quickly through congested roads also makes them especially useful in Nairobi, where traffic delays are a daily challenge in major commercial and residential areas.

Nairobi County also offers a wide range of spatial and socioeconomic environments within a single administrative unit, making it valuable for comparative analysis. The county includes dense commercial areas, middle-income estates, informal settlements, industrial zones, and peri-urban fringes. This diversity allows a pilot study to capture variations in boda-boda demand, route behaviour, service patterns, and user dependence across different urban settings. A study conducted in Nairobi can therefore produce findings that reflect multiple realities rather than a single, uniform transport environment.

In addition, boda bodas are closely tied to livelihoods and the informal economy in Nairobi. For many young people, the sector provides direct employment and a relatively accessible source of income. At the same time, riders support trade and service delivery by improving access to markets, shops, residential neighbourhoods, and transit points. This makes boda-boda transport not only a mobility issue but also an economic one. Studying Nairobi helps reveal how transport systems support everyday survival, local commerce, and urban productivity.

The county is also important as a pilot area because it clearly shows the challenges associated with boda-boda operations. These include road safety concerns, weak compliance with traffic rules, inconsistent helmet use, accidents, and conflicts with other road users. Because these issues are visible and significant in Nairobi, the county provides a realistic setting for testing interventions related to safety, regulation, infrastructure planning, and rider management. Lessons drawn from such a setting are likely to be practical and policy relevant.

Furthermore, Nairobi is well suited for spatial analysis because of the availability of mapped transport features and activity nodes such as roads, markets, shopping centres, and settlements. As

shown in Figure 3.9, the spatial distribution of boda-boda nodes in relation to markets, shopping centres, towns, roads, and sub-county boundaries in Nairobi County indicates that motorcycle taxi activity is strongly connected to areas of intense social and economic interaction. The concentration of these services near commercial centres and along major roads highlights their role in improving accessibility, supporting short-distance movement, and linking residents to key activity areas within the county. This makes Nairobi especially appropriate for GIS-based analysis of connectivity, clustering, and service coverage.

Overall, Nairobi County is an appropriate pilot study area for boda-boda research because it combines high transport demand, varied urban landscapes, strong dependence on informal mobility, and clearly observable operational challenges. Its complexity makes it possible to study both the benefits and problems of boda-boda transport in one setting. As a result, findings from Nairobi can provide a strong foundation for planning, policy development, and future studies in other counties and cities facing similar urban transport conditions.

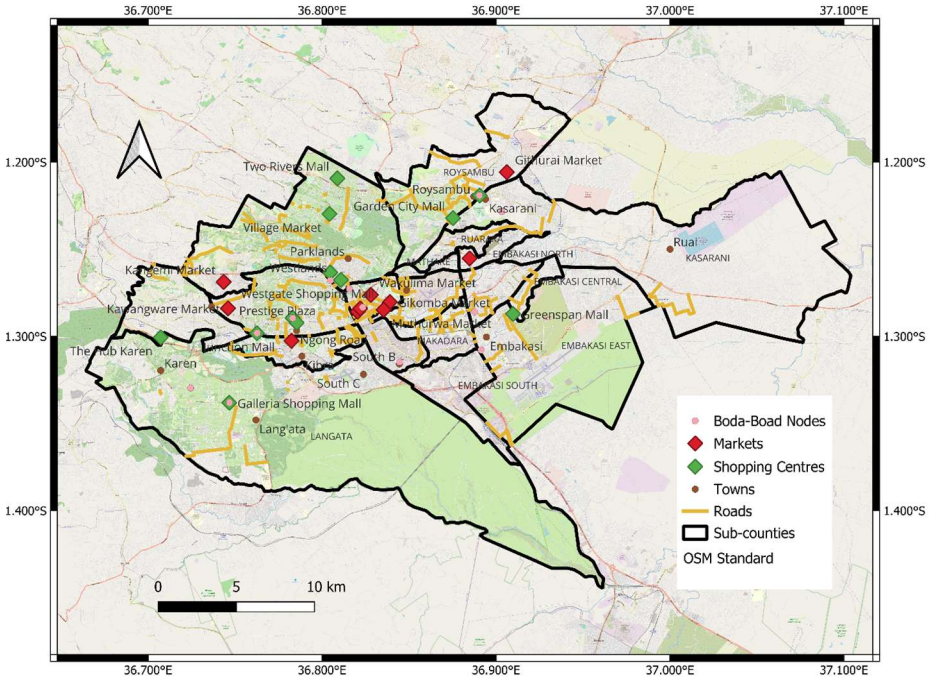


Figure 3.9: Spatial distribution of boda-boda nodes and sub-county boundaries in Nairobi County.

Migori County was a suitable pilot study area for boda-boda transport due to its predominantly rural, with an international border and peri-urban characteristics, which present a different but equally important mobility context compared to major urban centres. Located in southwestern

Kenya and bordering Lake Victoria, Migori has dispersed settlements, agricultural-based livelihoods, and limited formal public transport infrastructure. These conditions create a strong reliance on boda-bodas as a primary means of transport for both people and goods, especially in areas where road access are limited or public transport services are infrequent.

One of the key reasons Migori is ideal for such a study is the critical role boda-bodas play in providing basic transport connectivity. In many parts of the county, residents depend on motorcycle taxis to access markets, health facilities, schools and administrative centres. The relatively low density of transport networks and longer distances between settlements make boda-bodas an essential mode for bridging mobility gaps. Their ability to operate on both paved and unpaved roads further enhances their importance in rural accessibility.

Migori County also offers a diverse spatial structure that supports comparative analysis within a rural context. It includes small urban centres such as Migori town, Rongo, Awendo, Kehancha and Isebania, as well as extensive rural hinterlands. This allows a pilot study to examine how boda-boda usage varies between town centres and surrounding rural areas. For instance, demand patterns, trip purposes and operational challenges may differ significantly between densely populated market centres and sparsely populated villages.

In addition, boda-bodas are closely linked to the local economy in Migori. The county's economy is largely driven by agriculture, small-scale trade, and cross-border activities into Tanzania. Boda-bodas facilitate the movement of farm produce to markets, support small businesses, and enhance access to trading centres. They also provide employment opportunities for many young people, making them a key component of both mobility and livelihoods in the region.

Migori was also an important pilot area because it highlighted unique challenges associated with rural boda-boda operations. These include poor road conditions, especially during rainy seasons, limited enforcement of traffic regulations, low usage of protective gear and safety risks on narrow or unmaintained roads. Additionally, longer travel distances and lower passenger volumes in rural areas affected income stability for riders. Studying these challenges in Migori provides valuable insights into how interventions can be tailored to non-urban settings.

Furthermore, Migori County was well suited for spatial and network analysis due to the clear relationship between transport routes and activity centres. As illustrated in Figure 3.9, the spatial

distribution of boda-boda nodes in relation to roads, markets, shopping centres, towns and county boundaries in Migori County revealed that motorcycle taxi activity is strongly concentrated around market centres and along key road corridors. These nodes act as focal points of mobility, linking rural populations to economic and social services. The road network, although less dense than in urban areas, plays a crucial role in shaping movement patterns and accessibility.

Overall, Migori County was an appropriate pilot study area for boda-boda research because it represented a rural mobility system where motorcycle taxis are not just complementary but essential. Its combination of dispersed settlements, economic reliance on agriculture and trade, limited transport alternatives, and distinct operational challenges provides a valuable contrast to urban case studies like Nairobi. As a result, findings from Migori can inform policies and interventions that address the needs of rural and peri-urban populations, contributing to more inclusive and context-sensitive transport planning.

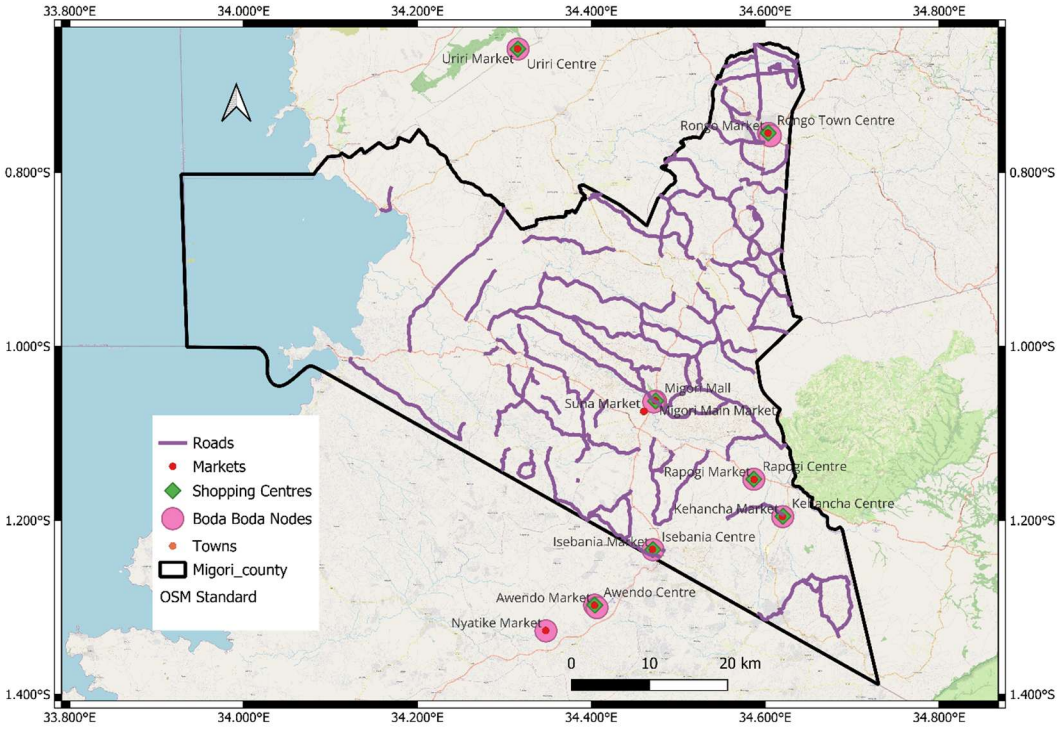


Figure 3.10: Spatial distribution of boda-boda nodes, markets, shopping centres, towns, roads, and county boundary in Migori County.

3.3 **Target Population**

The target population for the original field protocol comprised stakeholders who were directly or indirectly involved in the boda-boda transport ecosystem within the six protocol counties. The target population was defined broadly because boda-boda-related crime and its evolution into organised criminal activity are not confined to riders alone but involve a wider network of actors operating within transport, governance, security, and community systems. Across the six counties, the target population included boda-boda riders, stage and market leaders, boda-boda SACCO or association officials, county transport and licensing officers, National Government Administrative Officers (NGAO), law-enforcement and prosecution officers, security and intelligence-related actors, community leaders, civil society and non-governmental organisation representatives, and where ethically appropriate, victims or survivors of boda-boda-related crime.

Because the study covered an informal and partly fluid sector, the figures provided are approximate and are intended for research planning and sampling purposes. The estimates may be refined at field-entry stage through county records, SACCO listings, stage registers, and local stakeholder mapping.

Table 3.3: Approximate Target Population by Category and County

Category	**Mombasa**	**Machakos**	**Nyeri**	**Bomet**	**Busia**	**Marsabit**	**Kirinyaga**	**Approximate Total**
Boda-boda riders	9,200	8,800	6,200	7,000	7,500	4,500	6,500	49,700
Stage / market leaders	180	170	110	130	100	70	115	875
SACCO / association officials	90	85	60	70	50	40	65	460
County transport / licensing officers	25	20	15	15	15	15	15	120
NGAO officers	70	70	55	60	60	65	60	440
Law-enforcement / prosecution officers	120	115	85	90	95	85	85	675
Security / border / intelligence-related actors	40	25	20	25	70	80	25	285
Community leaders	120	115	90	100	90	85	90	690
CSO / NGO representatives	35	25	15	15	25	20	15	150
Victims / survivors, where ethically appropriate	180	155	120	140	130	90	125	940
Approximate total	**10,060**	**9,580**	**6,770**	**7,645**	**8,135**	**5,050**	**7,095**	**54,335**

This gave an approximate total target population of 54,335 potential respondents and stakeholders across the seven selected counties.

The estimates in Table 3.2 show that boda-boda riders constitute the largest proportion of the target population, reflecting their central role in the transport system under investigation. The other categories comprise institutional, regulatory, community, security and civil society stakeholders

whose perspectives are essential for understanding the manifestations, drivers, governance conditions, and spatial dimensions of boda-boda-related crime across the selected counties. Since the boda-boda sector is largely informal, mobile and constantly changing, the figures are treated as approximate planning estimates rather than fixed population counts. They therefore served mainly to guide sampling decisions, field logistics and the organisation of data collection across Mombasa, Machakos, Nyeri, Bomet, Busia, Marsabit, and Kirinyaga.

3.4 **Sample Size and Sampling Procedures**

This section presents the sample size determination and sampling procedures that was used in the study. Since the study adopts a mixed-methods design, sample size and respondent selection were handled differently for the quantitative and qualitative components. The quantitative component requires a statistically adequate sample of boda-boda riders for survey analysis, while the qualitative component relies on purposive selection of information-rich participants drawn from relevant stakeholder categories. In addition, because the study has a strong spatial and corridor-based dimension, the sampling framework also incorporates route-distance coverage and sampled operational nodes across trunk, primary, secondary and tertiary roads within each county. This integrated approach was appropriate because it provided the statistical breadth required for comparative analysis, the contextual depth needed for qualitative interpretation, and the spatial coverage necessary for examining route-based and hotspot patterns of insecurity within the boda-boda informal transport sector.

The quantitative survey drew on William G. Cochran's (1977) formula, which is recommended when the target population is very large, geographically dispersed, or not fully documented. Such conditions describe the partly informal boda-boda sector in the study counties, where comprehensive administrative registers are either incomplete or change frequently. The formula provides an efficient, statistically defensible way to fix the minimum number of respondents needed for both descriptive and inferential analysis.

$$n_0 = \frac{Z^2\, p\, q}{e^2} \tag{3.1}$$

where:

n_0 = required sample size

Z = standard-normal deviate for the chosen confidence level

p = estimated proportion of the population with the characteristic of interest

$$q = 1 - p$$

e = acceptable margin of error

For a 95 % confidence level, $Z = 1.96$. Because no reliable prior estimate of $p$was available, the study adopted the conservative values $p = 0.5$and $q = 0.5$, which maximise the required sample size. The allowable margin of error was set at $e = 0.05$.

Substituting these values into Equation 3.1 gives

$$n_0 = \frac{(1.96)^2\ (0.5)\ (0.5)}{(0.05)^2} \ = \ 384.16$$

Thus, a minimum of 385 respondents (rounding up to the nearest whole number) was required to achieve the desired statistical precision.

Because this study is comparative and treats each original protocol county as an independent analytical unit, the minimum sample size of 385 respondents was applied separately to each county rather than distributed proportionately across the six protocol counties. This approach is methodologically was appropriate because the study seeks to generate sufficient data for meaningful within-county analysis as well as cross-county comparison of boda-boda-related crime, organised criminal indicators, socio-economic drivers, institutional conditions, and spatial patterns. Applying the same statistically adequate sample to each county therefore strengthens the comparative design of the study.

Accordingly, the total quantitative sample for the study was:

$$385 \times 7 = 2{,}695$$

This means that the study targeted 2,688 boda-boda riders across the six selected counties, distributed as follows:

Table 3.4: Quantitative Sample Size by County

County	Sample Size
Mombasa	385
Machakos	385
Nyeri	385
Kirinyaga	385
Bomet	385
Busia	385
Marsabit	385
Total	2,688

The equal allocation of 385 respondents per county was justified by the analytical purpose of the study. Since each county represents a distinct socio-economic, geographical, and security context, assigning an independent full sample to each county ensures that no county is underrepresented in the quantitative analysis. This made it possible to compare counties on a relatively equal statistical basis and to examine whether the manifestations and determinants of boda-boda-related crime vary significantly across urban/metropolitan, rural/hinterland, and transnational/border settings.

For the qualitative component, sample size was not determined using a statistical formula. Instead, it was guided by the principles of purposive selection, information richness, relevance to the study objectives, and thematic saturation. The qualitative sample included stage and market leaders, SACCO or association officials, county transport and licensing officers, National Government Administrative Officers, law-enforcement and prosecution officers, security or border-related actors, community leaders, civil society and non-governmental organisation representatives, and, where ethically appropriate, victims or survivors of boda-boda-related crime. These respondents are included because they possess institutional, regulatory, operational, community, or experiential knowledge necessary to explain the forms, drivers, governance conditions and spatial dynamics of boda-boda-related insecurity.

Unlike the quantitative component, the aim of the qualitative component was not statistical generalisation, but contextual depth and explanatory richness. For this reason, the number of participants in each stakeholder category depended on accessibility, role relevance, county context, and the point at which no substantially new information emerged from the field. For planning purposes, the study used an indicative qualitative sample distributed across the six counties as shown below.

Table 3.5: Qualitative Sample by County and Stakeholder Category

County	**Stage / market leaders**	**SACCO / association officials**	**County transport / licensing officers**	**NGAO officers**	**Law-enforcement / prosecution officers**	**Security / border actors**	**Community leaders**	**CSO / NGO representatives**	**Victims / survivors**	**Total**
Mombasa	2	1	2	1	2	1	1	1	2	13
Machakos	2	1	1	1	2	1	1	1	2	12
Nyeri	1	1	1	1	1	0	2	0	2	9
Bomet	2	1	1	1	1	1	2	0	2	11
Busia	1	1	1	1	2	2	1	1	2	12
Marsabit	1	1	1	1	1	2	2	1	2	12
Kirinyaga	1	1	1	1	1	0	2	0	2	9
Total	**10**	**7**	**8**	**7**	**10**	**7**	**11**	**4**	**14**	**78**

The qualitative figures shown above were fieldwork planning estimates and were adjusted slightly during data collection depending on accessibility, respondent availability, willingness to participate, and the point at which thematic saturation was reached. Nonetheless, they provided a practical framework for ensuring that all relevant stakeholder categories were represented across the seven selected counties.

3.4.1 **Sampling Procedures**

This study employed a combination of probability and non-probability sampling techniques in order to capture both the breadth and depth of boda-boda-related crime across the selected counties. The use of mixed sampling procedures was appropriate because the study had both a quantitative component, which required a statistically adequate sample of boda-boda riders, and a

qualitative component, which required purposive selection of respondents with relevant knowledge, institutional roles, or lived experience. This combined approach was consistent with the mixed-methods design of the study and was intended to generate both survey-based evidence and in-depth contextual insights into the evolution of security threats within the boda-boda informal transport sector.

At the first stage, the seven study counties of Mombasa, Machakos, Nyeri, Bomet, Busia, Marsabit, and Kirinyaga were selected purposively as the study sites. These counties were identified because they represent diverse socio-economic, geographical, transport, and security contexts relevant to the study. Mombasa and Machakos represent urban and metropolitan-linked transport environments; Nyeri, Bomet and Kirinyaga represent rural, peri-urban, and agricultural-commercial mobility systems; while Busia and Marsabit represent border and frontier settings where cross-border movement, informal mobility, and security concerns are more pronounced. This purposive selection was necessary because the study is comparative in design and seeks to examine how boda-boda-related crime varies across distinct county contexts.

At the second stage, relevant field locations within each county were identified. These included sub-counties, wards, market centres, boda-boda stages, transport terminals, major road corridors, trading centres, shopping centres and border points, depending on the county context. Selection at this stage was also purposive and was guided by the concentration of boda-boda activity, the operational significance of the site, accessibility, and relevance to the manifestations of crime under investigation. This was important because boda-boda operations are not evenly distributed within counties; some localities are more central than others in terms of transport flow, market activity, mobility demand, and exposure to insecurity.

For the quantitative component, the primary respondents were boda-boda riders, since they form the largest population group in the study and are most directly involved in the transport system under investigation. Probability sampling techniques were mainly applied to this category because riders required broader and more representative coverage for survey analysis.

In Mombasa and Machakos, where boda-boda operations are concentrated in busy urban, peri-urban, and highway-linked environments, stratified sampling was first used to divide riders into

relevant operational strata such as urban centres, municipality zones, market areas, transport corridors and major stage clusters. Within each stratum, simple random sampling or systematic sampling was then used to select individual riders from stage registers, SACCO lists, association records, or field-generated rider listings. This approach was appropriate because it captured the internal diversity of boda-boda operations in counties with dense and differentiated transport environments.

In Nyeri, Bomet and Kirinyaga, where boda-boda operations are strongly linked to rural settlements, agricultural production zones, market centres, small towns and inter-town connectivity, cluster sampling was applied at the level of selected trading centres, transport nodes, route-based stages and market centres. Within the selected clusters, simple random sampling or systematic sampling was then used to identify individual riders. Cluster sampling was appropriate in these counties because riders are distributed across multiple rural and peri-urban localities, and the method reduced logistical complexity while still ensuring adequate coverage of key boda-boda operating areas.

In Marsabit, where the county is geographically extensive and settlements are more dispersed, cluster sampling was also applied at selected settlements, trading centres, route-based nodes, and transport stages. This approach allowed the study to reach riders operating in a frontier context marked by long distances, uneven infrastructure, and varying levels of institutional presence.

In Busia, given the significance of border activity, transit movement, and market-linked transport, stratified sampling was used to distinguish border points, inland market centres, and major transport nodes. Systematic sampling or simple random sampling was then applied to select riders within the relevant strata. This was appropriate because boda-boda activity in Busia is shaped by borderland and corridor dynamics that required deliberate analytical coverage.

Where complete rider lists were not available, the researcher conducted a field listing exercise at selected stages in order to establish an operational sampling frame. After this, respondents were selected either randomly or systematically depending on the structure of the listing and the number of respondents required from that site. These procedures were intended to reduce selection bias and improve the representativeness of the quantitative data.

For the qualitative component, the study used purposive sampling to select respondents from stakeholder categories relevant to the study objectives. These categories included stage and market leaders, SACCO or association officials, county transport and licensing officers, National Government Administrative Officers, law-enforcement and prosecution officers, security or border-related actors, community leaders, CSO/NGO representatives, and, where ethically appropriate, victims or survivors of boda-boda-related crime. Purposive sampling was appropriate because these respondents possessed specialised knowledge, practical experience, institutional responsibility, or lived experience relevant to boda-boda operations, regulation, insecurity, and crime response.

In Mombasa, Machakos, and Busia, purposive sampling paid particular attention to stage leaders, SACCO officials, transport officers, law-enforcement personnel and community representatives because of the complexity of route systems, market activity, urban mobility, and transport governance in those counties. In Nyeri, Bomet, and Kirinyaga, purposive selection focused more strongly on riders, community leaders, NGAO officers, SACCO officials, stage leaders, and local security actors because of the importance of local social structures, rural mobility systems, agricultural-market linkages, and community-level regulation. In Busia and Marsabit, purposive selection also included border and security-related actors because of the importance of transnational movement, frontier governance, informal crossing systems, and security surveillance.

Where the study sought to reach participants who were not easily identifiable through formal structures, especially victims or survivors of boda-boda-related crime, snowball sampling was used cautiously and only where ethically appropriate. Under this technique, an initial respondent helped identify other participants with relevant experiences. This approach was useful for sensitive or hard-to-reach categories, but it was applied carefully to protect confidentiality, minimise exposure to harm, and avoid placing participants at risk.

For focus group discussions, participants were also selected purposively. The groups were composed in a way that promoted relative homogeneity within each discussion, for example by grouping boda-boda riders separately from community leaders or institutional actors. This arrangement was intended to encourage open discussion, reduce status-related inhibition, and

allow participants to speak more freely about boda-boda operations, crime risks, institutional responses, and community experiences.

County Sampling Tables

To operationalise the mixed sampling design, the study applied county-specific sampling plans across the seven counties. These tables indicate the approximate target population, sample size, and corresponding sampling technique for each respondent category in each county. The sampling tables therefore provide a practical link between the overall research design and the fieldwork procedures used to collect quantitative, qualitative, and contextual data.

Table 3.6: Sampling Plan for Mombasa County

Category	**Approximate Target Population**	**Sample Size**	**Sampling Technique**
Boda-boda riders	9,200	385	Stratified sampling, then simple random/systematic sampling
Stage / market leaders	180	2	Purposive sampling
SACCO / association officials	90	1	Purposive sampling
County transport / licensing officers	25	2	Purposive sampling
NGAO officers	70	1	Purposive sampling
Law-enforcement / prosecution officers	120	2	Purposive sampling
Security / border / intelligence-related actors	40	1	Purposive sampling
Community leaders	120	1	Purposive sampling
CSO / NGO representatives	35	1	Purposive sampling
Victims / survivors	180	2	Snowball sampling, where ethically appropriate
Total		**398**	

Table 3.7: Sampling Plan for Machakos County

Category	**Approximate Target Population**	**Sample Size**	**Sampling Technique**
Boda-boda riders	8,800	385	Stratified sampling, then simple random/systematic sampling
Stage / market leaders	170	2	Purposive sampling
SACCO / association officials	85	1	Purposive sampling
County transport / licensing officers	20	1	Purposive sampling
NGAO officers	70	1	Purposive sampling
Law-enforcement / prosecution officers	115	2	Purposive sampling

Security / border / intelligence-related actors	25	1	Purposive sampling
Community leaders	115	1	Purposive sampling
CSO / NGO representatives	25	1	Purposive sampling
Victims / survivors	155	2	Snowball sampling, where ethically appropriate
Total		**397**	

Table 3.8: Sampling Plan for Nyeri County

Category	**Approximate Target Population**	**Sample Size**	**Sampling Technique**
Boda-boda riders	6,200	385	Cluster sampling, then simple random/systematic sampling
Stage / market leaders	110	1	Purposive sampling
SACCO / association officials	60	1	Purposive sampling
County transport / licensing officers	15	1	Purposive sampling
NGAO officers	55	1	Purposive sampling
Law-enforcement / prosecution officers	85	1	Purposive sampling
Security / border / intelligence-related actors	20	0 or 1	Purposive sampling, where applicable
Community leaders	90	2	Purposive sampling
CSO / NGO representatives	15	0 or 1	Purposive sampling, where applicable
Victims / survivors	120	2	Snowball sampling, where ethically appropriate
Total		**394–396**	

Table 3.9: Sampling Plan for Bomet County

Category	**Approximate Target Population**	**Sample Size**	**Sampling Technique**
Boda-boda riders	7,000	385	Cluster sampling, then simple random/systematic sampling
Stage / market leaders	130	2	Purposive sampling
SACCO / association officials	70	1	Purposive sampling
County transport / licensing officers	15	1	Purposive sampling
NGAO officers	60	1	Purposive sampling
Law-enforcement / prosecution officers	90	1	Purposive sampling
Security / border / intelligence-related actors	25	1	Purposive sampling
Community leaders	100	2	Purposive sampling
CSO / NGO representatives	15	0 or 1	Purposive sampling, where applicable
Victims / survivors	140	2	Snowball sampling, where ethically appropriate
Total		**396–397**	

Table 3.10**:** Sampling Plan for Busia County

Category	**Approximate Target Population**	**Sample Size**	**Sampling Technique**
Boda-boda riders	7,500	385	Stratified sampling, then simple random/systematic sampling
Stage / market leaders	100	1	Purposive sampling
SACCO / association officials	50	1	Purposive sampling
County transport / licensing officers	15	1	Purposive sampling
NGAO officers	60	1	Purposive sampling
Law-enforcement / prosecution officers	95	2	Purposive sampling
Security / border / intelligence-related actors	70	2	Purposive sampling
Community leaders	90	1	Purposive sampling
CSO / NGO representatives	25	1	Purposive sampling
Victims / survivors	130	2	Snowball sampling, where ethically appropriate
Total		**397**	

Table 3.11: Sampling Plan for Marsabit County

Category	**Approximate Target Population**	**Sample Size**	**Sampling Technique**
Boda-boda riders	4,500	385	Cluster sampling, then simple random/systematic sampling
Stage / market leaders	70	1	Purposive sampling
SACCO / association officials	40	1	Purposive sampling
County transport / licensing officers	15	1	Purposive sampling
NGAO officers	65	1	Purposive sampling
Law-enforcement / prosecution officers	85	1	Purposive sampling
Security / border / intelligence-related actors	80	2	Purposive sampling
Community leaders	85	2	Purposive sampling
CSO / NGO representatives	20	1	Purposive sampling
Victims / survivors	90	2	Snowball sampling, where ethically appropriate
Total		**397**	

Table 3.12: Sampling Plan for Kirinyaga County

Category	**Approximate Target Population**	**Sample Size**	**Sampling Technique**
Boda-boda riders	6,500	357	Cluster sampling, then simple random/systematic sampling
Stage / market leaders	115	1	Purposive sampling
SACCO / association officials	65	1	Purposive sampling
County transport / licensing officers	15	1	Purposive sampling

NGAO officers	60	1	Purposive sampling
Law-enforcement / prosecution officers	85	1	Purposive sampling
Security / border / intelligence-related actors	25	0	Not prioritised for Kirinyaga due to its non-border county context
Community leaders	90	2	Purposive sampling
CSO / NGO representatives	15	0	Not prioritised where relevant CSO/NGO representation was limited
Victims / survivors	125	2	Snowball sampling, where ethically appropriate
Total		**366**	

Route Distance and Sampled Nodes by Road Class. To strengthen the spatial and transport-system coverage of the study, the sampling framework also incorporated route-distance coverage and sampled operational nodes across trunk, primary, secondary, and tertiary roads within each county. In this study, sampled nodes included boda-boda stages, market centres, road junctions, transport terminals, border points, trading centres, and other operational touchpoints relevant to boda-boda movement and crime occurrence. Route coverage were organised across different road classes in order to ensure that the study captures crime dynamics across the main layers of the transport network.

The use of route-distance and node-based sampling is appropriate because boda-boda operations do not occur randomly in space. Rather, they are concentrated along transport corridors, feeder roads, market routes, peri-urban connectors, and borderland mobility systems. By specifying the planned sampled route distance and the number of sampled nodes per road category, the study ensured that field coverage reflects the operational geography of the boda-boda sector within each county. These route and node figures are intended for research planning and sampled coverage, and not as official county road inventory figures. They were refined during field entry using QGIS-based route mapping, county road information, stage registers, and local stakeholder validation.

Table 3.13: County Sampling Coverage by Route Distance and Sampled Nodes

County	Planned Sampled Route Distance (km)	Trunk Road Nodes	Primary Road Nodes	Secondary Road Nodes	Tertiary Road Nodes	Total Sampled Nodes
Mombasa	210	6	10	14	10	40
Machakos	230	5	9	15	11	40
Nyeri	190	4	8	13	11	36
Bomet	205	4	8	14	10	36
Busia	220	5	9	14	10	38
Marsabit	280	5	8	11	8	32
Kirinyaga	200	4	8	13	11	36
Total	**1,535**	**33**	**60**	**94**	**71**	**258**

The figures in Table 3.13 represent the planned sampled route coverage rather than the full inventory of roads in each county. They indicate the approximate route distance to be covered by the study in each county and the number of operational nodes to be sampled across the four road classes. The allocation reflects the logic of the county clusters in the study. In Mombasa and Machakos, node concentration is relatively high because of dense urban, peri-urban, and metropolitan-linked transport systems. In Nyeri, Bomet, and Kirinyaga, the pattern reflects rural, peri-urban, agricultural, market-based, and feeder-road mobility environments. In Busia, route and node allocation captures border-related and market-linked movement systems. In Marsabit, the planned sampled route distance is longer because of the county's vast spatial extent, even though the number of sampled nodes is relatively lower due to lower settlement density and wider distances between operational points.

In operational terms, sampled nodes along trunk roads captured major highway-linked boda-boda stages, freight interfaces, bus terminals, border access points where applicable, and high-volume mobility locations. Primary road nodes captured major market connectors, municipal approach roads, and large trading-centre stages. Secondary road nodes focused on feeder-road stages, intermediate markets, peri-urban linkages, and rural trading centres. Tertiary road nodes captured local access stages, village market routes, interior settlement connectors, and low-order road environments where boda-boda transport remains active. This layered approach enabled the study to observe how crime patterns, rider operations, and security risks vary across different levels of the road hierarchy.

In Kirinyaga, the sampled route and node coverage was designed to capture boda-boda activity around towns, market centres, shopping centres, agricultural production zones, and inter-town road corridors. Key operational environments included areas around Kerugoya, Kutus, Wang'uru, Kagio, Kianyaga, Mwea, Sagana, and surrounding rural market routes. This allowed the study to examine how boda-boda mobility in an agricultural-commercial county connects households, farms, markets, service centres, and major roads, while also identifying locations where weak surveillance, route-based anonymity, theft risks, and opportunistic crime may emerge.

3.4.2 Sampled Nodes and Indicative Coordinates by County

To operationalise the spatial coverage of the study, the researcher used a node-based sampling framework in which selected boda-boda stages, market centres, road junctions, transport terminals, municipal centres, shopping centres, and border points where applicable were treated as sampled operational nodes. For purposes of field organisation, each county had a separate node table indicating the sampled nodes, the road class within which each node is located, and the indicative geographic coordinates used to guide reconnaissance and mapping.

These coordinates were preliminary and were verified and refined in QGIS during field entry, route tracing, ground observation, and stakeholder validation. They were therefore intended for research planning and spatial sampling design rather than as final geodetic survey points. The inclusion of Kirinyaga in this framework strengthens the spatial design by adding a rural–peri-urban and agricultural-commercial county where boda-boda nodes are closely associated with markets, towns, shopping centres, feeder roads, and inter-county mobility corridors.

Table 3.14: Sampled Nodes for Mombasa County

Node Name	Road Class	Indicative Coordinates (Lat, Long)	Functional Description
Changamwe	Trunk	-4.026, 39.631	Major highway and port-industrial access node
Miritini	Trunk	-4.043, 39.651	Trunk corridor and intermodal transport approach
Likoni Ferry / Likoni	Trunk	-4.096, 39.654	High-volume crossing and mobility control node
Nyali	Primary	-4.043, 39.698	Urban commercial and residential mobility node
Bamburi	Primary	-3.995, 39.731	Dense tourism-residential corridor node
Kongowea Market	Primary	-4.043, 39.679	High-activity market and stage node
Mikindani	Secondary	-4.053, 39.613	Residential-market connector node
Kisauni	Secondary	-3.998, 39.690	Dense settlement and feeder mobility node
Jomvu	Secondary	-4.053, 39.666	Industrial-residential movement node
Mwakirunge	Tertiary	-3.958, 39.643	Interior feeder and local stage node
Frere Town	Tertiary	-4.015, 39.701	Local residential feeder stage
Utange	Tertiary	-3.963, 39.744	Peripheral feeder-road node

Table 3.15: Sampled Nodes for Machakos County

Node Name	Road Class	Indicative Coordinates (Lat, Long)	Functional Description

Athi River	Trunk	-1.450, 36.983	Major industrial and trunk-road transport node
Mlolongo	Trunk	-1.362, 37.010	Metropolitan highway and logistics approach node
Machakos Town	Trunk	-1.517, 37.263	County capital and major transport-administrative node
Kangundo	Primary	-1.303, 37.348	Primary town and county connector node
Tala	Primary	-1.279, 37.104	Market and peri-urban mobility node
Matuu	Primary	-1.141, 37.548	Yatta corridor market and transport node
Masii	Secondary	-1.486, 37.390	Secondary market-centre node
Mwala	Secondary	-1.267, 37.433	Rural connector and local transport node
Kathiani / Mitaboni axis	Secondary	-1.413, 37.132	Feeder-road and market link node
Koma Hill / Koma Market	Tertiary	-1.252, 37.180	Interior feeder-road stage node
Kinanie	Tertiary	-1.386, 37.057	Peri-urban feeder settlement node
Mutituni	Tertiary	-1.544, 37.252	Local access and settlement connector node

Table 3.16: Sampled Nodes for Nyeri County

Node Name	**Road Class**	**Indicative Coordinates (Lat, Long)**	**Functional Description**
Nyeri Town	Trunk	-0.417, 36.950	County capital and principal transport node
Karatina	Trunk	-0.487, 37.127	Major highway and market corridor node
Othaya	Primary	-0.547, 36.942	Important town and transport service node
Naro Moru	Primary	-0.166, 37.017	Primary corridor and tourism-agricultural node
Mweiga	Primary	-0.347, 36.905	Rural connector and market node
Chaka	Secondary	-0.333, 37.000	Feeder-road and stage node
Mukurweini	Secondary	-0.571, 36.912	Agricultural market and feeder mobility node
Marua	Secondary	-0.545, 37.004	Junction and local connector node
Kabaru	Tertiary	-0.450, 36.990	Local feeder-road stage
Kiawara	Tertiary	-0.390, 36.880	Settlement-market feeder node
Giakanja	Tertiary	-0.430, 36.930	Local mobility and community node
Mahiga	Tertiary	-0.510, 36.890	Local feeder stage and settlement link

Table 3.17**:** Sampled Nodes for Bomet County

Node Name	**Road Class**	**Indicative Coordinates (Lat, Long)**	**Functional Description**
Bomet Town	Trunk	-0.782, 35.341	County capital and principal transport node
Sotik	Trunk	-0.681, 35.111	Major town and trunk-connected market node
Mulot	Primary	-1.016, 35.350	Corridor town and transport junction node
Longisa	Primary	-0.885, 35.373	Health-market and feeder-road connector node
Silibwet	Primary	-0.915, 35.276	Rural market and administrative connector node

Kaplong	Secondary	-0.593, 35.203	Secondary town and agricultural movement node
Mogogosiek	Secondary	-0.632, 35.239	Feeder-road market node
Chebunyo	Secondary	-0.860, 35.240	Rural access and stage node
Sigor	Tertiary	-0.930, 35.180	Interior feeder and local market node
Ndanai	Tertiary	-0.820, 35.030	Peripheral feeder-road node
Boito	Tertiary	-0.870, 35.470	Local settlement connector node
Merigi	Tertiary	-0.900, 35.290	Feeder mobility and market stage

Table 3.18: Sampled Nodes for Busia County

Node Name	**Road Class**	**Indicative Coordinates (Lat, Long)**	**Functional Description**
Busia Town	Trunk	0.460, 34.111	Border municipality and customs-linked node
Malaba	Trunk	0.635, 34.274	Major international border crossing node
Nambale	Primary	0.459, 34.253	Primary market and inland connector node
Funyula	Primary	0.300, 34.483	Lake-border corridor and market node
Port Victoria	Primary	0.099, 34.085	Lake transport and border-adjacent node
Bumala	Secondary	0.099, 34.277	Market and corridor feeder node
Butula	Secondary	0.347, 34.287	Secondary town and feeder-road node
Amukura	Secondary	0.196, 34.336	Market-based feeder connector
Ang'urai	Tertiary	0.617, 34.347	Borderland feeder stage
Mayenje	Tertiary	0.430, 34.160	Local feeder and settlement node
Bujumba	Tertiary	0.410, 34.430	Rural feeder-market node
Nangina	Tertiary	0.365, 34.210	Local access and market stage

Table 3.19: Sampled Nodes for Marsabit County

Node Name	**Road Class**	**Indicative Coordinates (Lat, Long)**	**Functional Description**
Moyale	Trunk	3.526, 39.056	International border town and trunk corridor node
Marsabit Town	Trunk	2.334, 37.991	County capital and main administrative node
Sololo	Trunk	3.539, 38.642	Border corridor and commercial transport node
Laisamis	Primary	1.600, 37.820	Main north-south corridor service node
Loglogo	Primary	2.730, 37.580	Corridor settlement and connector node
Merille	Primary	1.467, 37.433	Transport stop and market-access node
North Horr	Secondary	3.320, 37.061	Arid hinterland service node
Loiyangalani	Secondary	2.750, 36.717	Lake corridor and tourism-local mobility node
Kargi	Secondary	2.450, 37.540	Feeder-corridor settlement node
Kalacha	Tertiary	3.120, 37.770	Peripheral feeder-road stage
Badasa	Tertiary	2.430, 37.930	Local access and community node
Bubisa	Tertiary	2.200, 37.680	Sparse-settlement feeder node

Table 3.20: Sampled Nodes for Kirinyaga County

Node Name	Road Class	Indicative Coordinates (Lat, Long)	Functional Description
Sagana	Trunk	-0.669, 37.205	Major highway-linked mobility node connecting Kirinyaga to Murang'a, Nyeri, Nairobi, and Embu routes
Makutano / Sagana Junction	Trunk	-0.675, 37.209	Strategic road junction and inter-county transport interchange node
Mwea / Ngurubani	Trunk	-0.689, 37.355	High-volume rice-belt, market, and highway-linked boda-boda operating node
Wang'uru	Primary	-0.683, 37.347	Major market, commercial, and agricultural transport node within the Mwea irrigation zone
Kerugoya	Primary	-0.498, 37.280	County administrative, commercial, health-service, and urban mobility node
Kutus	Primary	-0.575, 37.318	Educational, administrative, market, and inter-town boda-boda mobility node
Kagio	Primary	-0.525, 37.239	Active market-centre and rural–urban connector node
Kianyaga	Secondary	-0.431, 37.322	Rural trading centre and feeder-road mobility node serving upper Kirinyaga settlements
Baricho	Secondary	-0.556, 37.278	Local market and secondary-road connector node linking rural settlements to main towns
Kagumo	Secondary	-0.542, 37.259	Residential, educational, and market-linked boda-boda stage node
Kabare	Tertiary	-0.455, 37.295	Interior rural settlement and local access-stage node
Kiamutugu	Tertiary	-0.385, 37.323	Agricultural hinterland and village-market feeder node
Gathigiriri	Tertiary	-0.736, 37.361	Local irrigation-scheme settlement and interior feeder-road boda-boda node

Note: The coordinates shown in Tables 3.14 to 3.20 are indicative operational coordinates for sampled operational nodes. They were verified and refined through reconnaissance, QGIS route validation, stage-level confirmation, and stakeholder consultation before final field deployment. They are intended to support route planning, node selection, and spatial sampling design rather than to serve as final surveyed GPS points.

Inclusion and Exclusion Criteria. The study included respondents who are directly involved in or knowledgeable about the boda-boda sector within the selected counties. For the quantitative survey, eligible respondents were active boda-boda riders operating in the selected areas and willing to participate in the study. For the qualitative component, participants included individuals whose roles relate to transport regulation, security management, community leadership, border administration, victim support, or boda-boda operations. Respondents who are not directly relevant to the study, who fall outside the selected county sites, who are below the legally acceptable age for participation, or who are unable or unwilling to provide informed consent were excluded.

Overall, the sample size and sampling procedures adopted in this study are intended to ensure both analytical rigour and field practicality. The quantitative sample provides the statistical basis for comparing crime-related patterns across counties, while the qualitative sampling procedures ensure that the study captures institutional, community, and security perspectives necessary for explaining how and why security threats evolve within the boda-boda informal transport sector. The addition of route-distance and node-based coverage further strengthens the study by ensuring that its fieldwork and spatial analysis reflect the transport geography within which boda-boda-related crime occurs.

3.5 **Data Collection Methods and Instruments**

This study used multiple data collection methods because boda-boda crime and its evolution into organised criminal activity could not be adequately understood through a single source of evidence. It was also prudent and significant to interrogate the existing legal and policy frameworks through the mandated institutions. Quantitative methods generated measurable data on prevalence, patterns, and correlates, while qualitative methods provided in-depth understanding of experiences, perceptions, institutional responses and contextual drivers. Spatial data collection added a geographical dimension by showing where key activities and crime concentrations occur. Multi-method data collection is a well-established way to strengthen triangulation and depth in mixed-methods research. (Creswell & Plano Clark, 2018).

Questionnaire. The questionnaire was the principal instrument for collecting quantitative data from boda-boda riders in the six selected counties. It was used because the study sought to obtain standardised information from a relatively large number of respondents spread across different geographical contexts. The questionnaire is considered appropriate for this study since it allows the collection of comparable data that can be coded, quantified, and analysed statistically. In addition, it enables the researcher to capture patterns, trends and variations in boda-boda-related crime across urban, rural and border settings in a systematic manner (Kothari, 2004; Mugenda & Mugenda, 2003).

The questionnaire consisted mainly of structured and semi-structured questions. The structured questions generated uniform responses that were suitable for quantitative analysis, while the semi-structured items provided limited room for respondents to elaborate on issues that may not be fully captured through fixed-response options. This combination is important because it preserves the

statistical strength of the survey while also allowing respondents to clarify experiences and perceptions that may be relevant to the study objectives. The use of largely structured items is particularly suitable where the researcher intends to compare responses across a large sample and across multiple counties (Kothari, 2004; Mugenda & Mugenda, 2003).

The questionnaire was organised into several sections aligned with the study objectives. The first section captured background characteristics of respondents, including variables such as age, sex, education level, marital status, county, sub-county, and duration of involvement in boda-boda operations. These variables are important because they provide the socio-demographic profile of the respondents and make it possible to examine whether experiences of crime and insecurity vary by personal and occupational characteristics.

The second section focused on the operational characteristics of boda-boda work. This part of the questionnaire gathered information on the nature of boda-boda operations, including stage affiliation, type of work arrangement, average working hours, common routes, daily income patterns, level of association with SACCOs or rider groups, and the role of boda-boda transport in local mobility systems. Such information is necessary for understanding the structure of the sector and the operational environment within which crime may occur. It also helps to establish whether particular forms of work organisation or mobility patterns expose riders to higher levels of insecurity or criminal opportunity.

The third section addressed experiences of crime and insecurity among boda-boda riders. It included questions on whether respondents have experienced or witnessed incidents such as theft, assault, robbery, extortion, smuggling, collusion, harassment, or other forms of boda-boda-related crime. It also captured the frequency, location, and perceived seriousness of such incidents. This section is central to the study because it generated primary data on the prevalence and forms of crime associated with the boda-boda sector in the selected counties.

The fourth section examined perceptions of safety and insecurity. Respondents were asked to indicate how safe or unsafe they feel while operating in different environments, such as urban centres, markets, remote roads, transport corridors, or border areas. They were also asked to identify the times, places, and circumstances under which they felt most vulnerable. This section helped the study move beyond actual victimization to include the subjective dimensions of

insecurity, which are important for understanding how riders interpret and respond to risk in their working environment.

The fifth section focused on exposure to criminal networks and organised criminal tendencies. Questions in this part sought to determine whether respondents are aware of patterns of coordination, protection arrangements, repeated criminal collaboration, or organised networks involving boda-boda riders or actors linked to the sector. The purpose of this section is to help distinguish between isolated or incidental criminal acts and more organised forms of criminal activity. This distinction is central to the study because it spoke directly to the question of whether boda-boda-related crime in the selected counties is evolving into a more structured and organised phenomenon.

The sixth section examined relationships between boda-boda riders and law-enforcement or regulatory institutions. Respondents were asked about their interactions with police, county transport officers, NGAO personnel, SACCO officials, and other regulatory actors. Questions may address reporting of crime, access to protection, perceptions of fairness, enforcement practices, corruption, trust in institutions, and the effectiveness of existing regulatory measures. This section is important because institutional relationships may either constrain or facilitate criminal behaviour within the sector, depending on how regulation and enforcement are experienced in practice.

The final section explored respondents' views on the factors that enable boda-boda crime to evolve into more organised forms. This included questions on unemployment, poverty, weak regulation, corruption, poor registration systems, peer influence, political interference, border proximity, weak local governance, and lack of accountability within rider groups or SACCOs. By including these items, the questionnaire generated data not only on the occurrence of crime, but also on the perceived drivers and enabling conditions of organised criminal evolution in the boda-boda sector.

The questionnaire primarily contained closed-ended items, including dichotomous questions, multiple-choice questions, ranking items, and Likert-scale statements. These formats are appropriate because they facilitate coding and statistical analysis. A limited number of open-ended or short-response items may also be included in order to allow respondents to provide brief clarification where necessary. The instrument was prepared in clear and simple language so as to ensure that respondents understand the questions easily. Where it was necessary, the questionnaire was translated orally into a language familiar to the respondent during administration.

The questionnaire was administered to sampled boda-boda riders in selected stages, market centres, transport nodes, and other operational locations within the study counties. Because literacy levels and field conditions varied, the questionnaire was mainly interviewer-administered. This approach is preferred because it helped reduce non-response, improve completeness of answers, and allow clarification of questions where necessary. It also helped the researcher or research assistants ensure that respondents interpret the items consistently.

Before the main data collection, the questionnaire was pilot tested in Nairobi and Migori to assess clarity, relevance, sequencing, length, response categories, and practical suitability for field administration. The pilot feedback was used to revise ambiguous, repetitive, unclear, or overly sensitive items. It also confirmed the need for stronger category standardisation, clearer skip instructions, and improved coding of sensitive crime and security variables. This process strengthened the validity, reliability, and analytical usefulness of the questionnaire.

Overall, the questionnaire provided the study with reliable and comparable quantitative data on the characteristics of boda-boda riders, the operational context of their work, their experiences of crime and insecurity, and their perceptions of the factors that may facilitate the emergence and evolution of organised criminal activity within the boda-boda sector. It therefore served as a central instrument in generating the quantitative evidence required for the study

Key Informant Interviews (KIIs) were used to collect qualitative data from respondents who possess specialised knowledge, institutional responsibility, or practical experience relevant to boda-boda operations, crime patterns, legal perspectives, regulations, and security governance in the sampled counties. This method was appropriate because the study sought to not only identify the forms and prevalence of boda-boda-related crime, but also to understand the processes, institutional dynamics, and contextual conditions through which such crime may emerge and evolve into organised criminal activity. Key Informant Interviews were particularly useful where the researcher required detailed, explanatory and context-specific information from participants who are well placed to provide informed insight into the subject under investigation (Creswell & Plano Clark, 2018).

In this study, key informants were selected purposively from stakeholder categories that are directly involved in the management, legal and regulation oversight, security and safety management in the transport sector. These included stage leaders, SACCO officials, county

transport officers, National Government Administrative Officers (NGAO), police officers, prosecutors, border security personnel where relevant, community leaders, and civil society actors. These categories were included because they possessed institutional memory, operational knowledge, and contextual understanding that cannot be adequately captured through the questionnaire survey administered to boda-boda riders. Their views were therefore important in explaining how boda-boda crime is understood, how it is managed, what institutional weaknesses may exist, and how local conditions may facilitate or constrain the emergence of organised criminal activity within the sector.

The use of KIIs was particularly important in a study of this nature because boda-boda-related crime may involve hidden processes, informal arrangements and institutional interactions that are not always visible in quantitative data. Through the interviews, the researchers were able to obtain deeper insight into issues such as criminal coordination, collusion, local protection networks, stage governance, enforcement gaps, registration systems, dispute-resolution mechanisms, cross-border mobility dynamics, the legal and regulation administration. In this respect, the key informant interview helped the study move beyond description of crime incidents to a more interpretive understanding of how and why such crime occurs and under what conditions it may evolve into a more organised form.

The interviews were guided by a semi-structured key informant interview guide. The guide contained open-ended questions organised around the major themes of the study, while also allowing flexibility for probing, clarification and follow-up depending on the respondent's institutional role and the issues that emerge during the interview. The semi-structured format was appropriate because it ensured that all interviews addressed the core themes relevant to the study while still allowing respondents the freedom to provide detailed explanations, examples and reflections based on their own experience. This balance between structure and flexibility is particularly valuable in qualitative inquiry, where both consistency and depth are important.

The interview guide was organised into several thematic sections. The first section established the respondent's role, experience, and involvement in boda-boda-related issues. This included information on the respondent's position, institutional responsibilities, period of service, and level of engagement with matters relating to transport operations, regulation, crime control, or

community security. This introductory section is important because it provides the context within which the respondent's views and experiences could be understood.

The second section focused on the respondent's understanding of the nature and forms of boda-boda-related crime in the county or locality concerned. Respondents were asked to describe the main crimes associated with boda-boda operations, whether such crimes were perceived to be increasing or changing, and the areas or circumstances in which they were most common. This section was intended to generate informed perspectives on the kinds of criminal activity linked to the boda-boda sector, including theft, robbery, assault, extortion, smuggling, collusion, or the use of boda-boda transport to facilitate other crimes.

The third section addressed the patterns, organisation and evolution of crime within the boda-boda sector. Respondents were asked whether the crimes they observed were largely isolated and opportunistic or whether they involved repeated coordination, protection networks, territorial control, or collaboration with wider criminal structures. This part of the interview was central to the study because it spoke directly to the question of whether boda-boda-related crime in the selected counties was evolving into organised criminal activity. Respondents such as police officers, prosecutors, security personnel, stage leaders, and SACCO officials were particularly valuable in shedding light on this issue.

The fourth section focused on the drivers and enabling conditions of boda-boda crime. Respondents were asked to explain the social, economic, institutional, geographical and governance factors that they believed contribute to criminal activity within the sector. These included unemployment, poverty, weak regulation, corruption, poor rider identification systems, weak stage oversight, limited police presence, peer influence, political interference, inadequate enforcement, border proximity and transport informality. This section helped the study understand not only what forms of crime occur, but also why such patterns emerge and persist in settings.

The fifth section examined institutional responses and regulatory mechanisms. Respondents were asked about the effectiveness of county transport regulation, police enforcement, NGAO coordination, SACCO discipline, rider registration systems, local administration oversight, prosecution processes, and inter-agency collaboration in responding to boda-boda-related crime. This section was important because it helped identify the strengths and weaknesses of the current governance framework and assess whether institutional gaps contribute to the persistence or

organisation of crime in the sector. It also helped the study understand how different state and non-state actors engage with insecurity in practice.

The sixth section addressed county-specific and contextual dynamics. Since the study covers urban, rural and border counties, respondents were asked to reflect on how local conditions shape boda-boda operations and associated crime patterns in their specific setting. Respondents in urban counties were asked about congestion, high mobility, informal settlements and metropolitan regulation. Those in rural counties were asked about rural transport networks, agricultural market linkages, and community oversight structures. Those in border counties were asked about cross-border movement, informal crossings, smuggling routes, frontier security, and the challenges of enforcement in transnational settings. This helped ensure that the study captures both common and context-specific dimensions of boda-boda crime.

The final section of the interview guide invited respondents to provide their views on possible interventions and policy responses. They were asked to suggest measures that could strengthen accountability, improve regulation, reduce the criminal misuse of boda-boda transport, enhance local security, and prevent the evolution of organised criminal activity. This section was useful because it allowed the study to benefit from the practical experience of those who interact with the sector in real-life settings and may therefore offer grounded recommendations for policy and practice.

Nevertheless, the KIIs culminated with dialogues conduct with key government officials in relevant Ministries, Departments and Agencies (MDAs) policy formulation and implementation such as Ministry of Transport. Law enforcement institutions such Supreme Court, National Police Service (NPS) and SASLA. National leaders in key institutions and organizations like Matatu Owners Association (MOA) and University scholar in the field of security and governance.

Table 3.21 summarizes the main categories of key informants, the rationale for their inclusion, and the type of information expected from each category.

Table 3.21: Summary of Key Informant Categories and Information Sought

Key informant category	**Rationale for inclusion**	**Main information expected**
Stage leaders	They oversee day-to-day boda-boda stage operations and rider conduct	Stage governance, rider discipline, dispute resolution, local crime patterns, internal controls
SACCO officials	They are involved in organisation, membership, and informal regulation of riders	Membership systems, accountability mechanisms, registration, discipline, internal oversight, organised group dynamics

County transport officers	They regulate and oversee county transport operations	Licensing, county regulation, transport policy implementation, enforcement challenges, institutional gaps
NGAO officers	They are involved in local administration, coordination, and community security	Local governance, administrative oversight, conflict management, community complaints, local crime trends
Police officers	They are directly involved in law enforcement and crime control	Reported crime patterns, investigations, enforcement gaps, criminal networks, hotspot areas
Prosecutors	They deal with case processing and criminal justice outcomes	Nature of boda-boda-related cases, prosecution challenges, evidentiary issues, patterns of repeat offending
Border security personnel	They are important in border counties where transnational mobility shapes crime risks	Smuggling routes, cross-border movement, informal crossings, organised criminal linkages, enforcement problems
Community leaders	They provide community-level perspectives and local social regulation	Community perceptions of insecurity, local accountability, social norms, dispute resolution, trust in institutions
CSO/NGO representatives	They often work on governance, security, livelihoods, or victim support	Community interventions, policy gaps, victim experiences, advocacy issues, reform priorities
Policy makers, Leaders and Scholards	Policy formulators and implementors, Law enforcers, governance and security analysers	Legal frameworks and policy gaps or weaknesses or lack of the two.

Note: The actual number of interviews conducted under each category depended on county context, relevance to the study objectives, accessibility of respondents, and the point of thematic saturation.

The interviews were conducted primarily through face-to-face interaction in all situations unless on very limited cases where the interviewee could only be reached by phone. The face-to-face format created and facilitated rapport, probing, and contextual understanding. However, where distance, security concerns, or logistical constraints make direct interviews difficult, alternative arrangements such as telephone interviews may be considered. Each interview was conducted at a time and location convenient and safe for the respondent, and in a manner that ensured privacy and confidentiality. The expected duration of each interview was approximately 30 to 60 minutes, except for the dialogue format that was more than an hour. Howeve,r the interview duration depended on the respondent's role and the depth of discussion required.

With the respondent's consent, interviews were audio-recorded in order to ensure accuracy of data capture. Where recording was not possible or not permitted, detailed written notes were taken during and immediately after the interview. The recordings were later transcribed verbatim and, where necessary, translated into English for analysis. Care was taken to anonymize all transcripts and to remove identifying information in order to protect the confidentiality of respondents, especially where the issues discussed involved crime, enforcement weaknesses, corruption or other sensitive matters.

Selection of key informants was done purposively based on the respondent's relevance to the study objectives, institutional role, experience, and ability to provide rich and credible information. The number of interviews conducted in each county depended on the diversity of relevant actors and the point at which sufficient depth and thematic saturation were achieved. This is consistent with qualitative research practice, where sample adequacy is determined more by the richness and relevance of the information obtained than by numerical size alone. Table 3.6 further presents the distribution of key informants by county and category for planning purposes.

Table 3.22**:** Number of Key Informants by County and Category

County	**Stage leaders**	**SACCO officials**	**County transport officers**	**NGAO officers**	**Police officers**	**Prosecutors**	**Border security personnel**	**Community leaders**	**CSO/NGO representatives**	**Total key informants**
Mombasa	2	1	2	1	2	1	–	1	1	11
Machakos	2	1	–	1	2	1	–	1	1	9
Nyeri	–	1	–	1	1	1	–	2	–	5
Bomet	2	1	–	1	–	–	–	2	–	6
Busia	–	–	–	1	2	1	2	1	1	8
Marsabit	–	–	–	1	–	–	2	2	1	6
Kirinyaga	2	-	-	1	1	1	-	1	-	6
Total	**6**	**4**	**2**	**6**	**7**	**4**	**4**	**9**	**4**	**46**

Note: The figures shown in the table are minimum allocations for planning purposes. The final number of key informants interviewed varied slightly depending on accessibility, availability, willingness to participate, and the point at which sufficient depth and thematic saturation were achieved.

Focus group discussions (FGDs). The FGDs were used to collect qualitative data from selected groups of participants who share comparable experiences or roles within the boda-boda transport sector. This method is appropriate because the study seeks to understand not only individual experiences of crime and insecurity, but also shared perceptions, group norms, collective responses, and community-level interpretations of boda-boda-related crime. In this study, each of the six selected counties was treated as an independent analytical unit. Accordingly, FGDs were organised and conducted separately within each county so that county-specific experiences, perceptions, and contextual dynamics are captured and analysed independently before any cross-county comparison is made.

The use of FGDs is important because boda-boda crime is not only an individual experience but also a socially embedded phenomenon shaped by peer influence, rider culture, informal regulation, community relations, and shared perceptions of insecurity. Through group interaction, participants are able to discuss, confirm, challenge, and refine one another's experiences, thereby generating insights that may not emerge as clearly in individual interviews. The discussions therefore helped reveal group norms, collective understandings, and local narratives about the forms of boda-boda

crime, the factors that enable it, and the conditions under which it may evolve into more organised criminal activity.

Because each county was handled independently, the organisation of focus groups was guided by the specific context of the county concerned. In urban counties such as Mombasa and Machakos, FGDs may focus on boda-boda riders, stage leaders, and community members operating within highly commercialized and densely populated transport environments. In rural counties such as Nyeri and Bomet, discussions may emphasise riders, stage actors, and community leaders whose experiences are embedded in local market centres, agricultural transport networks, and small-town mobility systems. In border counties such as Busia and Marsabit, the discussions were organised in a manner that captures the realities of boda-boda operations within borderland and transnational mobility environments. This county-specific approach is intended to ensure that the data generated through FGDs remain grounded in the social, economic, and security context of each study site.

Participants for focus group discussions were selected purposively within each county on the basis of their relevance to the study objectives, their familiarity with boda-boda operations and associated security issues, and their ability to contribute meaningfully to group discussion. Care were taken to maintain relative homogeneity within each discussion group so that participants feel comfortable discussing sensitive issues. For instance, boda-boda riders were grouped separately from stage leaders or community members, while community leaders or residents may participate in distinct discussions where this is considered necessary. This arrangement is intended to reduce power imbalances within the groups and to encourage more open and candid discussion.

Each focus group discussion consisted of approximately 8 to 10 participants. This size is considered appropriate because it is large enough to generate diversity of views while still allowing each participant sufficient opportunity to contribute meaningfully to the discussion. It is important to note that the figure of 8 to 10 refers to the number of participants in each single discussion group, not the total number of participants in a county. Thus, where a county has, for example, three FGDs, each of those three groups independently comprised 8 to 10 participants.

The focus group discussions were guided by a semi-structured discussion guide organised around the major themes of the study. The discussion began with introductory questions on the nature of boda-boda operations in the locality, the role of boda-boda transport in mobility and livelihoods, and the participants' general views about the sector. This opening stage helped establish rapport,

create a comfortable atmosphere, and situate the discussion within the participants' everyday realities.

The next part of the discussion focused on perceptions and experiences of boda-boda-related crime and insecurity. Participants may be asked to discuss the kinds of crimes associated with boda-boda operations in their locality, whether such crimes are increasing or changing, and the circumstances under which insecurity is most likely to occur. They may also be asked to reflect on particular places, times, or situations that are perceived as risky. This section is intended to generate group-level insight into the prevalence, forms, and local meanings of crime within the boda-boda sector.

Another major theme in the discussion guide was the social and institutional factors that may enable crime within the boda-boda sector. Participants were encouraged to discuss such issues as unemployment, poverty, weak regulation, peer pressure, rider discipline, corruption, poor registration systems, local protection networks, weak enforcement, border proximity, or community tolerance of misconduct. This section is important because it helped identify shared explanations of why crime occurs and the conditions under which it may become more organised. Since such issues often involve collective perceptions and local narratives, the group discussion format is especially suitable.

The discussion guide also included questions on informal regulation, rider group norms, and community responses. Participants may be asked to explain how boda-boda stages maintain order, how misconduct is addressed within rider groups, what role SACCOs or stage leaders play in discipline, and how communities respond to insecurity involving boda-boda riders. This theme is important because the study is interested not only in formal state regulation, but also in the informal and community-based systems that may constrain or enable criminal behaviour. Through this discussion, the study gained insight into whether local accountability structures are strong, weak, compromised, or uneven across contexts.

A further theme addressed the possible evolution of crime into organised criminal activity. Participants may be asked whether they perceive some forms of boda-boda-related crime as isolated and opportunistic or whether they believe there are patterns of repeated coordination, collaboration, territorial control, or links to broader criminal networks. This section is especially important because it allows the study to explore whether local participants themselves perceive signs of organised criminal evolution within the sector and how they interpret such developments.

The final part of the focus group discussion sought participants' views on possible solutions and interventions. Participants may be asked to suggest ways of improving regulation, strengthening rider discipline, enhancing community safety, improving law-enforcement responses, and preventing the criminal misuse of boda-boda transport. This part of the discussion is valuable because it allows the study to capture practical and context-specific recommendations emerging directly from those who interact with the sector in their daily lives.

Table 3.23 summarizes the categories of focus group participants, the rationale for their inclusion, and the main themes explored during the discussions.

Table 3.23: Summary of Focus Group Discussion Categories and Themes

Focus group category	**Rationale for inclusion**	**Main themes to be explored**
Boda-boda riders	They are the principal actors in the sector and have first-hand experience of operations, insecurity, and rider culture	Operational realities, experiences of crime, perceptions of insecurity, peer influence, organised criminal tendencies, regulation challenges
Stage leaders	They oversee stage organisation and are familiar with rider discipline and local disputes	Stage governance, internal controls, rider accountability, local crime trends, dispute management
Community leaders / residents	They provide community-level perspectives on boda-boda operations and insecurity	Community perceptions of boda-boda crime, local accountability, trust in riders, conflict resolution, local safety concerns

Note: The exact categories varied slightly across counties depending on local context, relevance to the study objectives, and the practical feasibility of assembling relatively homogeneous groups.

Each focus group discussion lasted approximately 60 to 90 minutes depending on the level of engagement and the range of issues raised. The discussions were moderated by the researcher, with the support of a note-taker where necessary. The researcher guided the discussion using the FGD guide, ensure balanced participation, manage dominant voices, and encourage quieter participants to contribute. The discussions were conducted in settings that are safe, neutral, and convenient for participants. Every effort was made to create an atmosphere that encourages openness and respectful exchange. Since the study deals with crime and insecurity, particular care were taken to avoid discussing highly sensitive personal experiences in a manner that could expose participants to risk or discomfort in a group setting. Participants were informed of the purpose of the discussion, the voluntary nature of participation, and the need to respect the confidentiality of views shared during the session.

With participants' consent, the discussions were audio-recorded in order to ensure accurate capture of the data. In addition, detailed notes were taken during the discussion to record key issues, interaction patterns, non-verbal responses where relevant, and important contextual observations. The recordings were later transcribed verbatim and, where necessary, translated into English for analysis. Care was taken to remove names and other identifying information from the transcripts in order to preserve anonymity and confidentiality.

Table 3.24 presents the number of focus group discussions by county and participant category for planning purposes.

Table 3.24**:** Focus Group Discussions and Participants by County

County	**FGD category**	**Number of FGDs**	**Participants per FGD**	**Total participants**
Mombasa	Boda-boda riders	1	8–10	8–10
	Stage leaders	1	8–10	8–10
	Community leaders / residents	1	8–10	8–10
	Subtotal	**3**		**24–30**
Machakos	Boda-boda riders	1	8–10	8–10
	Stage leaders	1	8–10	8–10
	Community leaders / residents	1	8–10	8–10
	Subtotal	**3**		**24–30**
Nyeri	Boda-boda riders	1	8–10	8–10
	Community leaders / residents	1	8–10	8–10
	Subtotal	**2**		**16–20**
Bomet	Boda-boda riders	1	8–10	8–10
	Stage leaders	1	8–10	8–10
	Community leaders / residents	1	8–10	8–10
	Subtotal	**3**		**24–30**
Busia	Boda-boda riders	1	8–10	8–10
	Community leaders / residents	1	8–10	8–10
	Subtotal	**2**		**16–20**
Marsabit	Boda-boda riders	1	8–10	8–10
	Community leaders / residents	1	8–10	8–10
	Subtotal	**2**		**16–20**
Kirinyaga	Boda-boda riders	1	8–10	8–10
	Community leaders / residents	1	8–10	8–10
	Subtotal	**2**		**16–20**
	Grand Total	**17 FGDs**		**126–170**

Note: Each county was treated as an independent analytical unit. The number shown in the table refers to the number of focus group discussions in each county, while each individual discussion

group comprised approximately 8 to 10 participants. The final number of groups and participants varied slightly depending on field conditions, participant availability, and the point at which sufficient thematic depth is achieved.

Before the main data collection, the focus group discussion guide was pilot tested to assess the clarity, sequencing, appropriateness, neutrality, and sensitivity of the discussion prompts. The pilot showed that the guide could generate useful group-level narratives, but that long or multi-part prompts needed simplification to reduce respondent fatigue and avoid leading participants. The guide was therefore refined to improve flow, neutrality, probing, and alignment with the objectives of the study.

Overall, focus group discussions provided the study with rich qualitative evidence on group norms, collective experiences, community perceptions, and shared understandings of boda-boda crime and insecurity. Conducting and analysing the discussions on a county-by-county basis preserved the distinct analytical identity of each county and strengthen the validity of subsequent comparison across urban, rural, and border settings. The focus group findings therefore complemented the evidence generated through questionnaires, key informant interviews, observation, document review, and GIS analyses

Document review was used as a supplementary method of data collection to provide contextual, institutional, and secondary information relevant to the study. This method is appropriate because the study seeks to examine boda-boda crime not only as an individual or community experience, but also as a phenomenon shaped by policy, regulation, administrative practice, security reporting, and wider institutional contexts. Through document review, the study was able to access existing records, official reports, policy frameworks, and other written sources that shed light on the structure of the boda-boda sector, the governance environment within which it operates, and the documented patterns of crime and insecurity associated with it. In this way, document review complemented the primary data collected through questionnaires, key informant interviews, focus group discussions, observation, and GIS analysis.

The use of document review is important because it enables the researcher to examine information that may not be fully captured through direct field interaction alone. Some issues relevant to the study, such as regulatory provisions, licensing procedures, court outcomes, county transport policies, crime statistics, and prior interventions in the boda-boda sector, are often best understood

through documentary evidence. Document review therefore helped the study establish the broader administrative, legal, and policy context within which boda-boda crime occurs. It also helped identify gaps between formal rules and actual practice, thereby enriching the interpretation of primary data collected in the field.

In this study, the documents to be reviewed included a wide range of official, institutional, and secondary sources. These included county integrated development plans, county spatial plans, annual development plans, county transport policy documents, county licensing records, boda-boda registration records where accessible, police reports, court records, prosecution records, security briefings, county enforcement reports, boda-boda association or SACCO reports, NGO and civil society reports, parliamentary or administrative reports, and media reports relevant to boda-boda crime and insecurity. Where available and ethically accessible, records from law-enforcement and judicial institutions may be particularly useful in identifying the documented forms of crime associated with boda-boda operations and the institutional responses that have been applied.

Because the study covers seven counties that were each treated as independent analytical units, document review was also undertaken on a county-by-county basis. This means that the researcher sought and reviewed documents relevant to each of the sampled counties including, Mombasa, Machakos, Nyeri, Bomet, Busia, Kirinyaga and Marsabit; so that county-specific transport, security, and governance contexts could be properly understood. This approach is important because the available documentary evidence is likely to vary across counties in terms of content, depth, and accessibility. Reviewing documents independently for each county helped preserve the distinct contextual profile of each study site before broader comparisons are made across urban, rural, and border settings.

The main purpose of document review in this study was to generate information on several key issues. First, it helped establish the policy and regulatory framework governing boda-boda operations, transport management, local licensing, rider organisation, and county-level control measures. Second, it helped identify the documented forms and patterns of boda-boda-related crime, including whether available records point to isolated criminal acts or more coordinated and organised forms of activity. Third, it provided information on institutional responses, including enforcement, prosecution, registration, regulation, and crime-prevention measures. Fourth, it

helped locate the study within the wider context of county planning, local security management, and mobility governance. Finally, it provided a basis for comparing official or institutional accounts with the experiences and perceptions reported by respondents during data collection.

To guide the process systematically, the researcher used a document review checklist. The checklist was designed to ensure that relevant information is extracted consistently from different categories of documents. It included items relating to the title of the document, year of publication, issuing institution, geographical relevance, major themes covered, and the specific type of information relevant to the study objectives. The checklist also guided the extraction of information on policy provisions, crime trends, identified risk factors, institutional responses, regulatory gaps, border and mobility issues, and any references to boda-boda operations within the broader governance or security environment. The use of a checklist is important because it helps maintain consistency in reviewing documents drawn from different institutions and counties.

The document review process involved several steps. First, relevant documents were identified through county offices, transport departments, security institutions, public repositories, libraries, websites, media archives, boda-boda associations, and civil society organisations. Second, the researcher assessed the relevance, authenticity, and usefulness of each document for the study. Third, the selected documents were read carefully and systematically, and relevant information was extracted using the document review checklist. Fourth, the extracted information were organised thematically and by county so that it can later be compared with the primary data collected in the field. This process helped ensure that document review is not treated as a passive background activity, but as an active and structured component of data collection.

Particular attention was paid to the credibility, authenticity, and relevance of the documents reviewed. Official documents issued by county governments, transport agencies, law-enforcement institutions, and judicial bodies were prioritised where available because they are more likely to provide authoritative information on regulation, administration, and documented cases. However, civil society reports, NGO publications, association reports, and reputable media sources may also be useful in identifying gaps, controversies, community concerns, and practical challenges that may not be fully reflected in official documentation. In using such materials, the researcher was careful to distinguish between verified institutional records and interpretive or advocacy-oriented sources.

Table 3.25 summarizes the main categories of documents to be reviewed, their relevance to the study, and the type of information expected from each source.

Table 3.25: Summary of Documents to be Reviewed and Information Expected

Document category	Examples	Relevance to the study	Main information expected
County development and planning documents	CIDPs, spatial plans, annual development plans	Provide county context on transport, infrastructure, governance, and security priorities	County transport context, infrastructure profile, development priorities, security concerns
County transport and licensing records	Licensing registers, transport department reports, rider registration records	Help establish the formal regulatory and administrative framework for boda-boda operations	Registration systems, licensing practices, regulation gaps, operational controls
Police and security reports	Police crime reports, occurrence records, security briefs	Provide institutional data on crime patterns and law-enforcement responses	Reported crime trends, common offences, enforcement challenges, hotspot information
Court and prosecution records	Court files, prosecution summaries, case records	Help show how boda-boda-related crime enters and moves through the justice system	Types of cases, prosecution outcomes, evidentiary issues, repeat offences
Boda-boda association/SACCO documents	Membership lists, constitutions, disciplinary records, meeting reports	Reveal the internal organisation and regulatory practices of rider groups	Membership structures, accountability mechanisms, internal discipline, rider governance
NGO and CSO reports	Governance, transport, security, or community safety reports	Provide external assessments and community-based perspectives	Policy gaps, victim support issues, community concerns, intervention experiences
Media reports	Newspaper articles, broadcast reports, online reports	Help identify reported incidents, trends, and public discourse around boda-boda crime	Public narratives, reported incidents, emerging issues, local debates

Note: The actual availability of documents varied across counties and institutions. Only documents considered relevant, accessible, and credible were included in the review.

In addition to identifying categories of documents, the study also organised document review by county so that the specific documentary profile of each county can be taken into account.

Table 3.26 presents the focus of document review across the six selected counties.

Table 3.26: County-Level Focus of Document Review

County	Main documentary focus
Mombasa	Urban transport regulation, metropolitan insecurity, county transport administration, reported crime and enforcement patterns
Machakos	Urban and peri-urban transport systems, local mobility governance, law-enforcement response, reported boda-boda crime trends

Nyeri	Rural and semi-urban mobility governance, community regulation, local security administration, crime reporting patterns
Bomet	Rural transport systems, stage organisation, local administration, agricultural transport linkages, community-level security issues
Busia	Border mobility, cross-border trade, transport regulation, security and smuggling concerns, enforcement challenges
Marsabit	Frontier mobility, sparse transport networks, security administration, borderland enforcement, remoteness and access challenges
Kirinyaga	Rural and semi-urban mobility governance, community regulation, local security administration, crime reporting patterns

Note: Each county was handled independently during document review so that county-specific policy, regulatory, and security contexts are first understood separately before comparative interpretation is undertaken.

The findings from document review were analysed thematically and used mainly for triangulation. This means that the information obtained from documents was compared with evidence generated through questionnaires, interviews, focus group discussions, observation, and GIS analysis. For example, official reports of crime patterns may be compared with riders' experiences of insecurity, while county transport policies may be compared with respondents' views on enforcement and regulation. This process helped strengthen the credibility of the study by allowing the researcher to identify areas of convergence, complementarity, or discrepancy across different data sources.

The use of document review also raises important issues of access, confidentiality, and ethical use of information. Some documents, especially police records, court files, security briefs, or internal administrative reports, may contain sensitive information. Only documents that are legally and ethically accessible were reviewed, and all information obtained were handled responsibly. Where the study draws on sensitive records, the researcher ensured that no confidential or identifying information is disclosed in the final report in a manner that could compromise institutions, respondents, or ongoing cases.

Overall, document review provided the study with valuable contextual, institutional, and secondary information on boda-boda operations, crime patterns, governance systems, and policy responses across the selected counties. It strengthened the study by situating the primary data within broader administrative and regulatory frameworks, supporting triangulation, and helping the researcher develop a more comprehensive and context-sensitive interpretation of boda-boda crime and its possible evolution into organised criminal activity.

GIS and spatial data collection methods were used to capture the geographical dimension of boda-boda operations and crime patterns in the selected counties. This component is important because

the study seeks not only to understand the forms and drivers of boda-boda-related crime, but also to establish where such crime occurs, how it is distributed geographically, and whether it is concentrated in identifiable hotspot locations. Spatial data collection is therefore intended to add a geographical layer to the study by linking boda-boda operations, crime incidents, and local infrastructure to specific places within the selected counties. In this way, the GIS component complemented the quantitative and qualitative strands of the study by enabling spatial analysis of insecurity within the boda-boda sector.

The use of GIS in this study is justified by the fact that crime and insecurity are not randomly distributed across space. Rather, they tend to cluster in particular environments, such as busy transport corridors, market centres, border crossing areas, densely populated settlements, or poorly regulated operational zones. Since boda-boda transport is highly dependent on route connectivity, road hierarchy, local mobility nodes, and stage locations, the spatial distribution of crime is likely to reflect important relationships between transport infrastructure and insecurity. GIS-based spatial data collection therefore allowed the study to identify such patterns and to interpret boda-boda crime not only as a social or institutional phenomenon, but also as a geographically situated one.

The spatial data to be collected in this study included both primary and secondary spatial data. Primary spatial data were collected directly during data collection and included the GPS coordinates of boda-boda stages, reported crime locations, major market centres, transport terminals, road junctions, border crossing points, police posts, and other operational or security-related features relevant to the study. These coordinates provided the study with location-specific data that can later be mapped, analysed, and compared across the six selected counties. The primary spatial data was particularly important in identifying the operational geography of the boda-boda sector and the local spatial context within which crime occurs.

Secondary spatial data were obtained from official and publicly available repositories where accessible. These included county and sub-county administrative boundary shapefiles, road-network layers, settlement layers, market-location layers, border-line data, police station locations, and other map layers relevant to the study. Secondary spatial data provided the broader geographical and infrastructural context within which the primary field data can be interpreted. They also made it possible to conduct overlay analysis and spatial comparison between boda-boda crime locations and other physical or administrative features.

Because the study covers six counties that were each treated as independent analytical units, spatial data collection was also organised on a county-by-county basis. This means that the location data collected in Mombasa, Machakos, Nyeri, Bomet, Busia, and Marsabit were first mapped and analysed independently within each county before broader cross-county comparison is undertaken. This is important because each county has its own distinctive spatial characteristics, including settlement structure, road network, transport intensity, administrative boundaries, and security environment. Handling the counties independently during spatial data collection therefore helped preserve the contextual integrity of each site and ensure that the geographic evidence generated is meaningful within the setting in which it was collected.

The primary spatial data were collected using GPS-enabled devices or mobile applications capable of capturing accurate geographic coordinates in the field. These included handheld GPS devices or mobile phones equipped with location-enabled data collection applications. For each relevant site or point feature, the researcher recorded the geographic coordinates together with a brief attribute description indicating the type of feature, county, sub-county, and any other relevant notes. For example, where a boda-boda stage is recorded, the researcher may note its name, estimated activity level, proximity to roads or markets, and any relevant security observations. This combination of coordinate data and descriptive attributes improved the usefulness of the spatial database for later mapping and analysis.

The main categories of primary spatial features to be collected are summarized in Table 3.27.

Table 3.27: Categories of Primary Spatial Data to Be Collected

Spatial feature	**Description**	**Relevance to the study**
Boda-boda stages	Formal or informal boda-boda pickup and operating points	Help map the operational geography of boda-boda transport and compare stage locations with crime patterns
Reported crime locations	Places where crime incidents involving boda-boda operations are reported to have occurred	Help identify the spatial distribution and concentration of crime
Market centres	Major commercial and trading centres within the selected counties	Help assess whether crime hotspots are associated with commercial activity and population movement
Transport nodes	Bus parks, terminals, junctions, road intersections, and mobility hubs	Help examine the relationship between mobility concentration and insecurity
Major roads and corridors	Important road links, highways, and access roads	Help assess whether crime is associated with transport corridors and route hierarchy
Border points	Official or informal border crossing areas in Busia and Marsabit	Help examine the link between cross-border mobility and organised criminal activity

Police posts / security installations	Locations of police posts, stations, or other security facilities	Help assess the relationship between security presence and the distribution of crime

Note: The actual categories recorded in the field varied slightly depending on county context and the relevance of specific features to the objectives of the study.

In addition to primary data, the study relied on several categories of secondary spatial data in order to provide the broader geographical and administrative framework for analysis. These are summarized in Table 3.28.

Table 3.28: Categories of Secondary Spatial Data to be Used

Spatial layer	**Source type**	**Relevance to the study**
County and sub-county boundaries	Official administrative shapefiles	Provide the spatial framework for mapping and county-level comparison
Road-network layers	Government or open-source road databases	Support road classification, transport corridor analysis, and accessibility interpretation
Settlement / built-up area layers	Census, planning, or open-source datasets	Help relate crime patterns to settlement concentration and urbanisation
Market and service-centre layers	County planning documents or digitized point datasets	Help assess the concentration of crime around commercial and service nodes
Border-line and crossing-point data	Official border or administrative datasets	Important for examining border-related mobility and insecurity in Busia and Marsabit
Hydrography and land-cover layers	Public GIS repositories where relevant	Provide additional geographical context for movement patterns and accessibility

Note: Secondary spatial datasets were selected on the basis of relevance, availability, accuracy, and compatibility with the objectives of the study.

The collection of GIS data was guided by a spatial data collection sheet or field form. This instrument enabled the researcher to record not only coordinates, but also descriptive details associated with each location. The form included the name of the location, feature type, county, sub-county, GPS coordinates, date of recording, and any relevant remarks on accessibility, activity level, or security significance. The use of a structured field form is important because it ensures consistency in spatial data collection across counties and improves the reliability of later spatial processing and analysis.

Once collected, the spatial data were imported into GIS software such as QGIS or ArcGIS for storage, cleaning, processing, visualisation, and analysis. QGIS is an established open-source GIS platform used to create, edit, visualize, analyse, and publish geospatial information, while ArcGIS is also widely used for professional spatial analysis and map production. The collected point data were checked for coordinate accuracy, duplicate entries, and consistency of attribute information

before analysis begins. This cleaning process is essential because spatial errors at the data-entry stage may compromise the accuracy of maps and spatial interpretation.

Spatial data processing involved several stages. First, all spatial layers were projected into a common coordinate reference system suitable for analysis. Second, the point data collected in the field was linked to descriptive attributes and organised by county. Third, secondary layers such as roads, settlements, markets, and boundaries were clipped to the selected county boundaries. Fourth, the cleaned datasets were prepared for mapping and for more advanced spatial analyses such as hotspot analysis, point pattern analysis, buffer analysis, and spatial overlay analysis. This structured process helped ensure that the GIS component of the study is methodologically rigorous and analytically useful.

The GIS data were used for several analytical purposes in the study. First, it supported descriptive mapping, showing the location of boda-boda stages, crime incidents, transport nodes, market centres, and other relevant features. Second, it enabled hotspot analysis, especially through kernel density estimation, to identify areas where crime incidents are concentrated. Third, it supported buffer analysis to examine the concentration of crime around specific features such as major roads, boda-boda stages, market centres, police posts, and border points. Fourth, it supported spatial overlay analysis to examine how crime patterns relate to roads, settlements, administrative units, and other environmental characteristics. Finally, GIS supported comparative spatial analysis across the six counties, making it possible to identify differences between urban, rural, and border contexts.

Table 3.29 summarizes the main analytical uses of GIS data in the study.

Table 3.29: Main Analytical Uses of GIS and Spatial Data in the Study

Analytical use	Purpose
Descriptive mapping	To visualize the spatial distribution of boda-boda stages, crime incidents, transport nodes, and other relevant features
Hotspot analysis	To identify areas with relatively high concentrations of boda-boda-related crime
Point pattern analysis	To assess whether crime incidents are clustered, dispersed, or randomly distributed
Buffer analysis	To examine the concentration of crime around roads, markets, stages, police posts, and border points
Spatial overlay analysis	To compare crime locations with roads, settlements, administrative units, and mobility corridors
Comparative county analysis	To assess how spatial patterns differ across urban, rural, and border counties

Note: These analytical procedures were undertaken after spatial data collection and cleaning, and their detailed application is presented in the data analysis section of the proposal.

Since the study involved crime mapping, the handling of spatial data was guided by strict ethical safeguards. Exact coordinates of sensitive incidents, respondent-linked locations, or operational sites were not publicly disclosed where such disclosure may compromise safety, privacy, or confidentiality. Where necessary, spatial data were generalised, masked, or aggregated in the final presentation of findings. This was especially important in a study dealing with crime, insecurity, and possible organised criminal activity, where careless disclosure of location data could expose participants or communities to harm.

Before the main data collection, the spatial data collection procedures and GIS field forms were pilot tested to assess practical suitability, clarity, coordinate reliability, and compatibility with route, node, and hotspot mapping. The pilot showed that GIS data collection is feasible and valuable, but that latitude and longitude fields must be separated, made mandatory where applicable, and checked against expected county ranges. It also confirmed the need for node codes, route codes, hotspot descriptors, and coordinate-verification status in the main study.

Overall, GIS and spatial data collection provided the study with an important geographical dimension by showing where boda-boda operations and associated crime patterns are located, how such patterns are distributed, and whether they are spatially concentrated in identifiable hotspots. This component strengthened the study by complementing the questionnaire, key informant interviews, focus group discussions, observation, and document review, and by making it possible

to analyse boda-boda crime not only as a social and institutional phenomenon but also as a spatially organised one

Observation. Where feasible, non-participant observation was used as an additional method of data collection to capture contextual information on boda-boda operations and the environments within which crime and insecurity may occur. This method is appropriate because the study seeks not only to rely on what respondents report through questionnaires, interviews, and focus group discussions, but also to directly examine the everyday practices, organisational arrangements, and physical settings associated with boda-boda transport. Observation is useful because it allows the researcher to see practices and conditions that respondents may not fully describe, may take for granted, or were sometimes unwilling to discuss openly (Kothari, 2004).

In this study, observation was used mainly to capture the operational context of boda-boda stages and related transport environments within the selected counties. The focus was not on participating in boda-boda activities, but rather on systematically observing how the sector functions in practice. As a non-participant observer, the researcher remained external to the activities being observed and noted interfere with the normal operations of riders, stage leaders, or other actors. This was important because it allowed the study to record natural behaviour and environmental conditions as they occur in real-life settings.

Because the study covers seven counties that were each treated as independent analytical units, observation was conducted separately within each county. This means that observations made in Mombasa, Machakos, Nyeri, Bomet, Busia, Kirinyaga and Marsabit were first recorded and interpreted within the specific context of each county before any cross-county comparison was undertaken. This county-based approach was important because the organisation of boda-boda stages, rider behaviour, passenger movement, and local security environments are likely to differ significantly between urban, rural, and border settings. By handling each county independently, the study was better able to capture the contextual realities that shape boda-boda operations and associated insecurity in each site.

Observation in this study focused on several key aspects of boda-boda operations. First, it examined stage organisation and management, including how riders are arranged at the stage, whether there appears to be a recognized leadership structure, how riders are called for passengers, whether records or registration systems are visible, and whether there were observable signs of

internal regulation or discipline. This is important because the way a stage is organised may provide useful insight into accountability, order and the extent to which informal controls exist within the boda-boda sector.

Second, observation focused on rider interactions and group dynamics. The researcher paid attention to how riders interact with one another, with stage leaders, with passengers, and with local officials where applicable. This included observing cooperation, conflict, informal decision-making, dispute handling, or patterns of inclusion and exclusion within the group. Such observations may help reveal aspects of rider culture, peer regulation, and collective behaviour that are relevant to understanding the social environment within which crime may either be contained or facilitated.

Third, the study observed movement patterns and passenger flow at selected stages and transport nodes. This included noting the volume of rider and passenger activity, peak operating times, common travel directions, levels of congestion, and the relationship between boda-boda activity and nearby markets, roads, transport terminals, or border points. This is relevant because movement concentration and route patterns may influence both the operational importance of particular locations and their exposure to crime and insecurity. Observation of such patterns therefore complemented the GIS and questionnaire data by adding real-time contextual understanding.

Fourth, the study observed the presence or absence of security and regulatory actors in boda-boda operational spaces. This included noting whether police officers, NGAO personnel, county enforcement officers, or stage leadership structures are visibly present and active; whether there are notices, checkpoints, or visible controls; and whether rider conduct appears to reflect active supervision or weak regulation. The purpose of this aspect of observation was not to monitor enforcement actions directly, but to understand the visible governance environment within which boda-boda transport operates.

Fifth, observation examined compliance with operational rules and safety practices where such matters are visible. This included whether riders wear identifiable clothing, whether safety gear such as helmets or reflective jackets appears to be in use, whether stages operate in an orderly or disorderly manner, whether passengers are handled in a structured way, and whether there are visible signs of registration or association membership. While the study is not primarily about road

safety, these observations may still be relevant because weak operational discipline and weak regulation may relate to the broader conditions that enable crime and insecurity within the sector.

Finally, observation captured general environmental and locational conditions at key sites. This included the physical location of the stage, proximity to markets or major roads, crowding, visibility, accessibility, lighting conditions where relevant, signs of informal activity, and the overall character of the surrounding environment. Such environmental factors are important because they may influence both boda-boda operations and the spatial opportunities for crime. Observation of these physical conditions therefore strengthened the contextual interpretation of the study.

To guide this process systematically, the researcher used an observation checklist. The checklist helped ensure that relevant features are recorded consistently across the different study sites and counties. It included items relating to stage structure, number of riders observed, visible leadership arrangements, rider behaviour, passenger flow, security presence, operational orderliness, compliance indicators, and key environmental features. The checklist may also include space for brief narrative field notes to capture unexpected observations or contextual details that do not fit neatly into predetermined categories. The use of a checklist was important because it helped transform observation from casual looking into a more systematic research procedure.

Table 3.30 summarizes the main areas of observation and the type of information expected from each.

Table 3.30: Main Areas of Observation and Information Expected

Area of observation	Focus of observation	Information expected
Stage organisation	Physical arrangement of stages, leadership visibility, orderliness, internal controls	Nature of stage governance, structure, and accountability
Rider interactions	Interactions among riders, leaders, passengers, and officials	Group dynamics, peer regulation, conflict, cooperation
Movement patterns and passenger flow	Activity levels, rider turnover, passenger demand, peak times, route direction	Operational intensity and mobility patterns
Security and regulatory presence	Visibility of police, NGAO, county officials, checkpoints, notices	Governance environment and visible enforcement context
Compliance with operational rules	Safety gear, identifiable clothing, queue order, registration signs	Visible discipline, regulation, and operational control
Environmental conditions	Proximity to roads, markets, border points, congestion, physical setting	Contextual conditions that may shape crime and insecurity

Note: The actual issues observed varied slightly depending on county context, site conditions, and the practical feasibility of observing specific operational environments.

Observations were conducted at selected boda-boda stages, markets, transport nodes, major road junctions, and other operational locations identified during data collection. These sites were selected because they are likely to reflect the everyday realities of boda-boda transport and because they are relevant to the study's objectives. In some cases, observation may also be undertaken at or near identified hotspot areas or border mobility zones where such access is feasible and ethically appropriate. However, observation remained limited to what can be safely and responsibly examined in the field.

The observational data were recorded mainly through field notes and checklist entries. Where relevant and ethically appropriate, the researcher may also note the approximate time, date, and location of the observation so that the contextual conditions can be related to other forms of data such as GIS mapping or interview findings. Observation was not used to identify or track individual persons in a manner that compromises privacy. Rather, it was used to record patterns, practices, settings, and visible conditions relevant to the study.

The findings from observation were used mainly for contextualization and triangulation. This means that they were compared with data obtained from questionnaires, key informant interviews, focus group discussions, document review, and GIS analysis. For example, respondents may describe a stage as poorly regulated, and observation may help verify whether leadership structures and visible controls are indeed weak. Similarly, GIS mapping may show that a stage is located near a market or major road, while observation may help clarify the actual nature of movement and congestion at that site. In this way, observation strengthened the overall credibility of the study by providing direct evidence from the field.

Observation in this study was also guided by ethical considerations. Since the study involves crime and insecurity, the researcher ensured that observation is conducted in a manner that does not expose participants or the researcher to unnecessary risk. The researcher avoided intrusive observation of sensitive situations and noted record identifying details in ways that compromise privacy or confidentiality. Where a setting was considered unsafe or ethically inappropriate for observation, the researcher noted proceed with the activity. These precautions were important in ensuring that observation remains a responsible and supportive method of data collection rather than a source of harm or discomfort.

Before the main data collection, the observation checklist was pilot tested to assess its clarity, practicality, and suitability for recording stage organisation, route conditions, lighting, visible enforcement presence, environmental vulnerability, and safety-related conditions at selected sites. The pilot helped identify the need for concise observation prompts and stronger safety guidance for researchers in sensitive or high-risk locations. This improved the consistency, usefulness, and ethical safety of observational data in the study.

Overall, non-participant observation provided the study with valuable contextual information on stage organisation, rider behaviour, mobility patterns, regulatory presence, and the environmental conditions within which boda-boda operations take place. It strengthened the study by adding direct field-based evidence to the data obtained through questionnaires, interviews, focus group discussions, document review, and GIS analysis. Observation therefore served as an important supportive method for understanding the practical and situational context of boda-boda crime and insecurity across the selected counties.

3.6 **Pilot Study, Validity and Reliability of Instruments**

This section describes the procedures used to pre-test and refine the research instruments and to ensure that the data collected were valid, reliable, ethically safe and suitable for addressing the study objectives. Because the study adopted a mixed-methods design and used several instruments, the tools were subjected to expert review and pilot testing before the main data collection. Pilot testing was important because it helped identify weaknesses in wording, sequencing, clarity, relevance, length, sensitivity, data-entry structure, and operational practicality before full deployment.

The pilot phase covered the main data collection instruments: the questionnaire, key informant interview guide, focus group discussion guide, observation checklist, document review checklist, GIS/spatial data collection form, node register, pathway register, data-cleaning log, and missing-data log. It assessed whether the instruments could capture the five core dimensions of the study: crime manifestations, indicators of organised criminal activity, socio-economic drivers, institutional and contextual conditions, and spatial distribution or hotspot patterns. It also tested whether the instruments could be administered across contrasting transport-security environments without criminalising the broader boda-boda livelihood system.

Pilot Study. A two-county pilot study was conducted in Nairobi and Migori before the main data collection. Nairobi represented a dense urban and metropolitan transport setting characterised by high commuter flows, complex stage dynamics, market nodes, informal settlements, congestion, and intensive enforcement interactions. Migori represented a rural, peri-urban, lake-side, and border-influenced setting characterised by feeder roads, market-day mobility, remote routes, night operations, and cross-border movement. These two counties were appropriate because they tested whether the same instruments could work across different mobility and security environments.

The pilot generated a useful mixed-methods evidence base. Direct sheet-level review identified 646 usable questionnaire records, comprising 374 usable questionnaire rows in Nairobi and 272 in Migori. The qualitative and spatial data also provided important methodological evidence, including Nairobi KII, FGD, GIS, and node records and Migori KII, FGD, GIS, and node records. These records were used not as final inferential evidence for Kenya, but as a basis for assessing instrument clarity, construct coverage, field practicality, spatial readiness, data quality, and ethical safety.

The pilot confirmed that the instruments were broadly suitable for the main study after revision. Respondents in both counties were able to discuss boda-boda-related crime, identify crime forms and hotspot locations, distinguish ordinary operational challenges from security-relevant threats, and provide information on repeated or organised criminal activity. The pilot also showed that the distinction between incidental criminal use and organised criminal activity was meaningful to respondents and should be retained as a central analytical distinction in the study.

At the same time, the pilot identified specific weaknesses that required refinement. These included long KII prompts, inconsistent spelling and capitalisation in categorical responses, income-category distortion, record-count mismatches between dashboards and direct questionnaire rows, coordinate-entry errors, and the need for safer handling of sensitive questions on criminal groups, corruption, political misuse, and organised-crime dynamics. These findings informed revisions to question wording, coding categories, skip patterns, interviewer guidance, GIS fields, and data-entry validation rules.

The pilot therefore strengthened both the content of the instruments and the operational readiness of the study. It informed respondent approach strategies, sequencing of data collection activities, note-taking procedures, ethical safeguards, privacy screening, use of GPS-enabled devices, node

and route coding, and data-quality checks. The final instruments were prepared on the basis of these lessons so that the main study could generate clearer, more reliable, more comparable, and ethically safer data.

Validity refers to the extent to which a research instrument measures what it is intended to measure. In this study, particular attention was given to content validity, face validity, and construct validity because the instruments were designed to capture complex issues such as boda-boda crime, insecurity, criminal organisation, mobility patterns, regulatory weakness, enforcement gaps, and spatial hotspot formation. The pilot study provided practical evidence that the instruments could capture these constructs across contrasting urban and rural-border contexts.

Content validity was strengthened by ensuring that all instruments were closely aligned with the study objectives, research questions, conceptual framework, and key variables. Each section of the questionnaire, interview guide, focus group discussion guide, observation checklist, document review checklist, and GIS field form was derived from the issues investigated by the study, including forms of boda-boda crime, operational characteristics of the sector, perceptions of insecurity, institutional responses, enabling factors, organised criminality, and spatial concentration of risk.

The pilot further strengthened content validity by demonstrating that the tools could operationalise all five study objectives. The instruments captured crime categories, victim and location information, indicators of coordination and repetition, socio-economic vulnerability, institutional weaknesses, and spatial nodes or routes associated with hotspots. Where gaps or ambiguities were identified, the items were revised, simplified, re-sequenced, or supported with clearer interviewer instructions.

Face validity refers to the extent to which a research instrument appears, at face value, to measure what it is intended to measure. In this study, face validity was assessed through expert review and pilot responses. The pilot confirmed that respondents generally understood the questions and could relate them to actual boda-boda operations, crime experiences, institutional interactions, and mobility contexts in Nairobi and Migori.

During the review stage, the draft questionnaire, key informant interview guide, focus group discussion guide, observation checklist, document review checklist, and GIS/spatial data

collection tools were examined for logic, clarity, relevance, sequencing, and sensitivity. The review considered whether the wording of questions was simple and understandable, whether response categories were appropriate, and whether the instruments could capture sensitive crime and security issues without exposing respondents or researchers to unnecessary risk.

Face validity was also assessed during the pilot study in Migori and Nairobi. Respondent reactions, field feedback, and administration experience showed that the tools were generally understandable, but some prompts were too long, some response categories required standardisation, and some sensitive questions required clearer skip options and indirect wording. These lessons were particularly important because the study deals with crime, corruption, political misuse, and possible organised criminality.

The pilot process therefore improved the credibility and practical acceptability of the instruments. Questions or prompts that appeared vague, confusing, too technical, repetitive, leading, or unnecessarily sensitive were revised, simplified, reworded, or removed. In this way, face validity was strengthened by ensuring that the instruments were methodologically sound, field-ready, and acceptable to respondents across different operational environments.

Construct validity was addressed by ensuring that the items included in the instruments corresponded clearly to the theoretical constructs being studied. The key constructs included boda-boda-related crime, insecurity, organised criminality, mobility patterns, regulatory weakness, enforcement gaps, socio-economic vulnerability, institutional conditions, and spatial risk. The pilot confirmed that respondents could distinguish among ordinary boda-boda operations, incidental crime, irregular group activity, and organised or repeated criminality. This strengthened confidence that the instruments measured more than general opinion and generated data linked to the core concepts of the study.

Table 3.31 summarises the main forms of validity addressed in the study and the strategies used to strengthen them.

Table 3.31: Forms of Validity and How they were Addressed

Type of validity	Meaning	How it was strengthened in the study
Content validity	Extent to which the instrument adequately covers the study objectives and variables	Alignment of instruments with objectives, research questions, conceptual framework, and pilot evidence from Nairobi and Migori; revision of unclear or weakly aligned items after pilot testing.
Face validity	Extent to which the instrument appears appropriate and relevant on the surface	Expert review and pilot feedback from Nairobi and Migori respondents; simplification of long prompts, standardisation of response categories, and refinement of sensitive questions.
Construct validity	Extent to which the instrument captures the theoretical constructs under study	Operationalisation of crime manifestations, organised-crime indicators, socio-economic drivers, institutional conditions, and spatial hotspot patterns; pilot confirmation that respondents could distinguish incidental crime from organised or repeated criminal activity.

Note: The instruments were revised after expert review and pilot testing to improve content, face, and construct validity before the main data collection.

Reliability refers to the degree to which a research instrument yields consistent and dependable results when used under similar conditions. In this study, reliability was considered mainly in relation to the quantitative questionnaire because it contains structured items intended for statistical analysis. Consistency and dependability were also addressed in the qualitative component through systematic procedures for interviewing, note-taking, transcription, coding, and interpretation. Reliable instruments reduce measurement error and strengthen confidence in the findings.

Reliability of the Questionnaire. For the quantitative questionnaire, reliability was assessed using Cronbach's alpha coefficient for selected item clusters. Cronbach's alpha was used as an internal-consistency diagnostic to determine whether items expected to measure related constructs behaved coherently as groups. Because several clusters functioned as checklists rather than pure psychometric scales, the alpha results were interpreted cautiously and alongside conceptual relevance.

Where alpha is the reliability coefficient, k is the number of items in the scale or item cluster, the item variance is the variance of each individual item, and the total-score variance is the variance of the summed scale or item-cluster score.

The pilot reliability results showed that the Nairobi crime-manifestation items had a Cronbach's alpha of 0.794, indicating relatively strong internal consistency for a pilot checklist. The organised-crime indicators also performed well, with an alpha of 0.759. The hotspot-reason items produced an alpha of 0.698, which is close to the commonly used 0.70 threshold and acceptable at pilot level given that hotspot reasons can vary by locality. The institutional-condition items produced a lower alpha of 0.351, suggesting that institutional factors such as corruption, weak registration, poor coordination, political interference, low reporting, and weak stage discipline may represent multiple governance dimensions rather than one narrow scale. These results supported retention and refinement of the core item clusters rather than replacement of the instruments.

Reliability and Dependability in the Qualitative Component. Although reliability in the strict statistical sense applies mainly to the quantitative component, the study also strengthened consistency and dependability in the qualitative instruments and procedures. This was achieved through the use of prepared interview and discussion guides, neutral probing, careful note-taking, audio recording where consent was granted, systematic transcription, and consistent coding procedures. The pilot also showed the need to shorten long qualitative prompts and to train interviewers to avoid leading questions, especially when discussing organised criminality, corruption, political misuse, and insecurity.

The qualitative strand was also guided by the trustworthiness criteria of credibility, dependability, confirmability, and transferability. Credibility was enhanced through triangulation of questionnaire, KII, FGD, observation, document-review, and GIS evidence. Dependability was improved through consistent procedures for interviewing, recording, transcribing, and coding. Confirmability was supported by documentation of field decisions and grounding interpretation in actual data. Transferability was addressed through contextual description of county settings, transport nodes, routes, and operational environments.

Table 3.32 summarises the reliability and trustworthiness procedures used in the study.

Table 3.32: Reliability and Trustworthiness Procedures

Component	Aspect addressed	Procedure applied / refinement made
Quantitative questionnaire	Internal consistency	Cronbach's alpha was computed for selected pilot item clusters. Nairobi results showed alpha = 0.794 for crime manifestations, 0.759 for organised-crime indicators, 0.698 for hotspot reasons, and 0.351 for institutional-condition items, with checklist-based interpretation.
Questionnaire administration	Consistency of administration	Structured questions, interviewer guidance, pilot testing, skip instructions, and standardised response categories were used to improve consistency across respondents and counties.
Key informant interviews	Dependability	Semi-structured guide, neutral probing, audio recording where consent was granted, detailed notes, and simplified prompts after pilot feedback.
Focus group discussions	Dependability	Discussion guide, moderation consistency, note-taking, transcription, and shortened prompts to reduce fatigue and avoid leading participants.
Observation	Consistency	Observation checklist and standardised field notes, with improved safety guidance for sensitive or high-risk locations.
Document review	Consistency	Document review checklist and thematic extraction procedure for consistent handling of institutional, policy, security, and transport records.
Qualitative analysis	Trustworthiness	Credibility, dependability, confirmability, and transferability procedures, supported by triangulation across questionnaire, KII, FGD, observation, document-review, and GIS evidence.
GIS and spatial records	Spatial reliability and verification	Separate latitude and longitude fields, coordinate checks, node codes, route codes, hotspot descriptors, and verification status were incorporated following pilot findings.

Note: Reliability and trustworthiness were strengthened through pilot testing, revision of instruments, triangulation of data sources, and systematic documentation of field and analytical procedures.

Revision of Instruments After Pilot Testing. After completion of the pilot study, the instruments were reviewed comprehensively in light of the pilot findings. The revisions focused on simplifying long KII and FGD prompts, standardising response categories, correcting inconsistent spelling and capitalisation, clarifying the distinction between ordinary safety concerns and national security issues, strengthening skip patterns for sensitive questions, improving interviewer guidance, and ensuring that questions on criminal groups, corruption, political misuse, and organised-crime dynamics are asked ethically and safely.

The pilot also led to improvements in the data-management and GIS components of the study. The main-study tools were refined to include stronger respondent-ID controls, protected dashboard formulas, coded income categories, dropdown validation lists, separate latitude and longitude fields, coordinate-range checks, coordinate-verification status, node codes, route codes, and

hotspot descriptors. Overall, the pilot study in Nairobi and Migori strengthened the clarity, consistency, validity, reliability, ethical safety, and spatial readiness of the study instruments.

3.7 **Data Presentation, Analysis, and Interpretation Procedure**

This section explains how data generated from the study were organised, presented, analysed, and interpreted in line with the study objectives, research questions, and hypotheses. Because the study seeks to examine both the observable patterns of boda-boda-related crime and the deeper socio-economic, institutional, and spatial conditions associated with it, the analysis adopted a mixed-methods approach integrating quantitative, qualitative, and spatial analytical techniques. This approach ensured that the findings move beyond simple description to provide explanation, comparison, and interpretation of the dynamics of boda-boda-related crime across the selected counties.

3.7.1 **Data Preparation and Management**

Following data collection, all raw data went under rigorous preparation and management process to ensure accuracy, consistency, completeness and suitability for subsequent analysis. This process involved the systematic handling of quantitative, qualitative, secondary, and spatial data generated from the study. The purpose of data preparation at this stage was to enhance the reliability, validity, comparability, and interpretive value of the findings.

3.7.1.1 ***Editing and verification of field instruments***

All completed questionnaires, interview schedules, focus group discussion guides, observation checklists, and document review schedules were reviewed immediately after collection to confirm that responses were complete, legible, internally consistent, and relevant to the study variables. This initial scrutiny helped identify omissions, duplicated entries, contradictory responses, and recording errors. Instruments found to be substantially incomplete or unusable was flagged and either excluded from analysis or treated according to established methodological procedures. Field notes were also reviewed alongside the instruments to clarify ambiguous entries and preserve contextual observations made during data collection.

For quantitative data, each questionnaire item was assigned numerical codes based on the variables outlined in the study objectives, research questions, and hypotheses. A coding framework or codebook was developed to specify variable names, labels, value categories, and measurement

scales. The coded data were then entered into a statistical software package such as R or STATA for storage, cleaning, and analysis. To minimize data entry errors, entries were cross-checked against original questionnaires, and where possible, double-entry verification or random spot checks was undertaken. Once entered, the quantitative dataset was subjected to data cleaning procedures involving checks for missing values, outliers, illogical responses, inconsistent coding, duplication, and entry mistakes. Frequency distributions, descriptive summaries, and range checks were run to detect unusual values and inconsistencies across variables. Where missing data are minimal and random, cases may be retained and treated statistically. Where missing values are substantial or systematic, appropriate procedures such as exclusion, imputation, or variable-level adjustment was considered depending on the pattern and extent of missingness. Extreme outliers was examined carefully to determine whether they reflect valid variation or error. Only those confirmed to be erroneous were corrected or excluded.

Quantitative variables intended to measure broader concepts such as manifestations of crime, socio-economic vulnerability, institutional weakness, or organised criminal activity was also reviewed for possible index construction and recategorization. Related items may be combined to form composite indicators where theoretically and statistically justified. Before such indices are used, internal consistency tests such as Cronbach's alpha may be conducted to assess the reliability of multi-item scales.

For qualitative data, all interviews with key informants, focus group discussions, field observations, and relevant narrative records were transcribed verbatim as soon as possible after data collection. Transcription preserved participants' wording, tone, and emphasis as much as possible in order to maintain the authenticity of the data. Where interviews are conducted in Kiswahili or local languages, the transcripts were first translated into English and reviewed carefully to ensure that original meanings and contextual nuances are preserved. Each transcript was labeled using unique identifiers indicating respondent category, location, date, and instrument type to facilitate organisation and retrieval. After transcription, qualitative data were read repeatedly for familiarization and then organised into manageable units for coding. The data may be imported into software such as NVivo or analysed manually using structured thematic coding procedures. Initial codes were generated both deductively from the study objectives and inductively from the emerging field evidence, then grouped into broader categories and themes.

For secondary data, including police occurrence book extracts, county security reports, administrative records, crime statistics, policy documents, and official reports, a separate compilation and harmonization process was undertaken. Since these materials may originate from different institutions and counties, they varied in format, terminology, time coverage, and reporting standards. The data were therefore cleaned, standardised, and reorganised into a common analytical structure to facilitate comparison across counties. Variables such as incident type, date, location, victim characteristics, offender characteristics, and mode of operation was aligned where possible. Inconsistencies in terminology or classification was reconciled through a standard coding scheme informed by the study framework. Where gaps exist in official records, these was noted and triangulated with primary quantitative and qualitative data.

For the spatial component of the study, geo-referenced crime incident data were cleaned and prepared for analysis using GIS software such as ArcGIS or QGIS. This process began with verification of spatial attributes associated with each crime incident, including geographic coordinates, place names, administrative locations, boda-boda stages, road networks, border points, market centres, and settlement clusters. Because some data may be recorded using different formats or levels of precision, all spatial records were standardised into a uniform coordinate reference system suitable for mapping and comparison. Duplicate entries, incorrect coordinates, missing location values, and inconsistently named places was identified and corrected where possible. Where precise coordinates are unavailable, incidents were assigned to the most reliable spatial unit available, such as ward, sub-county, known boda-boda stage, major road corridor, or neighbourhood cluster. Spatial datasets were then linked with attribute data describing the type of crime, time of occurrence, suspected organisational pattern, and relevant socio-economic or institutional variables.

3.7.1.2 ***Data Security and Confidentiality***

To enhance data security and confidentiality, all datasets were stored in password-protected digital files, while hard-copy instruments were kept in secure storage accessible only to the researcher and authorized supervisors where necessary. Personal identifiers were removed or replaced with codes during data entry, transcription, and analysis in order to protect respondent anonymity. Backup copies of digital data were maintained in encrypted storage systems to prevent accidental loss. Overall, the data preparation and management process ensured that all forms of evidence

collected for the study are systematically organised, cleaned, coded, secured, and made ready for rigorous quantitative, qualitative, and spatial analysis.

3.7.1.3 ***Data Presentation Procedure***

The presentation of findings in this study was guided by the nature of the data collected, the analytical techniques employed, and the need to communicate results in a clear, systematic, and policy-relevant manner. Since the study adopts a mixed-methods design, data were presented through an integrated framework that combines quantitative summaries, qualitative narratives, and spatial visualisations. This multi-format presentation approach is intended to ensure that the findings are not only statistically meaningful, but also contextually rich and visually interpretable. The presentation plan therefore aligned each category of data with the study objectives, research questions, and hypotheses so that the reader can easily follow how evidence is generated, organised, and interpreted.

In general, the findings were presented using a combination of textual explanations, tables, charts, graphs, thematic maps, and narrative summaries, depending on the specific issue under analysis. Textual explanation accompanied every table, chart, and map in order to clarify the meaning of the results, highlight important trends, and link the evidence to the broader focus of the study. The intention is not merely to display data, but to present it in a way that supports analytical interpretation and facilitates the drawing of valid conclusions regarding the manifestations, determinants, organisation, and spatial dynamics of boda-boda-related crime in the selected counties.

Quantitative findings were presented using frequency tables, percentages, cross-tabulations, bar charts, pie charts, line graphs, and summary statistical tables. Frequency tables summarised the distribution of responses across key variables such as forms of boda-boda-related crime, demographic attributes of respondents, socio-economic conditions, institutional experiences, and contextual perceptions. Percentages was used to show the proportional distribution of responses within and across categories. Cross-tabulations examined relationships between categorical variables and show how crime forms, perceptions, and socio-economic characteristics vary across counties and respondent categories. Bar charts was used to compare the frequency or proportion of responses across categories, while pie charts was used selectively where proportional breakdowns are simple and clear. Line graphs was used where the data include time-related or

trend-oriented elements. Summary statistical tables presented measures such as means, standard deviations, rankings, correlations, regression coefficients, and significance values.

Qualitative findings were presented through thematic narratives, verbatim quotations, analytic matrices, and conceptual summaries. Thematic narratives organised the results under major themes corresponding to the research objectives, such as manifestations of boda-boda-related crime, distinctions between incidental and organised criminal activity, socio-economic drivers, institutional weaknesses, and contextual facilitators. Verbatim quotations was used to illustrate key arguments, recurring perceptions, local experiences, and points of convergence or divergence among respondents. Analytic matrices were employed where necessary to summarize qualitative patterns across respondent groups, counties, or themes. Conceptual summaries may take the form of explanatory models, typologies, or thematic diagrams that clarify relationships among important concepts emerging from the field data.

Spatial findings were presented using choropleth maps, dot density maps, kernel density maps, hotspot maps, and spatial clustering diagrams. Choropleth maps displayed variation in crime intensity or concentration across administrative units such as counties, sub-counties, or wards. Dot density maps plotted individual incidents or estimated concentrations to show spatial spread across the study area. Kernel density maps showed intensity surfaces and identify areas of relatively high and low concentration. Hotspot maps was developed using spatial statistical procedures to identify areas with significant clustering of incidents. Spatial clustering diagrams illustrated broader patterns of clustering, dispersion, or spatial autocorrelation. These formats visualised demonstrate the geographical spread, concentration, clustering, and spatial variation of boda-boda-related crime across the selected counties.

3.7.1.4 ***Data Interpretation***

Interpretation of findings was undertaken by linking the empirical evidence directly to the study objectives, research questions, hypotheses, and relevant criminological and socio-economic theories underpinning the research. In practice, this means that every major finding was discussed not only in terms of what it shows, but also in terms of what it means conceptually, theoretically, and practically. This interpretive approach ensured that the presentation of results goes beyond mere description to provide deeper understanding of the dynamics of boda-boda-related crime.

3.7.2 **Analysis Plan by Objective and Research Question**

The analysis plan for this study is designed to ensure that each research objective and corresponding research question is addressed using appropriate and complementary analytical techniques. Given the mixed-methods nature of the study, analysis proceeded along quantitative, qualitative, and spatial dimensions, with integration occurring at the interpretation stage. Quantitative data were analysed using R statistical software, qualitative data were analysed through manual thematic analysis, and spatial data were analysed using R and QGIS for mapping and spatial visualisation where necessary. The three strands of analysis was treated as mutually reinforcing, so that statistical patterns can be explained by qualitative insights and spatial evidence can reveal the geographical structure of the observed trends.

3.7.2.1 ***Objective I: Analysis of the Manifestations and Patterns of Boda-Boda-Related Crime***

This subsection addresses Objective i, which seeks to analyse the manifestations and patterns of boda-boda-related crime across the selected counties, and responds directly to Research Question i. The analysis began with descriptive statistical procedures aimed at identifying the main forms and operational patterns of boda-boda-related crime. Variables to be analysed included robbery, theft, assault, drug trafficking, smuggling, gang facilitation, extortion, use of motorcycles as getaway transport, and other manifestations emerging from field data and documentary sources. Frequencies and percentages was computed to determine the relative prevalence of these manifestations across the selected counties. Where crime pattern variables are expressed as scales or indices, means and standard deviations were also computed.

Comparative Analysis of Crime Patterns Across Counties. The first stage of analysis under Objective I involved a comparative examination of crime patterns across the selected counties using R software. The purpose of this analysis is to determine whether boda-boda-related crime manifests uniformly across counties or whether important differences exist in the forms, frequency, timing, victim characteristics, offender characteristics, and operational methods associated with such crime. Since the study adopts a comparative county design, this stage is essential for identifying both shared and context-specific manifestations of insecurity within the boda-boda informal transport sector.

The analysis began with the generation of cross-tabulations in R in order to compare categorical crime variables across counties. Cross-tabulation is appropriate because many of the study

variables under Objective I are categorical in nature, such as type of crime, time of occurrence, victim category, offender category, and operational mode. By arranging these variables in contingency tables, the study was able to show how the frequency and distribution of different forms of boda-boda-related crime vary across Mombasa, Machakos, Nyeri, Bomet, Busia, and Marsabit. For example, the analysis may show whether robbery is more common in urban counties, whether smuggling-related incidents are more prominent in border counties, or whether theft and retaliatory violence are more visible in rural or hinterland counties.

In the study, the comparative analysis focused on several key dimensions of crime patterns. The first was type of crime, including offences such as robbery, theft, assault, extortion, smuggling, kidnapping, bribery, illicit transport facilitation, and related manifestations of boda-boda-linked insecurity. The second was frequency of occurrence, which assessed how often particular crimes are reported in each county. The third is timing, referring to the time of day, day of the week, or broader temporal patterns under which crimes are most likely to occur. The fourth is victim profile, which included categories such as riders, passengers, traders, local residents, business people, or institutional actors. The fifth is offender profile, which included categories such as individual riders, criminal groups posing as riders, youth gangs, known repeat offenders, or unknown actors. The sixth is operational mode, referring to how the crime is carried out, including ambush, snatching, escape facilitation, organised stage capture, couriering of illicit items, intimidation, or collusive operations. These dimensions provided a broad but structured basis for comparing county-level manifestations of crime.

To determine whether observed differences in categorical crime patterns across counties are statistically significant, the study used the Chi-square test of independence. In R, these tests were conducted using relevant contingency table functions and the Chi-square procedure. The Chi-square test was appropriate because it assesses whether there is a significant association between two categorical variables, in this case, county and a given crime-pattern variable. This makes it suitable for testing whether manifestations of crime are distributed independently of county context or whether county location was significantly associated with particular crime forms or operational characteristics.

The Chi-square statistic was expressed as:

$$\chi^2 = \sum \frac{(O_{ij} - E_{ij})^2}{E_{ij}} \tag{3.3}$$

where:

χ^2 = Chi-square test statistic;

O_{ij}= observed frequency in cell; and

E_{ij}= expected frequency in cell.

The expected frequency was computed as:

$$E_{ij} = \frac{(R_i)(C_j)}{N} \tag{3.4}$$

Where:

R_i= row total;

C_j= column total; and

N= total sample size.

The logic of the test is that if county and crime manifestation are independent, the observed frequencies should not differ substantially from the expected frequencies. However, if the observed pattern differs significantly from what would be expected under independence, then the study concluded that county location is significantly associated with the relevant crime variable. This allowed the study to test whether crime manifestations vary systematically across the selected counties.

In interpreting the Chi-square results, attention was given not only to the statistical significance level, but also to the substantive meaning of the association. A statistically significant result indicated that crime patterns differ across counties, but further examination of the contingency tables were necessary to identify the direction and nature of these differences. For example, a significant result may reveal that certain counties report disproportionately high levels of robbery, while others show stronger concentration in smuggling, extortion, or transport-facilitated illicit trade. Where necessary, standardised residuals or proportion comparisons may also be examined in R to determine which cells contribute most strongly to the observed Chi-square association.

Because comparative analysis should not rely on numerical tables alone, the study also employed graphical comparisons using R in order to make the results more intuitive and easier to interpret. These graphical procedures included bar charts, grouped bar charts, clustered charts, and other comparative visualisations showing how crime categories vary across counties. Such graphs was used to present differences in the frequency and distribution of offence types, victim categories, operational modes, and time-based patterns in a way that is both analytically clear and visually accessible. For example, clustered bar charts may be used to compare the distribution of robbery, theft, assault, and smuggling across the six counties, while grouped charts may be used to display the variation in victim profiles or offender profiles across county contexts.

R software was particularly useful at this stage because it allows the researcher to combine tabular and graphical outputs in a transparent and reproducible manner. The use of R supported the generation of frequency tables, contingency tables, significance tests, and graphical displays from the same dataset, thereby improving consistency in analysis and reporting. It also made it possible to disaggregate comparisons by cluster type—urban/metropolitan, rural/hinterland, and transnational/border—in order to determine whether the observed county-level differences reflect broader cluster patterns.

In addition, where sample distribution and variable coding permit, the comparative analysis may be extended to examine whether crime patterns differ not only by county but also by relevant respondent or contextual categories. For instance, the study may compare whether certain operational modes are more associated with particular victim groups or whether some counties show stronger linkage between time of occurrence and type of offence. Such supplementary comparisons enriched the descriptive understanding of crime manifestations and provide a stronger empirical basis for subsequent inferential and interpretive stages.

Overall, this stage of analysis established the comparative empirical foundation for Objective I. By using cross-tabulations, Chi-square tests of independence, and graphical comparisons in R software, the study identified the main manifestations and patterns of boda-boda-related crime across the selected counties and determine whether these patterns differ significantly by county context. The findings from this stage then informed the next step of analysis, including comparison of mean crime indices and interpretation of county-specific security dynamics.

3.7.2.2 ***Mean Comparison of Crime Pattern Indices***

Where continuous or index-based measures of crime patterns were developed, inter-county comparison were conducted using R software for statistical estimation and QGIS for spatial visualisation and interpretation of the resulting county-level patterns. This stage of analysis is important because not all manifestations of boda-boda-related crime was best represented by simple categorical counts. Some aspects of crime may be summarized into composite indices or continuous scores, for example crime prevalence scores, operational risk indices, intensity scores, or composite measures derived from the frequency, severity, and recurrence of boda-boda-related crime. Where such indices are constructed, comparison of mean values across counties provided a useful way of determining whether some counties exhibit significantly higher or lower crime pattern levels than others.

The first step in this stage involved the development and validation of the relevant crime pattern indices. Depending on the structure of the data, these indices may be formed from multiple items capturing dimensions such as type of crime, frequency of occurrence, victimization level, timing, operational method, and perceived risk. Once the index has been computed, summary statistics such as means and standard deviations were generated in R for each county in order to provide an initial descriptive comparison. These descriptive outputs showed whether counties such as Mombasa, Machakos, Nyeri, Bomet, Busia, and Marsabit differ in their average levels of boda-boda-related crime intensity or patterned insecurity.

To test whether the mean differences observed across counties are statistically significant, the study used one-way Analysis of Variance (ANOVA) in R where the dependent variable is continuous and the assumptions of parametric testing are reasonably satisfied. ANOVA is appropriate in this context because it allows comparison of the mean crime pattern index across more than two county groups simultaneously. Rather than conducting multiple pairwise tests, which would increase the risk of Type I error, ANOVA provides a single omnibus test of whether at least one county mean differs significantly from the others.

The one-way ANOVA model was expressed as:

compare mean crime-pattern scores across counties, a one-way analysis of variance (ANOVA) model was specified as

$$Y_{ij} = \mu + \tau_i + \epsilon_{ij} \tag{3.5}$$

where:

- Y_{ij}= observed crime-pattern score for respondent $j$in county i;
- μ= overall (grand) mean crime-pattern score;
- τ_i= effect of the i^{th}county (departure of that county's mean from the grand mean);
- ϵ_{ij}= random error term for respondent $j$in county i, assumed to be independently and normally distributed with mean 0 and constant variance σ^2.

Test Statistic

The null hypothesis $H_0: \tau_1 = \tau_2 = \cdots = \tau_k = 0$(no county-level differences) was evaluated with the classic **F-ratio**

$$F = \frac{\text{MS}_{\text{Between}}}{\text{MS}_{\text{Within}}} = \frac{\frac{\text{SS}_{\text{Between}}}{k-1}}{\frac{\text{SS}_{\text{Within}}}{N-k}} \tag{3.6}$$

where $k$is the number of counties and $N$is the total number of respondents. A calculated Fexceeding the critical value from the $F_{k-1,\,N-k}$distribution at the chosen significance level led to rejection of H_0, indicating statistically significant variation in crime-pattern scores across counties.

In R, ANOVA was estimated using appropriate modelling functions, and the resulting F-statistic and p-value was used to determine whether mean crime pattern scores differ significantly across counties. A statistically significant F-statistic indicated that county context is associated with differences in the average level of the crime pattern index. However, because ANOVA only indicates that at least one difference exists, further post hoc comparisons may be conducted in R where necessary to determine which counties differ significantly from one another. Such post hoc procedures were especially useful if the study seeks to identify whether urban/metropolitan counties differ significantly from rural/hinterland or transnational/border counties in their mean crime pattern levels.

Before interpreting ANOVA results, the study assessed the assumptions underlying the test. These include approximate normality of the dependent variable within groups, homogeneity of variances across counties, and independence of observations. In R, diagnostic procedures such as residual inspection, normality checks, and tests of homogeneity of variance was used to determine whether these assumptions are adequately met. If the assumptions are seriously violated, the study used the Kruskal–Wallis test as a non-parametric alternative.

The Kruskal–Wallis test is appropriate when the dependent variable is ordinal, not normally distributed, or where variance homogeneity assumptions are not satisfied. This test compares the ranks of observations across groups rather than their raw means and is therefore less sensitive to distributional violations. In R, the Kruskal–Wallis test was estimated using the relevant non-parametric procedure. A statistically significant result indicated that the distribution of crime pattern scores differs across counties, even if the data do not meet ANOVA assumptions. Where the Kruskal–Wallis result is significant, additional pairwise non-parametric comparisons may be performed to identify the specific counties contributing to the difference.

In addition to the statistical testing, R software was used to generate visual displays of the mean or ranked crime pattern indices across counties. These included boxplots, violin plots, mean comparison charts, and confidence interval plots. Such graphs made it easier to observe not only central tendency, but also variation, spread, and overlap between county distributions. These visualisations complemented the formal statistical tests and strengthen the interpretability of inter-county comparisons.

While the statistical comparison of mean crime pattern indices were conducted in R, QGIS was used to support the spatial visualisation and interpretation of the results. County-level mean crime scores or ranked crime pattern indices can be joined to county boundary layers in QGIS and displayed through choropleth mapping or graduated colour schemes. This allowed the researcher to visualize how crime pattern intensity varies geographically across the selected counties and to relate statistical differences to the broader spatial logic of the study. For example, QGIS maps may show whether counties with higher mean crime indices align with urban transport hubs, border mobility systems, or hinterland areas characterised by weak surveillance and dispersed transport routes.

The use of QGIS at this stage was particularly valuable because it situates statistical mean differences within a geographical context. A county may have a significantly higher mean crime pattern score, but mapping that score could help explain whether the elevated level is associated with port-city congestion, transnational crossings, market concentration, or rural transport vulnerability. Thus, QGIS complemented the statistical findings from R by helping to interpret the territorial and environmental meaning of observed differences.

Where appropriate, the study could also compare not only the six counties individually, but the broader county clusters of urban/metropolitan, rural/hinterland, and transnational/border. In R, this could be done by grouping counties into cluster categories and re-estimating mean comparison models. In QGIS, the results could be displayed spatially to show whether there is a broader cluster logic in crime pattern intensity beyond individual county differences. This strengthened the comparative design of the study and connect the quantitative findings more directly to the study's broader analytical framework.

Overall, this stage of analysis enabled the study to determine whether mean levels of boda-boda-related crime patterns differ significantly across the selected counties and whether such differences reflect broader geographical and contextual variation. By combining R-based mean comparison testing with QGIS-based spatial visualisation, the study provided a more robust and interpretable assessment of how crime pattern intensity varies across county settings.

Interpretation under *Objective I* focused on whether boda-boda-related crime manifested uniformly across the selected counties or whether it assumes distinct county-specific forms shaped by local social, economic, institutional, and environmental conditions. This stage of interpretation was important because the study was comparative in design and seeks to establish not only what types of crime occur within the boda-boda sector, but also how those manifestations vary across urban/metropolitan, rural/hinterland, and transnational/border settings. The interpretation therefore moved beyond statistical comparison to explain the substantive meaning of the observed patterns within each county context.

First, the interpretation examined the dominant manifestations of boda-boda-related crime identified in each county and determine whether some forms of crime are disproportionately associated with particular settings. For example, the analysis may show that robbery, extortion, and rapid transport-facilitated offending are more prominent in urban counties such as Mombasa

and Machakos; that theft, coercive enforcement, retaliatory violence, and informal taxation dynamics are more visible in rural counties such as Nyeri and Bomet; or that smuggling, illicit brokerage, and cross-border mobility-related offences are more strongly associated with Busia and Marsabit. In this respect, interpretation focused on the extent to which the manifestations of crime correspond to the transport environment, market structure, mobility systems, and law-enforcement realities of each county.

Second, interpretation considered the frequency and operational character of crime manifestations across the counties. The study assessed whether crime incidents appear as isolated events, repeated operational patterns, or part of more routinized systems of offending. For instance, if some counties show repeated patterns involving the same operational modes, victim categories, or route structures, this may indicate a more entrenched security problem than counties where incidents are infrequent or less patterned. Similarly, timing and victim profiles were interpreted in relation to county-specific daily routines, transport demand cycles, market activity, and vulnerability of particular groups. This helped distinguish between general crime occurrence and patterned manifestations that may signal deeper structural or governance problems.

Third, interpretation assessed the extent to which the observed county differences reflect underlying social and economic conditions. Counties with high unemployment, dense informal settlements, active trade corridors, or precarious transport livelihoods may exhibit different manifestations of boda-boda-related crime from counties characterised by dispersed settlements, agricultural transport routes, or frontier mobility systems. In this regard, the interpretation noted treat crime patterns as merely descriptive outcomes, but as expressions of broader socio-economic environments. The study therefore examined whether the variation in manifestations can be linked to specific local pressures, opportunities, or vulnerabilities associated with each county.

Fourth, interpretation paid attention to institutional and environmental context. Crime manifestations were discussed in relation to the strength or weakness of county regulation, local enforcement practices, rider registration systems, stage governance, border management, community oversight, and transport infrastructure. For example, where counties exhibit organised stage capture, frequent extortion, or corridor-based offending, the interpretation considered whether such manifestations are linked to weak oversight, poor traceability, political interference, or weak inter-agency coordination. Where certain counties show concentration of crime around

markets, border points, or transport terminals, the interpretation examined how environmental and institutional conditions shape the opportunities for such crime.

Fifth, interpretation under this objective considered whether the observed manifestations point to localised or emerging forms of organised criminality. Although the primary purpose of Objective I is to identify manifestations and patterns, the interpretation also reflected on whether repeated and county-specific manifestations suggest more than opportunistic offending. For example, if some counties exhibit recurrent forms of robbery facilitation, transport-linked smuggling, organised stage control, or sustained extortion patterns, such findings may indicate the beginning of more structured criminal activity. This interpretive link is important because it connects Objective I to the subsequent objective on distinguishing incidental criminal misuse from organised criminal activity.

Finally, the findings under *Objective I* was discussed in relation to localised crime prevention and transport governance strategies. Rather than assuming that a single national response can address all manifestations of boda-boda-related crime, the interpretation emphasised the need for context-sensitive intervention. Counties characterised by urban corridor robbery may require different prevention strategies from those affected by rural theft systems or cross-border smuggling networks. Accordingly, the interpretation drew out the implications of county-specific crime manifestations for rider registration, stage regulation, local policing, surveillance of routes and terminals, border management, community oversight, and inter-agency coordination. This approach is consistent with the wider aim of the study, which is to generate evidence that supports targeted, proportionate, and policy-relevant responses to insecurity in the boda-boda sector.

Overall, interpretation under *Objective I* treated county differences in crime manifestation not as incidental variation, but as analytically important evidence of how boda-boda-related insecurity is shaped by context. By linking the observed crime patterns to local socio-economic conditions, transport environments, and governance realities, the study provided a stronger foundation for understanding the evolution of security threats across the selected counties.

3.7.2.3 ***Objective II: Analysis of Indicators Distinguishing Incidental Criminal Use from Organised Criminal Activity***

This subsection addresses *Objective II*, which examineed the conceptual and empirical indicators that distinguish incidental criminal use of boda-boda transport from organised criminal activity and responds to Research Question ii. The analysis under this objective combined quantitative classification techniques and qualitative thematic analysis. The first step involved identifying and organising indicators drawn from the literature, field evidence, and official records into measurable dimensions. These dimensions included level of planning, repetition and regularity of involvement, group coordination, specialised roles, territorial control, links to broader criminal networks, concealment mechanisms, financial gain patterns, and possible institutional infiltration or collusion.

Quantitative Classification of Organised Criminality: Quantitative responses relating to these indicators were first analysed descriptively using frequencies, percentages, means, and other summary statistics. Thereafter, the study may develop a composite index of organised criminality by combining related indicators into a structured scale. Such an index helped classify reported incidents or cases along a continuum ranging from incidental misuse to semi-organised criminal activity, to more fully structured organised criminal operations. Where appropriate, factor analysis was employed to determine whether the selected indicators load into coherent dimensions representing latent aspects of organised criminality. Cluster analysis or similar typology-building procedures may also be used to classify cases into distinct analytical groups.

Qualitative Interpretation of Organised Criminal Indicators: Interview and focus group discussion data were analysed thematically to understand how respondents define and recognize the transition from ordinary misuse of boda-boda transport to organised criminal activity. Special emphasis was placed on themes such as recruitment networks, command structures, protection arrangements, information-sharing systems, territorial dominance, repeat offending, concealment practices, and coordination with other criminal actors. Interpretation under this objective focused on generating a contextually grounded analytical framework for distinguishing incidental criminal use of motorcycles from systematic, organised criminal operations in the boda-boda sector.

3.7.2.4 ***Objective III: Analysis of Socio-Economic Factors Associated with Boda-Boda-Related Crime.***

This subsection addresses *Objective III*, which seeks to evaluate the socio-economic factors associated with boda-boda-related crime in the selected counties and responds to Research Question III. The analysis focused on socio-economic variables such as age, gender, education level, employment status, income level, household conditions, migration status, peer influence, substance abuse, poverty, indebtedness, and livelihood insecurity.

***1. Descriptive and Bivariate Analysis of Socio-Economic Characteristics*:** The first analytical stage under *Objective III* involved the descriptive and bivariate analysis of socio-economic characteristics associated with boda-boda-related crime across the selected counties. This stage is important because it provides the initial empirical foundation for understanding the social and economic profile of respondents and communities represented in the study, as well as the extent to which selected socio-economic factors are associated with crime-related outcomes. The analysis was conducted primarily in R software for statistical computation and visualisation, while QGIS was used to support the spatial display of socio-economic variation where geographically referenced data are available.

The analysis began with descriptive statistics in order to summarize the socio-economic profile of the respondents and the study settings. Variables to be described included age, sex, education level, marital status, employment status, income level, type of boda-boda work arrangement, livelihood insecurity, debt pressure, migration status, peer influence, and substance abuse. In R, these variables were summarised using frequencies, percentages, means, and standard deviations, depending on the level of measurement of the variable concerned. Frequencies and percentages was used for categorical variables such as employment status, education level, and substance abuse categories, while means and standard deviations was used for numerical variables such as age, income, and duration of involvement in boda-boda operations.

These descriptive measures helped establish the prevalence and distribution of socio-economic conditions across the selected counties and respondent groups. For example, the analysis showed whether some counties are characterised by relatively higher unemployment, lower education levels, greater poverty, or stronger indicators of livelihood insecurity than others. In this way, the descriptive stage provided a comparative statistical profile of socio-economic conditions in Mombasa, Machakos, Nyeri, Bomet, Busia, Kirinyaga and Marsabit, and indicated whether the

counties differ substantially in the social and economic contexts within which boda-boda-related crime occurs.

In R, descriptive outputs were presented through summary tables and graphical displays such as bar charts, histograms, boxplots, and comparative county charts. These visualisations made it easier to compare socio-economic characteristics across counties and clusters. Where relevant, the analysis may also be disaggregated by urban/metropolitan, rural/hinterland, and transnational/border groupings to show broader contextual contrasts. This use of R strengthened transparency and reproducibility in the descriptive phase of analysis.

Where socio-economic data are linked to geographic units such as wards, sub-counties, stages, or local clusters, QGIS was used to map the spatial distribution of selected socio-economic characteristics. For example, the study may produce choropleth maps or graduated symbol maps showing the spatial concentration of poverty, livelihood insecurity, or unemployment across the selected county areas. This were especially useful where the study seeks to relate socio-economic conditions to spatial concentrations of boda-boda-related crime. In such cases, QGIS complemented the descriptive statistical outputs from R by showing whether socio-economic disadvantage is spatially concentrated in areas that also exhibit higher levels of insecurity or hotspot formation.

After the descriptive stage, the study proceeded to bivariate analysis in order to examine the association between selected socio-economic factors and boda-boda-related crime. The purpose of this stage is to determine whether there is a statistically meaningful relationship between individual socio-economic variables and the crime-related measures used in the study before proceeding to multivariate modelling. This helped identify the variables that are most strongly associated with crime involvement, exposure, prevalence, or risk.

The choice of bivariate test depended on the measurement level and distribution of the variables being analysed. For associations between categorical socio-economic variables and categorical crime variables, the study used the Chi-square test of independence in R. This test was appropriate, for example, in examining whether employment status is associated with crime involvement category, or whether education level differs significantly across groups exposed to different forms of boda-boda-related crime.

Where the variables are continuous and approximately normally distributed, the study applied the Pearson product-moment correlation coefficient. In R, this were estimated using appropriate correlation procedures. Pearson's correlation coefficient was expressed as:

Pearson's product–moment correlation coefficient was expressed as:

$$r = \frac{\sum_{i=1}^{n}(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum_{i=1}^{n}(X_i - \bar{X})^2}\sqrt{\sum_{i=1}^{n}(Y_i - \bar{Y})^2}} \quad (3.7)$$

Where the

- r= Pearson's correlation coefficient
- X_i, Y_i= paired values of variables $X$and $Y$for observation i
- $\bar{X}$, $\bar{Y}$= arithmetic means of $X$and Y
- n= number of paired observations

This statistic measured the strength and direction of the linear relationship between two continuous variables. For instance, it may be used to assess whether income level is related to a continuous measure of crime risk or whether age is associated with exposure to boda-boda-related crime. A positive coefficient indicated that the variables move in the same direction, while a negative coefficient indicated an inverse relationship.

Where variables are ordinal, ranked, or not normally distributed, the study applied Spearman's rank correlation coefficient. This test is appropriate because it does not assume normality and is suitable for monotonic relationships involving ordinal or non-parametric data. In R, Spearman's correlation was estimated using the corresponding non-parametric correlation option. The coefficient was expressed as:

$$\rho = 1 - \frac{6\sum d_i^2}{n(n^2 - 1)} \quad (3.8)$$

where:

ρ= Spearman rank correlation coefficient;

d_i= difference between paired ranks; and

n= number of paired observations.

Spearman's correlation was useful where the study examines ranked or ordinal relationships, such as between poverty level categories and crime risk levels, or between perceived livelihood insecurity and ordinal measures of exposure to boda-boda-related crime. As with Pearson's correlation, the sign and magnitude of the coefficient indicated the direction and strength of the association.

In interpreting the bivariate results, attention was given to both statistical significance and substantive meaning. A statistically significant association indicated that a given socio-economic factor is related to boda-boda-related crime, but the coefficient or cross-tabulated pattern was also examined to determine the direction and practical importance of that relationship. Variables found to exhibit significant bivariate association with crime outcomes may then be selected for further analysis in the multivariate stage.

R was also used to produce supporting visualisations for bivariate analysis, such as scatterplots, grouped boxplots, bar charts, and comparative county charts. These assisted in identifying patterns that may not be obvious in numerical summaries alone. Where socio-economic variables display geographic clustering that appears relevant to crime distribution, the corresponding results may be linked back to QGIS maps for spatial interpretation. For example, if poverty or unemployment shows significant association with crime measures in R, QGIS may then be used to visualize whether those same socio-economic conditions are concentrated in areas where crime incidence is spatially high.

Overall, this stage of analysis provided both a statistical and spatially informed understanding of the socio-economic context of boda-boda-related crime. R was used for descriptive summaries, bivariate testing, and statistical visualisation, while QGIS was used to map and interpret the spatial distribution of socio-economic conditions where location-based data are available. The combined use of these tools strengthened the study's ability to identify which socio-economic characteristics are most prevalent, how they vary across counties, and whether they are associated with the occurrence and geography of boda-boda-related crime.

2. Multivariate Modelling of Socio-Economic Factors: To estimate the effect of socio-economic factors on boda-boda-related crime, the study employed multivariate regression analysis using R software. This stage of analysis is important because socio-economic factors do not operate independently. Variables such as age, education, income, employment status, poverty, peer influence, and substance abuse may interact in complex ways, and multivariate modelling makes it possible to estimate their net effects while controlling for other predictors in the model. The use of R software is appropriate because it provides a flexible and robust environment for statistical analysis, model estimation, diagnostics, and graphical presentation of results.

The choice of regression model depended on the measurement level of the dependent variable. Where the dependent variable is continuous, such as a composite crime prevalence score or risk index, the study used multiple linear regression. In R, this model was estimated using the lm() function. The relationship between socio-economic predictors and the crime-prevalence (or risk) score was modelled as

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \cdots + \beta_k X_{ki} + \varepsilon_i \quad (3.9)$$

where

- Y_i– crime-prevalence (or risk) score for respondent i;
- β_0– intercept (constant term);
- $\beta_1, \ldots, \beta_k$– regression coefficients that quantify the effect of each predictor;
- $X_{1i}, \ldots, X_{ki}$– socio-economic predictor variables measured for respondent i; and
- ε_i– random error term capturing unexplained variation.

In substantive form, the model may be expressed as:

$$CRIME_i = \beta_0 + \beta_1 AGE_i + \beta_2 EDU_i + \beta_3 INCOME_i + \beta_4 EMP_i + \beta_5 SUBABUSE_i + \beta_6 POVERTY_i + \epsilon_i \quad (3.10)$$

where:

$CRIME_i$= boda-boda-related crime prevalence or risk score;

AGE_i= age;

EDU_i= education level;

$INCOME_i$= income level;

EMP_i= employment status;

$SUBABUSE_i$= substance abuse; and

$POVERTY_i$= poverty or livelihood insecurity.

The estimated coefficients indicated the expected change in the crime score associated with a one-unit change in each predictor variable, holding all other variables constant. Positive coefficients indicated a direct relationship, while negative coefficients indicated an inverse relationship. In R, model outputs such as coefficient estimates, standard errors, t-values, p-values, and confidence intervals was used to interpret the significance and direction of the effects.

Where the dependent variable is dichotomous, such as whether a respondent has been involved in or exposed to boda-boda-related crime versus not, the study used binary logistic regression. In R, this model was estimated using the glm() function with the binomial family. The log-odds of a respondent's crime involvement (or exposure) were modelled as

$$\log\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \cdots + \beta_k X_{ki} \qquad (3.11)$$

where

- p_i– probability that respondent $i$is involved in, or exposed to, crime;
- β_0– intercept (constant);
- $\beta_1, \ldots, \beta_k$– logistic-regression coefficients;
- $X_{1i}, \ldots, X_{ki}$– predictor variables for respondent i.

A concrete (substantive) version of the model used the following socio-economic predictors:

$$\log\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 \text{ POVERTY}_i + \beta_2 \text{ UNEMP}_i + \beta_3 \text{ PEER}_i + \beta_4 \text{ SUBABUSE}_i + \varepsilon_i \qquad (3.12)$$

with

- POVERTY_i– respondent's poverty level;
- UNEMP_i– unemployment status;
- PEER_i– degree of peer influence;
- SUBABUSE_i– level of substance abuse;
- ε_i– random error term capturing unexplained variation.

In this case, the regression coefficients showed the direction of the effect of each predictor on the log-odds of crime involvement. For easier substantive interpretation, the coefficients were exponentiated in R to obtain odds ratios, which indicated how much more or less likely crime involvement is among respondents with particular socio-economic characteristics.

Where the dependent variable is ordinal, such as low, moderate, and high crime risk categories, the study applied ordinal logistic regression. In R, this may be estimated using relevant ordinal regression procedures available in appropriate statistical packages.

The (proportional-odds) ordinal logistic regression is typically written as

$$\ln\left(\frac{P(Y \leq j)}{P(Y > j)}\right) = \alpha_j - (\beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k), j = 1,2, \ldots, J-1 \quad (3.13)$$

where:

Symbol	Meaning
$P(Y \leq j)$	Cumulative probability that the response Y falls in category j **or below**
$P(Y > j)$	Probability that Y falls in a **higher** category than j
α_j	Threshold (category-specific intercept) separating category j from the higher ones
$\beta_1, \ldots, \beta_k$	Common slope coefficients for the predictor variables, assumed constant across categories under the proportional-odds assumption
$X_1, \ldots, X_k$	Predictor (independent) variables
J	Total number of ordered categories in Y
k	Number of predictors

Equation (3.13) models the log-odds of being in category j **or below** versus **above** j as a linear function of the predictors.

This model was used to determine whether socio-economic variables significantly increase the likelihood of a respondent falling into a higher category of crime risk or exposure.

In addition to parameter estimation, R software was used for model diagnostics and validation. For multiple linear regression, diagnostic procedures included checking for multicollinearity, examining residual plots, testing model assumptions such as linearity, homoscedasticity, and

normality of residuals, and assessing overall model fit using R-squared, adjusted R-squared, F-statistics, and significance values. For logistic regression, model adequacy was assessed using likelihood ratio tests, pseudo-R-squared measures, classification tables, and odds ratios. Where ordinal logistic regression is used, the study also assessed the appropriateness of the proportional odds assumption where necessary.

R software was further used to produce tables, coefficient summaries, and graphical presentations that support interpretation of results. These outputs assisted in identifying which socio-economic factors significantly predict boda-boda-related crime, the magnitude of their effects, and whether their influence differs across counties or county clusters. Where appropriate, subgroup analysis or interaction terms may also be explored in R to determine whether the effects of socio-economic variables vary across urban, rural, and border settings.

Overall, the use of R software in multivariate modelling strengthened the rigour, transparency, and reproducibility of the analysis. It enabled the study to move beyond descriptive statistics and provide robust empirical evidence on how socio-economic factors shape boda-boda-related crime across the selected counties.

3. Interpretation Under Objective III. Interpretation focused on identifying which socio-economic conditions significantly predict crime-related outcomes, the direction of their influence, and how they create vulnerability, opportunity, or motivation for criminal involvement within the boda-boda sector.

3.7.2.5 ***Objective IV: Analysis of Institutional and Contextual Conditions Facilitating Organised Criminal Activity***

This subsection addresses Objective iv, which seeks to assess the institutional and contextual conditions that facilitate the evolution of organised criminal activity within the boda-boda sector and responds to Research Question iv. The study examined factors such as effectiveness of regulation and licensing, law enforcement presence and response, corruption or collusion, strength of boda-boda associations, urban growth, settlement structure, road and transport infrastructure, political interference, border proximity, market demand for illicit transport services, and local insecurity conditions.

1. Descriptive and Inferential Analysis of Institutional and Contextual Factors. This stage of analysis examined the institutional and contextual conditions that facilitate the evolution of organised criminal activity within the boda-boda sector. The purpose is to determine not only which governance and environmental conditions are most associated with insecurity, but also the extent to which such conditions significantly influence the likelihood or intensity of organised criminal activity across the selected counties.

The analysis began with descriptive statistical procedures in order to summarize respondents' perceptions and experiences regarding institutional and contextual risk factors. Measures such as frequencies, percentages, means, rankings, and standard deviations was used to identify the conditions most frequently reported as enabling organised criminal activity. These conditions included weak regulatory systems, ineffective rider registration and identification, law-enforcement gaps, corruption or collusion, political interference, poor inter-agency coordination, weak local oversight, proximity to border environments, and demand for illicit transport services. Descriptive analysis made it possible to establish which factors are most visible and most strongly perceived across the study counties, and whether such perceptions vary across urban/metropolitan, rural/hinterland, and transnational/border clusters.

Means and ranking procedures were especially useful where respondents rate the severity or importance of institutional factors using Likert-scale items. For example, respondents were asked to indicate the extent to which poor registration systems, limited police presence, or political protection contribute to organised criminal activity in the boda-boda sector. The resulting mean scores and rank ordering allowed the study to compare the relative salience of these factors across counties and respondent categories. Standard deviations were further used to assess the degree of variation in respondent perceptions, thereby indicating whether there is broad agreement or significant divergence regarding particular institutional conditions.

After the descriptive analysis, the study proceeded to inferential analysis in order to estimate the effect of these institutional and contextual conditions on organised criminal activity. This is important because descriptive statistics alone can show which factors are commonly perceived, but they cannot establish whether such factors significantly predict organised criminality when analysed together. Regression analysis was therefore applied to assess the direction, strength, and

statistical significance of the relationship between the identified institutional variables and the dependent measure of organised criminal activity.

Where the organised criminality measure is continuous, such as an index or composite score derived from indicators of repeated coordination, protection arrangements, territorial control, continuity, and networked offending, multiple linear regression was used. Linear regression is appropriate in this case because it estimates how changes in each institutional or contextual factor are associated with changes in the organised criminality score while controlling for the influence of the other variables in the model.

Where the organised criminality measure is categorical or dichotomous, such as whether a case or locality is classified as exhibiting organised criminal activity or not, logistic regression was more appropriate. Logistic regression is suitable because it estimates the probability that organised criminal activity is present given a particular combination of institutional and contextual conditions. This is especially useful where the study seeks to identify which enabling factors significantly increase the likelihood of organised criminal evolution within the boda-boda sector.

A substantive model may be specified as follows:

$$ORGCRIME_i = \beta_0 + \beta_1 REGWEAK_i + \beta_2 ENFGAP_i + \beta_3 CORR_i + \beta_4 POLINT_i + \beta_5 BORDER_i + \beta_6 MARKET_i + \epsilon_i \quad (3.15)$$

where:

Symbol	Description
ORGCRIME_i	Organised-criminality score (or predicted probability) for observation i
β_0	Intercept (constant term)
β_1	Effect of **regulatory weakness** (REGWEAK_i)
β_2	Effect of **law-enforcement gaps** (ENFGAP_i)
β_3	Effect of **corruption or collusion** (CORR_i)

Symbol	Description
β_4	Effect of **political interference** (POLINT$_i$)
β_5	Effect of **border proximity / frontier mobility** (BORDER$_i$)
β_6	Effect of **market-driven illicit transport demand** (MARKET$_i$)
ε_i	Random error term for observation i

Equation (3.15) estimates how each explanatory factor (REGWEAK, ENFGAP, … ,MARKET) contributes to variations in organised criminality while holding the others constant, under the assumptions of a standard multiple linear regression framework.

2. ***Interpreting the model:*** In interpreting the model, the coefficients indicated the extent to which each institutional or contextual condition contributes to the organised criminality outcome when other factors are held constant. In the linear regression model, a positive and statistically significant coefficient suggested that an increase in the relevant factor is associated with a higher organised criminality score. In the logistic regression model, the coefficients or their odds ratios indicated whether the factor increases or decreases the probability of organised criminal activity occurring.

The study also assessed overall model fit and explanatory power using appropriate diagnostic measures. For linear regression, measures such as R-squared, adjusted R-squared, F-statistics, and significance levels was used to determine how well the model explains variation in organised criminality. For logistic regression, measures such as the likelihood ratio test, pseudo R-squared, and odds ratios was used to evaluate model performance and interpret the relative contribution of each predictor variable. Where necessary, diagnostic checks for multicollinearity, model specification, and residual behaviour was also undertaken in order to improve the robustness of the analysis.

In addition, the regression results were interpreted comparatively across county clusters in order to determine whether the same institutional conditions have different effects in urban, rural, and border settings. For example, border proximity may have stronger explanatory value in Busia and Marsabit than in Bomet or Nyeri, while political interference or stage capture may be more

prominent in urban counties such as Mombasa and Machakos. Such comparative interpretation was important in identifying both common and context-specific institutional drivers of organised criminal evolution.

Overall, this stage of analysis enabled the study to move from descriptive identification of institutional weaknesses to more rigorous estimation of their explanatory role in the emergence of organised criminal activity within the boda-boda sector. By combining descriptive and inferential techniques, the study was better positioned to identify which contextual and governance conditions matter most, how strongly they matter, and whether their effects vary across the selected county settings.

3. Qualitative Analysis of Institutional and Contextual Processes. Qualitative data obtained from law enforcement officers, county officials, boda-boda association leaders, local administrators, and community members were analysed thematically to explain the institutional and contextual processes that facilitate the evolution of organised criminal activity within the boda-boda sector. The analysis focused on how regulatory gaps, weak enforcement, poor coordination among agencies, corruption, collusion, political interference, protection networks, market demand for illicit goods and services, and local insecurity create enabling environments for criminal embedding.

Thematic coding was used to identify recurring explanations of how criminal actors exploit weaknesses in boda-boda governance structures. Particular attention was given to narratives on weak rider registration, unregulated stages, poor route monitoring, inconsistent licensing, inadequate patrols, limited intelligence sharing, and ineffective disciplinary mechanisms within rider associations. These themes were examined to determine whether institutional weaknesses merely allowed isolated criminal incidents or whether they contributed to more sustained, coordinated, and organised forms of criminal activity.

4. The qualitative analysis also examined county-specific contexts. In border and frontier counties, interpretation focused on how porous boundaries, long-distance routes, informal crossings, smuggling corridors, and limited state presence may facilitate criminal mobility. In urban and peri-urban counties, attention was given to nightlife zones, congested transport nodes, informal settlements, political mobilisation, and market-based opportunities for theft, robbery, extortion, and drug-related activities. In rural counties, the analysis considered how remote roads,

weak surveillance, low police visibility, and dependence on boda-boda transport may create opportunities for repeat offending.

The purpose of this qualitative analysis was therefore to explain the mechanisms behind the quantitative patterns observed under Objective Four. It helped clarify why institutional risk varies across counties and how specific governance failures interact with local economic, political, and spatial conditions. The findings were interpreted in relation to the broader study concern of security threat evolution, particularly the movement from incidental criminal use of boda-boda transport to more organised and embedded criminal activity. This approach ensured that institutional and contextual factors were not treated as abstract variables, but as lived and locally situated processes shaping crime within the boda-boda sector.

3.7.2.6. ***Objective V: Analysis of Spatial Distribution, Concentration, and Hotspot Patterns.***

This subsection addresses Objective Five, which sought to examine the spatial distribution, concentration, and hotspot patterns of boda-boda-related crime across the selected counties. It also responds to Research Question Five, which asked: What are the spatial distribution, concentration, and hotspot patterns of boda-boda-related crime across the selected counties?

The analysis under this objective employed GIS-based spatial analytical techniques using geo-referenced crime-risk data obtained from primary and secondary sources. Primary spatial data included field-recorded locations of boda-boda stages, routes, crime-prone areas, reported hotspots, market centres, border points, transport nodes, and other security-relevant locations identified during fieldwork. Secondary spatial data included administrative boundaries, road networks, settlement locations, market centres, and other relevant geographic layers used to contextualise the observed crime-risk sites.

The purpose of the spatial analysis was to determine whether boda-boda-related crime was randomly distributed or whether it showed identifiable geographical concentration across counties. The analysis therefore examined the location of reported incidents and risk sites in relation to transport corridors, remote roads, border crossings, markets, informal settlements, nightlife zones, poorly lit areas, escape routes, and areas with limited police visibility. This enabled the study to identify spatial patterns that may not be visible through questionnaire or interview data alone.

1. The GIS analysis: The analysis involved cleaning and validating coordinate data, plotting geo-referenced crime and risk locations, generating county-level spatial distribution maps, and examining the concentration of high-risk sites. Spatial-risk indicators were also used to construct a spatial risk index, which supported comparison of relative risk levels across counties. In addition, hotspot and clustering techniques were applied to identify areas where boda-boda-related crime or risk sites appeared to concentrate geographically.

2. *Spatial Interpretation*: The spatial interpretation was integrated with quantitative and qualitative findings. Quantitative survey responses helped identify the perceived frequency and location of crime, while qualitative narratives explained why particular places were considered risky. For example, areas described as remote, poorly lit, weakly policed, close to borders, or connected to escape routes were examined spatially to determine whether they corresponded with mapped crime-risk locations. This triangulation strengthened the interpretation of spatial patterns.

Overall, the analysis under Objective Five provided evidence on the geographical dimension of boda-boda-related crime. It helped determine where crime risks were concentrated, how these risks varied by county, and how physical space, transport mobility, institutional presence, and local opportunity structures shaped the emergence of hotspots. This spatial evidence was important for developing targeted, place-based recommendations for crime prevention, patrol planning, stage regulation, lighting improvement, border surveillance, and community security coordination.

3. Spatial Descriptive Analysis. The first stage of analysis under Objective V involved spatial descriptive analysis of all geo-referenced boda-boda-related crime incidents collected during the study. This stage is intended to provide an initial visual and analytical understanding of how crime is distributed across the selected counties before more advanced spatial statistical procedures are applied. Spatial descriptive analysis is important because it allows the researcher to identify preliminary patterns, locate potential concentrations of crime, and examine the relationship between incident locations and key transport, administrative, and socio-economic features of the study area.

The analysis began by plotting all recorded boda-boda-related crime incidents on county maps using their geographic coordinates. Each incident was represented as a spatial point in a Geographic Information System (GIS) environment. This initial mapping exercise made it possible

to visualize the overall spatial distribution of crime incidents and determine whether they appear to be randomly dispersed, corridor-based, clustered around major urban centres, concentrated near boda-boda stages, or associated with specific spatial nodes such as highways, border points, transport terminals, informal settlements, and market areas. At this stage, the analysis focused on visual pattern recognition and the spatial relationship between reported incidents and the broader transport landscape.

In addition to simple point plotting, the study used point mapping to show the exact location of incidents across the selected counties. Point maps provided a direct visual representation of where boda-boda-related crime events occur and was useful in identifying concentrations at particular stages, trading centres, border crossings, or settlement zones. However, because raw point maps may become difficult to interpret where incidents are numerous or closely spaced, they was complemented by additional descriptive mapping techniques.

One such technique was the use of proportional symbols to represent differences in the number or intensity of incidents at specific locations. For example, areas with multiple reported crime incidents may be represented using larger symbols than areas with fewer incidents. This made it easier to compare the relative concentration of incidents across stages, routes, or administrative units. Proportional symbol mapping therefore provided a clearer visual summary of the scale of crime occurrence at particular nodes within each county.

The analysis also included the creation of preliminary density surfaces to show areas where incidents are relatively concentrated. Although full hotspot and density modelling was undertaken in the next analytical stage, descriptive density surfaces at this point provided a broad visual indication of high-incidence zones and help identify areas requiring closer statistical examination. These density representations were especially useful in counties where incidents are spread across large geographical areas and where simple point plotting may not adequately reveal underlying spatial concentration.

Further, the study undertook administrative area aggregation of incidents by relevant spatial units such as sub-counties, wards, or other suitable administrative boundaries, depending on data availability and analytical relevance. This aggregation enabled the researcher to summarize the number of boda-boda-related crime incidents within each unit and compare variation across administrative areas. Such analysis helped determine whether some sub-counties or local

administrative units record consistently higher levels of insecurity than others. It also supported comparison between urban, rural, and border settings by situating point-level incidents within broader administrative structures.

A key purpose of this stage was to relate the distribution of crime incidents to the broader geography of boda-boda operation. The study therefore examined whether incidents are spatially associated with high-mobility corridors, busy commercial zones, unregulated stages, peri-urban settlements, isolated roads, borderland routes, or major market centres. In urban counties, descriptive analysis paid particular attention to congestion zones, central business districts, densely populated settlements, and major junctions. In rural counties, the analysis focused more strongly on agricultural market routes, dispersed transport nodes, and isolated road networks. In border counties, emphasis was placed on formal and informal crossings, customs zones, transnational roads, and trade-related mobility corridors.

The descriptive analysis also facilitated county-by-county comparison of spatial patterns. By examining the mapped distribution of incidents separately for each county, the study was able to identify whether boda-boda-related crime exhibits similar or different geographical tendencies across the urban/metropolitan, rural/hinterland, and transnational/border clusters. For example, one county may show concentrated urban corridor patterns, while another may show dispersed but strategically located incidents along border or hinterland transport routes. This comparative dimension is central to the study because it aligns spatial analysis with the broader objective of understanding how security threats evolve differently across county contexts.

Overall, spatial descriptive analysis served as the foundation for the subsequent stages of spatial modelling and interpretation. It provided the first analytical picture of the geography of boda-boda-related crime by showing where incidents occur, how they relate to transport and settlement features, and whether preliminary evidence points to clustering, corridor effects, nodal concentration, or dispersed distribution. These descriptive findings then guided the more advanced statistical analysis of spatial autocorrelation, hotspot patterns, and crime density in the next stage.

Spatial statistical modelling was conducted using QGIS in order to determine whether boda-boda-related crime incidents are randomly distributed, clustered, or dispersed across the selected counties. This stage of the analysis is important because the study is concerned not only with the occurrence of crime, but also with its geographical organisation, intensity, concentration, and

hotspot patterns. Spatial modelling therefore enabled the study to establish whether reported crime incidents form statistically meaningful clusters and whether such clusters correspond to identifiable transport and environmental features such as boda-boda stages, market centres, road junctions, highways, informal settlements, border points, and other high-mobility locations.

All geo-referenced incident data were first imported into QGIS and projected into an appropriate coordinate reference system to ensure spatial accuracy and comparability across counties. The analysis then proceeded through a series of complementary spatial statistical procedures, including spatial autocorrelation, nearest neighbour analysis, density estimation, and hotspot detection. These methods are intended to provide both overall and local measures of spatial pattern.

To test for spatial autocorrelation, the study employed Moran's I statistic, which measures the degree to which similar values occur near one another in space. Moran's I is useful because it indicates whether the distribution of boda-boda-related crime departs from randomness and exhibits a tendency toward clustering or dispersion. In QGIS, this analysis were conducted using appropriate spatial statistics tools or plugins after constructing the relevant spatial weights matrix. A positive Moran's I value indicated clustering of similar values, a negative value indicated dispersion, and a value close to zero suggested a random spatial pattern. Moran's I was expressed as:

To test whether boda-boda-related crime and risk are clustered, dispersed, or randomly distributed across the study area, the global Moran's *I* statistic was employed. Originally proposed by Patrick Alfred Pierce Moran and widely operationalised in modern spatial analysis by Luc Anselin, Moran's *I* measure the degree of linear association between a variable observed at one location and the same variable observed at neighbouring locations.

$$I = \frac{n}{\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}} \frac{\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}\ (x_i - \bar{x})(x_j - \bar{x})}{\sum_{i=1}^{n}(x_i - \bar{x})^2} \qquad (4.7.14)$$

where

- n= number of spatial units (e.g., 7 counties, 1 km grid cells, or enumeration areas);
- x_i= observed value of the boda-boda crime-risk variable for unit *i* (e.g., crime incidents per 100 riders, or the spatial crime-risk index score);
- $\bar{x}$= mean of all x_i;
- w_{ij}= spatial weight expressing the neighbourhood relation between units *i* and *j* (row-standardised first-order queen contiguity for county-level analysis, and inverse-distance weights within 10 km for grid-cell analysis);
- $\sum_i \sum_j w_{ij}$= sum of all spatial weights (normalising constant).

3.7.2.7 ***Interpretation for the boda-boda study***

- **Expected value under spatial randomness**
  E$[I] = -1/(n-1)$. With seven counties this is –0.167; with larger grids it approaches zero.
- **Observed value**
  - *I* > *E[I]* and statistically significant ($p < 0.05$in 9 999 Monte-Carlo permutations) indicates **positive spatial autocorrelation**—counties or cells with high boda-boda crime-risk scores are surrounded by others that are likewise high, and low-risk areas are near low-risk areas.
  - *I* ≈ *E[I]* (non-significant) suggests a random spatial pattern.
  - *I* < *E[I]* and significant implies **negative spatial autocorrelation**—high values are adjacent to low values (checkerboard pattern), which is uncommon in social-crime data.
- **Application in this thesis**
  1. Compute *I* for the **county-level mean risk index** to test broad spatial structure.
  2. Compute *I* for the **1 km × 1 km crime-incident density surface** (kernel-smoothed) to capture finer-scale clustering within counties.
  3. Use 9 999 random permutations to derive a pseudo-*p*-value and Z-score, ensuring robustness given the small number of counties.

A significant positive Moran's *I* would confirm that boda-boda crime-risk is spatially clustered, justifying subsequent Local Indicators of Spatial Association (LISA) to pinpoint specific hotspot counties or grid cells and guiding place-based intervention strategies.

This procedure helped determine whether boda-boda-related crime is spatially autocorrelated across the study area and whether nearby areas tend to exhibit similar crime intensities. Where appropriate, the study interpreted both the magnitude and statistical significance of Moran's I in order to establish whether clustering is strong enough to support further hotspot investigation.

To determine whether point incidents are clustered or dispersed, the study used the Nearest Neighbor Index (NNI). This measure compares the observed mean nearest-neighbor distance with the expected mean distance under a random spatial distribution. In QGIS, point-based spatial measurements was derived from the incident layer in order to calculate nearest-neighbor relationships. The NNI was expressed as:

$$NNI = \frac{d_o}{d_e} \tag{3.17}$$

where:

d_o= observed mean nearest-neighbor distance; and

d_e= expected mean nearest-neighbor distance.

The expected mean distance was computed as:

$$d_e = \frac{1}{2\sqrt{n/A}} \tag{3.18}$$

where:

n= number of points; and

A= size of the study area.

An NNI value less than 1 indicated clustering, a value greater than 1 indicated dispersion, and a value close to 1 suggested a random pattern. In practical terms, this analysis helped determine whether boda-boda-related crime incidents concentrate around particular nodes such as stages, market centres, road junctions, transport terminals, and border crossings, or whether they are

spatially spread out. This is especially useful in a multi-county study because some counties may exhibit compact clusters while others may display dispersed corridor-like patterns.

To generate continuous crime density surfaces, the study used Kernel Density Estimation (KDE) in QGIS. KDE is appropriate because it transforms individual incident points into a smooth raster surface that highlights areas of relatively high and low incident concentration. In QGIS, the Heatmap or Kernel Density tool was used to generate these surfaces based on incident locations and an appropriate bandwidth or search radius. The KDE function was expressed as:

The KDE function was expressed as

$$\hat{\lambda}(s) \;=\; \frac{1}{h^2} \sum_{i=1}^{n} K\left(\frac{\| s - s_i \|}{h}\right), \tag{3.19a}$$

where

Symbol	Meaning
$s = (x, y)$	Evaluation location in the study window (projected metres).
$s_i = (x_i, y_i)$	Coordinates of the *i*-th boda-boda crime/risk incident, $i = 1, \ldots, n$.
n	Total number of incidents included in the KDE (7 418 in this study).
h	Bandwidth (search radius); optimised to **2.3 km** (Section 3.8.5).
$K(u)$	Kernel function; the quartic (bi-weight) kernel was chosen.
$\| s - s_i \|$	Euclidean distance between $s$and $s_i$in metres.

For the **quartic kernel** applied here,

$$K(u) = \begin{cases} \frac{15}{\pi}\,(1 - u^2)^2, & 0 \le u < 1, \\ 0, & u \ge 1. \end{cases} \tag{3.19b}$$

Thus, only incidents within one bandwidth ($u < 1$) contribute to the estimated intensity at s; nearer points are weighted more heavily, and the influence tapers smoothly to zero at distance h.

The resulting KDE surfaces produced raster-based density maps showing where boda-boda-related crime concentrations are highest. These maps were particularly useful for identifying hotspot intensity gradients across counties and for examining whether high-density zones coincide with urban corridors, hinterland transport routes, border mobility systems, or market-based nodes of activity. KDE therefore served as a strong descriptive and visual analytical tool before inferential hotspot testing is applied.

3.7.2.8 **Getis-Ord Hotspot Statistic (G_i^*)**

Where data quality and spatial referencing were adequate, point-level risk values were subjected to Getis-Ord Gi* hotspot analysis the local-cluster test developed by Arthur Getis and J. Keith Ord. Unlike KDE's descriptive surface, Gi* yields an *inferential* z-score indicating whether a location sits inside a statistically significant concentration of high (hotspot) or low (cold-spot) values.

For each spatial unit i(grid cell or point buffer) with attribute value $x_i$and spatial weights $w_{ij}$to its $n$neighbours:

$$G_i^* = \frac{\sum_{j=1}^{n} w_{ij}\, x_j - \bar{X}\sum_{j=1}^{n} w_{ij}}{S\sqrt{\frac{n\sum_{j=1}^{n} w_{ij}^2 - (\sum_{j=1}^{n} w_{ij})^2}{n-1}}}, \tag{3.20}$$

where

Symbol	Meaning
x_j	Attribute value at neighbour j(e.g., KDE intensity, SCRI score)
$\bar{X}$	Global mean of x
S	Global standard deviation of x
w_{ij}	Spatial weight between units $i$and j

Symbol Meaning

n Total number of spatial units

Under the null hypothesis of spatial randomness, $G_i^*$is approximately normally distributed; $z > 1.96$($\alpha = 0.05$, two-tailed) marks a hotspot, $z < -1.96$a cold-spot.

A statistically significant positive z-score indicated a hotspot, meaning a concentration of high values, while a statistically significant negative z-score indicated a cold spot, meaning a concentration of low values. This analysis was useful in identifying areas where boda-boda-related crime is not only concentrated, but significantly more intense than would be expected under a random pattern. Such results helped distinguish visually dense areas from statistically meaningful hotspots.G_i^*

To strengthen interpretation, the spatial statistical outputs generated in QGIS were compared across the three analytical clusters of the study: urban/metropolitan, rural/hinterland, and transnational/border counties. This made it possible to establish whether spatial concentration follows similar or different patterns across county contexts. For instance, crime may cluster around congested road networks and commercial nodes in urban counties, along isolated rural corridors in hinterland counties, and around border crossings and mobility routes in transnational counties. This comparative use of QGIS-based spatial statistics is consistent with the broader objective of identifying how security threat evolution varies across county environments.

G_i G_i Taken together, Moran's I, the Nearest Neighbor Index, Kernel Density Estimation, and Getis-Ord provided complementary evidence on the spatial organisation of boda-boda-related crime. Moran's I indicated whether overall spatial autocorrelation exists; the Nearest Neighbor Index assessed clustering or dispersion of point incidents; KDE visualised density surfaces and concentration gradients; and Getis-Ord identified statistically significant hotspots and cold spots. The combined use of these methods in QGIS strengthened the study's analysis of spatial concentration, corridor effects, nodal concentration, and hotspot formation across the selected counties.

Interpretation under Objective V focused on the geography of risk and the spatial logic of boda-boda-related crime across the selected counties. The analysis goes beyond simply identifying

where incidents occur and instead examine how crime is distributed, concentrated, and patterned within particular mobility environments. The purpose of this interpretation is to explain not only where boda-boda-related crime is most prevalent, but also why certain locations emerge as areas of persistent insecurity and how such spatial evidence can inform targeted interventions.

First, interpretation identified the locations in which boda-boda-related crime is most highly concentrated. This included examining whether crime clusters around specific transport stages, market centres, road junctions, border crossing points, densely built urban corridors, peri-urban settlements, or poorly monitored rural routes. Areas showing repeated incident concentration, high density values, or statistically significant hotspot patterns were interpreted as priority zones of security concern. In this respect, the study assessed whether the geography of crime reflects isolated events or recurring spatial concentration suggestive of more entrenched and structured patterns of insecurity.

Second, interpretation focused on the structural and environmental characteristics associated with hotspot areas. This included analysis of whether identified hotspots are linked to features such as high population density, intense transport activity, weak police presence, poor road surveillance, proximity to informal settlements, border proximity, market congestion, unregulated stages, or the presence of transport and trading corridors that facilitate quick movement and concealment. In rural and border counties, attention was also given to remoteness, sparse infrastructure, unofficial crossing routes, and weak inter-jurisdictional enforcement. The aim was to determine whether hotspot areas share common environmental conditions that make them particularly conducive to boda-boda-related crime.

Third, the interpretation compared hotspot patterns across the three study clusters—urban/metropolitan, rural/hinterland, and transnational/border—in order to determine whether the geography of risk differs systematically across county contexts. For example, urban hotspots may reflect congestion, anonymity, and commercial opportunity; rural hotspots may reflect weak surveillance, long-distance escape routes, or localised retaliatory violence; and border hotspots may reflect smuggling corridors, cross-border brokerage, and porous movement networks. This comparative interpretation is important because it showed whether spatial concentration follows a common national pattern or varies according to political-economic and geographical context.

Fourth, interpretation considered the extent to which the observed spatial patterns support or contradict the broader argument of the study regarding the evolution of security threats. Where hotspots are isolated and scattered, the findings may suggest largely opportunistic and localised offending. However, where clustering is repeated, corridor-based, and associated with transport nodes, border systems, or linked county routes, the findings may suggest more organised patterns of criminal activity. In this way, spatial evidence contributed to the distinction between incidental criminal use of boda-boda transport and more structured forms of criminality.

Finally, interpretation under Objective V linked the spatial findings to policy and security implications. The study assessed how hotspot evidence can be used to guide targeted crime prevention, intelligence gathering, patrol planning, surveillance enhancement, rider registration efforts, inter-agency coordination, and county-specific regulation of stages and routes. Rather than recommending broad and undifferentiated enforcement, the interpretation emphasised the value of spatially informed interventions that focus on high-risk locations, critical corridors, and areas where criminal activity appears to be concentrated or systematically reproduced. This made it possible to propose security responses that are proportionate, place-specific, and sensitive to the legitimate livelihood role of the boda-boda sector.

3.7.2.9 ***Interpretation Objective V:*** Overall, interpretation under *Objective V* treated spatial analysis as more than a descriptive mapping exercise. It used spatial evidence to explain the geography of insecurity, identify the environmental and structural conditions associated with crime concentration, compare risk across county contexts, and generate policy-relevant insights for targeted and context-sensitive security intervention.

3.7.2.10 ***Integration of Analysis Across Objectives.*** Although each objective were analysed separately using techniques suited to the nature of its variables, the final analytical stage of the study involved integration and triangulation of findings across objectives. Quantitative findings showed prevalence, variation, and statistical relationships; qualitative findings explained processes, meanings, and contextual realities; and spatial findings revealed the geographical logic of occurrence and concentration. By bringing these strands together, the study developed a more complete and nuanced understanding of how boda-boda-related crime operates across the selected counties.

General Functional Form of the Study Model. For conceptual coherence the entire empirical framework can be expressed as a compact multivariate function:

$$\boxed{\text{BBC} = f(\text{MP}, \text{SEF}, \text{ICF}, \text{SP})} \tag{3.21}$$

where

Symbol	Conceptual meaning	Operationalisation in this study
BBC	*Boda-boda-related Crime* — the overall incidence or risk level to be explained	County-mean **Spatial Crime-Risk Index (SCRI)** and point-level KDE intensity values
MP	*Manifestations and patterns* of crime (what offences occur, how frequently, and in what combinations)	Descriptive crime-type proportions, repeat-victimisation indicators, and DBSCAN cluster membership (Sections 3.8.2 & 3.8.6)
SEF	*Socio-economic factors* that shape opportunity and motivation	Composite **SOCIO_VUL** index derived from unemployment, poverty, debt pressure, livelihood alternatives (Section 3.8.3.2)
ICF	*Institutional and contextual factors* — governance, regulation, enforcement climate	**INST_RISK** factor score and **ENF_EFF** effectiveness measure (Sections 3.8.3.1 & 3.8.3.4)
SP	*Spatial patterns and hotspot characteristics* that embed crime in place	KDE hotspot density, Gi* z-scores, Moran's/LISA cluster typology (Sections 3.8.4, 3.8.5, and Getis-Ord note)

Estimable (Regression) Form of the Conceptual Model

The qualitative functional form in Equation 3.21 is operationalised for quantitative analysis as a linear-additive regression:

$$\boxed{\text{BBC}_i = \beta_0 + \beta_1 \text{MP}_i + \beta_2 \text{SEF}_i + \beta_3 \text{ICF}_i + \beta_4 \text{SP}_i + \varepsilon_i} \tag{3.22}$$

with the following definitions:

Symbol	Definition
i	Spatial analysis unit – either a **county** (7 observations in the spatial-regression stage) or a **1 km × 1 km grid cell** (≈ 68 000 observations for point-pattern diagnostics).
BBC_i	Boda-boda crime outcome for unit i. • County level: mean **Spatial Crime-Risk Index (SCRI)**. • Grid level: KDE intensity or binary hotspot indicator.
β_0	Intercept – predicted value of BBC when all explanatory variables equal their mean-centred reference value 0.

Symbol	Definition
MP_i	Crime *Manifestations & Patterns* – indicators such as offence mix, repeat-victimisation count, or DBSCAN cluster membership (Section 3.8.6).
SEF_i	*Socio-Economic Factors* – composite **SOCIO_VUL** score capturing unemployment, poverty, debt pressure (Section 3.8.3.2).
ICF_i	*Institutional & Contextual Factors* – **INST_RISK** and/or **ENF_EFF** indices reflecting regulatory gaps, corruption, enforcement capacity (Sections 3.8.3.1 & 3.8.3.4).
SP_i	*Spatial Patterns* – KDE hotspot density, Gi* z-score, or Moran's/LISA cluster designation (Sections 3.8.4–3.8.5).
$\beta_1 \dots \beta_4$	Regression coefficients estimating the marginal effect of each explanatory block on BBC, holding the others constant.
ε_i	Stochastic error term capturing unobserved influences and measurement error; assumed $E[\varepsilon_i] = 0$.

In this study, the dependent variable may take different forms depending on the level and type of analysis being undertaken. For example, it may be measured as a crime prevalence score, a risk index, a dichotomous indicator of crime involvement or exposure, an organised criminality classification, or an aggregated crime intensity measure at the county or spatial-unit level. The precise operationalization depended on the dataset and the objective-specific model being estimated. This flexibility is necessary because the study combines quantitative, qualitative, and spatial analysis across multiple counties and analytical levels.BBC_i

The variable represents the manifestations and patterns of crime and captures the observable forms in which boda-boda-related crime appears. This included robbery, theft, assault, extortion, smuggling, kidnapping, facilitation of illicit trade, operational mode, frequency of occurrence, victim profile, offender profile, and timing of incidents. This component of the model reflects the assumption that the nature and pattern of crime manifestations are directly linked to the broader crime outcome being studied.MP_i

The variable SEF_irepresents socio-economic factors, including age, education, income, employment status, poverty, livelihood insecurity, peer influence, and substance abuse. These variables are included on the basis that socio-economic vulnerability may increase the likelihood of criminal exposure, recruitment, collusion, or participation within the boda-boda sector. Their inclusion in the model allows the study to estimate the extent to which economic and social pressures help explain variations in boda-boda-related crime across respondents and counties.

The variable ICF_icaptures institutional and contextual factors, such as weak regulation, law-enforcement gaps, poor rider registration systems, corruption or collusion, political interference, weak local governance, and broader county-specific security conditions. This component reflects the argument that crime in the boda-boda sector is influenced not only by individual or social factors, but also by the strength or weakness of the regulatory and governance environment within which the sector operates.

SP_iThe variable represents spatial patterns and hotspot characteristics. This component introduces the geographical dimension of the study by accounting for spatial concentration, clustering, corridor effects, nodal concentration, border proximity, and hotspot intensity. It recognizes that boda-boda-related crime is not merely a social or institutional phenomenon, but also a spatially organised one. Crime may be more likely to occur or intensify in environments characterised by dense transport flows, poorly monitored routes, market concentration, border crossings, informal settlements, and other high-mobility spaces.

The estimation of this general model was supported by both R and QGIS, each serving a complementary analytical role. R was used primarily for statistical modelling, variable construction, regression analysis, model diagnostics, and graphical presentation of results. Through R, the study estimated the effects of manifestations and patterns of crime, socio-economic variables, and institutional/contextual conditions on the selected crime outcome. R also supported the generation of composite indices, cross-tabulations, inferential statistics, and multivariate models relevant to the quantitative strand of the study.

SP_iQGIS, on the other hand, was used to operationalize and derive the spatial component of the model. Through QGIS, the study mapped geo-referenced incidents, identify hotspot areas, calculate density surfaces, examine clustering and dispersion, and generate spatial indicators that can be incorporated into the broader analytical model. For example, hotspot intensity, proximity to transport corridors, distance to border points, density of incidents around stages or market nodes, and spatial cluster membership may be derived in QGIS and then exported for further statistical analysis in R. In this way, QGIS provided the spatially derived explanatory measures represented by, while R was used to test their relationship with the overall boda-boda-related crime outcome.

The integration of R and QGIS is particularly important because this study is not limited to non-spatial explanatory variables. Instead, it seeks to combine social, institutional, and spatial

dimensions into a single analytical framework. The use of R allows for rigorous statistical estimation, while QGIS enables spatial exploration, hotspot detection, and geographical interpretation. Together, the two tools supported a more comprehensive model of boda-boda-related crime that reflects both its social drivers and its spatial organisation.

In interpretive terms, the coefficients to showed the direction and strength of the relationship between each explanatory component and the crime outcome. A positive coefficient indicated that an increase in the corresponding factor is associated with an increase in boda-boda-related crime or crime risk, while a negative coefficient indicated an inverse relationship. The relative magnitude and significance of the coefficients helped identify which domains, manifestation, socio-economic, institutional, or spatial—are most influential in explaining the evolution and distribution of crime within the boda-boda sector.$\beta_1\beta_4$

Overall, the general functional form of the study model provides a unifying framework for integrating the different strands of the analysis. It shows that boda-boda-related crime is conceptualized in this study as a function of crime manifestations, socio-economic conditions, institutional and contextual factors, and spatial patterns. By combining R-based statistical modelling with QGIS-based spatial analysis, the study was able to generate a more robust, multidimensional, and policy-relevant explanation of insecurity within the boda-boda informal transport sector across the selected counties.

3.7.3 **Qualitative Data Analysis and Interpretation**

Qualitative data analysis in this study was undertaken to generate in-depth understanding of the meanings, experiences, perceptions, and contextual explanations surrounding boda-boda-related crime in the selected counties. Since the study seeks not only to identify the manifestations and correlates of crime but also to understand how criminal activity is interpreted, organised, and sustained within the boda-boda sector, qualitative analysis played a central explanatory role. The qualitative strand complemented the quantitative and spatial findings by providing insight into processes, motives, relationships, institutional weaknesses, and localised realities that may not be adequately captured through numerical indicators alone.

3.7.3.1 ***Preparation of Qualitative Data for Analysis****:* Before analysis begins, all qualitative data were prepared systematically to ensure accuracy, organisation, and ease of retrieval. Audio-recorded interviews and focus group discussions were transcribed verbatim. Field notes taken

during interviews, observations, and informal interactions were also typed and organised into analyzable text. Where data are collected in Kiswahili or local languages, the transcripts were translated into English carefully to preserve intended meaning, expressions, and contextual nuance. Each transcript and field note was assigned a unique identifier based on respondent category, interview location, date, and instrument type. The prepared transcripts may then be imported into qualitative data analysis software such as NVivo or analysed manually using structured thematic procedures.

3.7.3.2 ***Familiarization, Coding, and Theme Development:*** Qualitative analysis began with familiarization with the data. This involved repeated reading of interview transcripts, focus group discussion transcripts, field notes, observation notes, and relevant documentary extracts in order to gain an overall understanding of the content, tone, and context of respondents' accounts. During this stage, the researcher paid close attention to recurring ideas, notable expressions, contradictions, and county-specific experiences relevant to boda-boda-related crime and its evolution. Familiarization is important because it provides the foundation for rigorous coding and helps ensure that subsequent analysis remains grounded in the data rather than being driven solely by prior assumptions or theoretical expectations.

To support this process, the qualitative materials was first prepared in a structured and analysable format. This included transcription of audio-recorded interviews and focus group discussions, verification of transcript accuracy, translation into English where necessary, anonymization of respondents, and labelling of each transcript according to respondent category, county, date, and study objective. Once this is completed, the dataset was imported into R software for text organisation and coding support. R was used to manage the qualitative corpus systematically, enabling the researcher to store, retrieve, search, and compare textual data efficiently across respondents, counties, and thematic categories.

After familiarization, the analysis moved to the stage of initial coding. Coding refers to the process of identifying and labelling meaningful segments of text that relate to the research problem and objectives. In this study, coding involved assigning short conceptual labels to sections of text that reflect issues such as robbery, theft, organised criminal coordination, poverty, weak regulation, corruption, dangerous routes, insecurity at stages, and other relevant patterns emerging from the data. Coding were both deductive and inductive in nature. Deductive coding was guided by the

study objectives, conceptual framework, and interview guide, while inductive coding allowed new and unanticipated ideas to emerge directly from respondents' narratives.

R software was used to support this coding process by enabling structured storage of transcripts, creation of code labels, extraction of coded segments, and comparison of text associated with specific codes. It may also be used to support keyword searches, frequency summaries, and code co-occurrence checks where relevant. However, the coding process remained primarily researcher-driven, meaning that the assignment of meaning to text segments and the interpretation of their relevance depended on close reading and analytical judgment rather than automated text classification. In this way, R served as a facilitative tool for coding management rather than a substitute for qualitative interpretation.

Once the initial coding has been completed, the study proceeded to theme development. At this stage, related codes were grouped together into broader categories and emerging themes. A theme in this study referred to a recurring and analytically meaningful pattern in the qualitative data that helps explain some aspect of boda-boda-related crime, insecurity, or organised criminal evolution. For example, codes relating to weak registration, poor regulation, police absence, and administrative inaction may be grouped under a broader theme such as institutional weakness. Similarly, codes relating to debt, unemployment, poverty, and livelihood stress may form a broader theme such as socio-economic vulnerability.

3.7.3.3 ***Theme development involved several iterative steps.*** First, the researcher examined the codes for conceptual similarity and relevance to the study objectives. Second, related codes was clustered into provisional categories. Third, these categories were reviewed against the original transcripts to determine whether they accurately reflect the underlying data and whether the data within each category are coherent. Fourth, categories was refined, merged, separated, or renamed where necessary in order to produce more analytically meaningful themes. Throughout this process, R supported retrieval of all text segments linked to a given code or provisional category, thereby allowing the researcher to assess the consistency, depth, and variation of the material associated with each emerging theme.

The process of theme development also paid attention to variation across counties and respondent groups. Because the study is comparative in design, the analysis noted only identify common themes across the dataset but also examine how some themes are more pronounced in particular

county clusters or among specific categories of respondents. For example, a theme such as border facilitation may emerge more strongly in Busia and Marsabit, while stage-based extortion or organised urban robbery may appear more prominently in Mombasa and Machakos. R assisted in this comparative dimension by allowing coded material to be filtered and retrieved by county, respondent type, or objective, making cross-case comparison more systematic.

As themes begin to stabilize, the researcher reviewed them in relation to the overall logic of the study. At this point, attention was given to whether the themes adequately address the study objectives, whether they capture both dominant and minority perspectives, and whether they help explain the difference between incidental criminal misuse and organised criminal activity in the boda-boda sector. The final themes were then clearly defined and named in a way that reflects both the empirical content of the data and the analytical focus of the study.

3.7.3.4 ***Thematic Analysis by Study Objective.*** Thematic analyses were conducted in alignment with the specific objectives of the study, with the aid of R software for text organisation, coding support, retrieval of excerpts, and descriptive text analysis. Interview transcripts, focus group discussion transcripts, field notes, and other qualitative materials were first cleaned, labeled, and organised in a structured format that links each text segment to the relevant respondent category, county, and study objective. R was then used to manage the textual dataset, support systematic coding, and facilitate comparison of coded material across counties and respondent groups. Packages used for text handling and qualitative text support included those designed for text mining and tidy text processing in R.

For Objective I, qualitative analysis focused on how respondents describe the main manifestations and patterns of boda-boda-related crime. The researcher identified recurring descriptions of robbery, theft, assault, extortion, smuggling, kidnapping, transport-facilitated illicit trade, and other forms of insecurity. R may be used to retrieve coded extracts associated with each manifestation, compare their frequency across counties, and support clustering of related narrative segments. However, the final thematic grouping was based on interpretive review rather than automated classification.

For Objective II, thematic analysis examined how respondents distinguish incidental criminal misuse of boda-boda transport from organised criminal activity. Attention was given to descriptions of repeated coordination, continuity over time, leadership structures, territorial

influence, concealment strategies, collusion, and links to wider illicit networks. R may support this stage by helping to organize coded passages under these indicators and by enabling comparison of how different respondent groups describe organised criminality across county settings. The final distinction between incidental and organised forms remained grounded in substantive interpretation of the narratives.

For Objective iii, the analysis explored respondents' views on socio-economic drivers such as poverty, unemployment, peer influence, migration, debt pressure, livelihood insecurity, and substance abuse. The coding process identified how respondents explain the relationship between these socio-economic conditions and boda-boda-related crime. R may be used to retrieve all excerpts associated with each socio-economic code, examine co-occurrence between codes, and summarize differences across counties or respondent categories. This strengthened the transparency and consistency of the thematic process.

For Objective iv, thematic analysis examined institutional and contextual conditions such as weak regulation, poor enforcement, corruption, insecurity, porous borders, weak rider identification systems, political interference, and limited inter-agency coordination. The analysis focused on how respondents explain the governance environment within which criminal activity emerges or persists. R may be used to organize institutional codes, compare patterns across urban, rural, and border counties, and identify which contextual issues recur most strongly in the qualitative material.

For Objective v, thematic analysis focused on respondents' descriptions of spatial distribution and hotspot patterns, including dangerous routes, insecure stages, high-risk neighbourhoods, border crossings, market centres, and transport corridors. The analysis paid attention to how respondents narrate the geography of risk and how they explain the concentration of crime in particular spaces. R may be used to group excerpts by location-based codes and support linkage between textual evidence and the spatial analysis produced separately in QGIS. This allowed the qualitative narratives on hotspots and dangerous routes to complement the mapped spatial patterns.

Across all objectives, the thematic analysis proceeded through familiarization with the data, generation of initial codes, grouping of codes into broader categories, review and refinement of categories, and development of final themes. R supported systematic handling of the qualitative dataset, but the development of themes remained interpretive and theory informed. The final

themes therefore reflected both the coded structure of the data and the researcher's analytical judgment regarding meaning, context, and relevance to the study objectives.

3.7.3.5 ***Use of Verbatim Quotations and Comparative Interpretation.*** To strengthen the credibility and authenticity of the findings, selected verbatim quotations from respondents was used to illustrate key themes and reinforce major arguments. These quotations were anonymized using respondent identifiers to protect confidentiality. The analysis also compared perceptions across respondent groups and counties to reveal areas of convergence and divergence. For example, boda-boda riders may emphasise economic hardship and stigma, while law enforcement officers may emphasise regulatory failures and criminal infiltration. Such comparisons enriched interpretation by showing how local context shapes both experience and understanding of boda-boda-related crime.

3.7.3.6 ***Trustworthiness and Interpretation of Qualitative Finding:*** To enhance rigour, the study applied standards of credibility, dependability, confirmability, and transferability. Credibility was enhanced through careful transcription, triangulation, and use of verbatim quotations. Dependability was supported by maintaining an audit trail of coding decisions and theme development. Confirmability was strengthened by grounding interpretations in respondent accounts rather than researcher assumptions, while transferability was supported through thick description of the study context and participants. Interpretation of qualitative findings involved relating emerging themes to the study objectives, research questions, and theoretical framework, and showing how they support, qualify, or challenge the quantitative and spatial findings.

3.7.3.7 ***Integration and Triangulation of Findings:*** Because this study adopts a mixed-methods design, the final stage of analysis involved the systematic integration and triangulation of quantitative, qualitative, and spatial findings. Quantitative analysis showed prevalence, variation, and statistical relationships; qualitative analysis explained meanings, experiences, and institutional processes; and spatial analysis revealed geographical distribution, concentration, and hotspot dynamics. Integration and triangulation therefore enabled the study to generate a more comprehensive, coherent, and policy-relevant understanding of the manifestations, drivers, organisational features, and spatial logic of boda-boda-related crime.

3.7.3.8 ***Forms of Triangulation:*** Triangulation was undertaken in several forms. Data triangulation involved comparing information from surveys, interviews, focus groups, observation

notes, police records, county security reports, and geo-referenced crime incidents. Methodological triangulation involved comparing findings produced through quantitative, qualitative, and spatial methods. Theoretical triangulation involved interpreting findings through multiple conceptual lenses drawn from the study's theoretical framework and the broader literature on crime, socio-economic strain, opportunity structures, and organised criminal activity.

3.7.3.9 ***Integration by Objective and Interpretation of Convergence:*** Integration was undertaken in relation to each objective so that the findings remain analytically focused. For Objective i, quantitative findings on crime manifestations were integrated with qualitative accounts and spatial distributions. For Objective ii, quantitative indicators of organised criminality were triangulated with qualitative explanations and relevant spatial evidence. For Objective iii, statistical findings on socio-economic factors were integrated with qualitative explanations of vulnerability and with spatial evidence where deprivation aligns geographically with crime concentration. For Objective iv, quantitative evidence on institutional and contextual conditions were integrated with qualitative findings on how these conditions facilitate organised criminality. For Objective v, spatial findings were integrated with survey and interview evidence to explain why certain areas become hotspots. During this process, the study examined convergence, complementarity, and divergence of findings. Convergence strengthened confidence in the validity of results, complementarity provided explanatory depth, and divergence were interpreted carefully as an opportunity to reveal hidden dynamics, underreporting, institutional blind spots, or methodological limitations.

3.7.3.10 ***Contribution of Triangulation:*** Triangulation enhanced the credibility, validity, and robustness of the study by ensuring that conclusions are based on multiple sources and methods rather than a single line of evidence. It also strengthened the policy relevance of the study by showing how crime patterns, socio-economic pressures, institutional weaknesses, and spatial hotspots intersect in the lived realities of the selected counties.

3.7.4 Hypotheses Testing Framework

This section outlines the procedures that was used to test the study hypotheses. To avoid repetition, the mathematical specifications of the statistical and spatial models are presented in Section 3.8.3, while this section focuses on the specific hypothesis tests and decision rules applied in the study. All hypotheses was tested at the 0.05 level of significance. Where the p-value is less than or equal

to 0.05, the null hypothesis was rejected. Where the p-value is greater than 0.05, the null hypothesis was not rejected.

1. **Hypothesis One.** To examine whether boda-boda-related crime differs across the selected counties, the study tested the following hypotheses:

Null Hypothesis (H01): There is no statistically significant difference in the manifestations and patterns of boda-boda-related crime across the selected counties.

Alternative Hypothesis (H1): There is a statistically significant difference in the manifestations and patterns of boda-boda-related crime across the selected counties.

This hypothesis is intended to establish whether boda-boda-related crime presents itself in a similar manner across the selected counties or whether significant county-level variations exist. In this study, the term manifestations refer to the different forms and expressions of boda-boda-related crime, while patterns refer to the recurring tendencies, operational characteristics, and trends associated with such criminal activities. These included the type of crime committed, the time of occurrence, offender characteristics, victim characteristics, and the methods used in carrying out the crimes.

The testing of this hypothesis depended on the nature of the data collected. For variables measured in categorical form, such as type of crime, timing of occurrence, offender profile, victim profile, and mode of operation, the study employed the Chi-square test of independence. This test is appropriate because it determines whether there is a statistically significant association between two categorical variables. In this case, it was used to assess whether the distribution of crime manifestations and operational patterns differs significantly from one county to another.

For variables measured on a continuous scale, or for composite indices developed to capture broader crime patterns, the study used one-way Analysis of Variance (ANOVA). ANOVA is suitable where the objective is to compare the mean scores of more than two independent groups. In this study, it was used to determine whether the mean scores of crime pattern indices vary significantly across the selected counties.

Before conducting ANOVA, the assumptions underlying the test was assessed. These assumptions include independence of observations, normality of the data, and homogeneity of variances across

the groups being compared. Where these assumptions are not satisfied, the study applied the Kruskal–Wallis test as a non-parametric alternative. The Kruskal–Wallis test is appropriate for comparing three or more independent groups when the data are not normally distributed or when the assumption of equal variances is violated.

The decision rule for hypothesis testing was based on the 0.05 level of significance. If the calculated p-value is less than or equal to 0.05, the null hypothesis was rejected and the alternative hypothesis accepted. This implied that there is a statistically significant difference in the manifestations and patterns of boda-boda-related crime across the selected counties. However, if the p-value is greater than 0.05, the null hypothesis was not rejected, indicating that no statistically significant difference exists across the counties under study.

The results of this hypothesis test helped determine whether boda-boda-related crime is uniformly experienced across the selected counties or whether its manifestations and operational patterns are shaped by local contextual factors. This is important because evidence of significant variation would justify county-specific policy responses and intervention strategies, while similarity across counties would suggest the need for broader, more standardised approaches to prevention and control.

2. Hypothesis Two. To examine the relationship between socio-economic factors and boda-boda-related crime in the selected counties, the study tested the following hypotheses:

Null Hypothesis (H02): There is no statistically significant relationship between socio-economic factors and boda-boda-related crime in the selected counties.

Alternative Hypothesis (H2): There is a statistically significant relationship between socio-economic factors and boda-boda-related crime in the selected counties.

This hypothesis seeks to determine whether socio-economic factors significantly influence boda-boda-related crime in the selected counties. The study focuses on socio-economic variables such as age, gender, level of education, employment status, income level, poverty, livelihood insecurity, migration status, peer influence, indebtedness, and substance abuse. These factors are considered important because they may shape both the likelihood of involvement in boda-boda-related crime and exposure to it.

To test this hypothesis, the analysis began with bivariate statistical procedures in order to establish the nature of the association between each socio-economic factor and boda-boda-related crime. For categorical variables, the Chi-square test of independence was used to assess whether significant associations exist between socio-economic characteristics and boda-boda-related crime. For variables measured on a continuous or ordinal scale, Pearson's correlation analysis or Spearman's rank correlation analysis were applied depending on the level of measurement and whether the assumptions of parametric testing are satisfied. These tests provided an initial understanding of whether and how the variables are related.

Thereafter, the study employed multivariate regression models to determine the magnitude and direction of the relationship between socio-economic factors and boda-boda-related crime while controlling for the effects of other relevant variables. The use of multivariate analysis is important because socio-economic factors often operate simultaneously, and regression models make it possible to estimate the independent effect of each factor on the dependent variable.

The specific regression model to be used depended on the nature of the dependent variable. Where the dependent variable is measured as a continuous variable, multiple linear regression was used. Where the dependent variable is dichotomous, binary logistic regression were applied. Where the dependent variable is ordinal, ordinal logistic regression was used. These models enabled the researcher to assess whether socio-economic factors significantly predict boda-boda-related crime and to establish the direction and strength of those relationships.

Before conducting the regression analysis, the relevant assumptions for each model were assessed. For multiple linear regression, these include normality, linearity, homoscedasticity, independence of errors, and absence of multicollinearity. For binary and ordinal logistic regression, the study assessed model fit, multicollinearity, and, where applicable, the proportional odds assumption for ordinal logistic regression. If these assumptions are not satisfied, appropriate adjustments or alternative estimation methods was considered.

The decision to accept or reject the null hypothesis was based on the 0.05 level of significance. If the p-value for the overall model or for the key predictor variables is less than or equal to 0.05, the null hypothesis was rejected. This indicated that there is a statistically significant relationship between socio-economic factors and boda-boda-related crime in the selected counties. However, if the p-value is greater than 0.05, the null hypothesis was not rejected, implying that no statistically

significant relationship exists between the socio-economic factors examined and boda-boda-related crime.

The findings from this hypothesis test helped determine whether boda-boda-related crime is associated with underlying socio-economic conditions in the selected counties. This provided an empirical basis for understanding whether interventions should focus not only on law enforcement measures, but also on addressing the socio-economic vulnerabilities that may contribute to criminal behaviour or victimization in the boda-boda sector.

3. Hypothesis Three. To examine the influence of institutional and contextual conditions on the evolution of organised criminal activity within the boda-boda sector, the study tested the following hypotheses:

Null Hypothesis (H03): Institutional and contextual conditions do not significantly influence the evolution of organised criminal activity within the boda-boda sector.

Alternative Hypothesis (H3): Institutional and contextual conditions significantly influence the evolution of organised criminal activity within the boda-boda sector.

This hypothesis seeks to determine whether the growth, persistence, and transformation of organised criminal activity within the boda-boda sector are shaped by institutional and contextual factors operating within the selected study areas. In this study, institutional conditions refer to the formal structures, systems, and responses that regulate or control the boda-boda sector, while contextual conditions refer to the broader environmental, political, economic, and security circumstances within which the sector operates. The factors to be examined include the effectiveness of regulation, law enforcement response, corruption or collusion, political interference, border proximity, infrastructural conditions, market demand for illicit transport services, and local insecurity.

The hypothesis is based on the assumption that organised criminal activity within the boda-boda sector does not emerge or evolve in isolation, but is often influenced by weaknesses in regulatory systems, gaps in law enforcement, and local contextual realities that create opportunities for criminal networks to form, expand, or adapt. Testing this hypothesis therefore helped to establish whether these institutional and contextual conditions significantly contribute to the evolution of organised criminality within the sector.

To test this hypothesis, the study applied regression analysis, with the specific model depending on the nature of the dependent variable measuring organised criminal activity. Where the outcome variable is measured on a continuous scale, such as an index or composite score of organised criminality, the study used multiple linear regression. This model made it possible to assess the extent to which changes in institutional and contextual factors predict changes in the level or intensity of organised criminal activity within the boda-boda sector.

Where the dependent variable is categorical or dichotomous, logistic regression was used. This approach is appropriate where the outcome of interest is measured in terms of the presence or absence of organised criminal activity, or where criminal evolution is classified into categories. Logistic regression enabled the researcher to estimate the likelihood that organised criminal activity emerges or intensifies under particular institutional and contextual conditions.

The regression analysis was conducted to determine both the magnitude and direction of the relationship between the predictor variables and the evolution of organised criminal activity. In this regard, the study examined whether factors such as weak regulation, ineffective law enforcement, corruption, political interference, proximity to borders, poor infrastructure, demand for illicit transport services, and local insecurity significantly increase or reduce the likelihood or level of organised criminal involvement within the boda-boda sector. By controlling for the simultaneous influence of multiple variables, the regression model provided a clearer understanding of the independent contribution of each factor.

Before conducting the regression analysis, the assumptions relevant to the selected model was assessed. For multiple linear regression, the assumptions of linearity, normality, homoscedasticity, independence of errors, and absence of multicollinearity was examined. For logistic regression, attention was given to model fit, independence of observations, absence of multicollinearity, and the adequacy of the sample for the categories being analysed. Where assumptions are not adequately met, appropriate corrective measures or alternative estimation procedures was considered.

The decision to accept or reject the null hypothesis was based on the 0.05 level of significance. If the p-value for the overall regression model or for the key predictor coefficients is less than or equal to 0.05, the null hypothesis was rejected. This indicated that institutional and contextual conditions significantly influence the evolution of organised criminal activity within the boda-

boda sector. However, if the p-value is greater than 0.05, the null hypothesis was not rejected, implying that the institutional and contextual factors under investigation do not have a statistically significant influence on the evolution of organised criminal activity within the sector.

The findings from this hypothesis test was important in establishing whether the evolution of organised criminal activity in the boda-boda sector is primarily shaped by broader governance, regulatory, and environmental conditions. Such evidence provided an empirical basis for recommending institutional reforms, improved law enforcement strategies, and context-specific interventions aimed at disrupting organised criminal networks and strengthening governance within the boda-boda sector.

4. **Hypothesis Four.** To examine the spatial distribution and concentration of boda-boda-related crime across the selected counties, the study tested the following hypotheses:

Null Hypothesis (H04): There is no statistically significant spatial variation in the distribution and concentration of boda-boda-related crime across the selected counties.

Alternative Hypothesis (H4): There is a statistically significant spatial variation in the distribution and concentration of boda-boda-related crime across the selected counties.

This hypothesis seeks to determine whether boda-boda-related crime is distributed randomly across space or whether it exhibits identifiable spatial patterns such as clustering, concentration, and hotspot formation within the selected counties. In this study, spatial variation refers to differences in the geographical distribution, intensity, and concentration of crime incidents from one location to another. The hypothesis is important because it enables the researcher to establish whether boda-boda-related crime is spatially patterned in ways that reflect localised risk factors, environmental opportunities, or contextual vulnerabilities.

To test this hypothesis, the study employed a combination of spatial statistical techniques and descriptive spatial analysis tools. These methods are appropriate for examining whether the observed distribution of boda-boda-related crime incidents departs significantly from randomness and whether particular areas experience unusually high or low concentrations of crime.

First, the study applied Moran's I statistic to assess the overall pattern of spatial autocorrelation in boda-boda-related crime across the selected counties. Moran's I is used to determine whether crime

incidents occurring in nearby locations are more similar to one another than would be expected by chance. A statistically significant positive Moran's I value indicated spatial clustering of crime incidents, while a significant negative value suggested spatial dispersion. A non-significant result implied that the spatial distribution of crime is random.

Second, the study employed Nearest Neighbour Analysis (NNA) to determine whether the spatial arrangement of boda-boda-related crime incidents is clustered, dispersed, or randomly distributed. This method compares the observed average distance between crime incidents with the expected average distance under conditions of complete spatial randomness. Where the observed pattern shows shorter distances than expected, the distribution were interpreted as clustered; where the distances are greater than expected, the pattern was considered dispersed.

Third, the study used Getis-Ord Gi* hotspot analysis to identify statistically significant hotspots and cold spots of boda-boda-related crime. This technique is particularly useful for detecting localised concentrations of high crime intensity and areas with significantly low crime incidence. Through this analysis, the study established whether particular locations within the selected counties experience significantly elevated levels of boda-boda-related crime relative to surrounding areas.

In addition, Kernel Density Estimation (KDE) was used as a descriptive geospatial technique to illustrate the spatial concentration and intensity of boda-boda-related crime incidents. KDE generated a smoothed surface showing areas with high and low densities of incidents, thereby providing a visual representation of the spatial pattern of crime. Although KDE is primarily descriptive and does not in itself test statistical significance, it complemented the inferential spatial statistics by enhancing the interpretation and presentation of spatial concentration patterns.

The decision to accept or reject the null hypothesis was based on the 0.05 level of significance. If the spatial statistical tests, including Moran's I, Nearest Neighbour Analysis, and Getis-Ord Gi hotspot analysis, produce p-values less than or equal to 0.05, the null hypothesis was rejected. This indicated that boda-boda-related crime exhibits statistically significant spatial variation across the selected counties and is therefore not randomly distributed. However, if the p-values are greater than 0.05, the null hypothesis was not rejected, implying that no statistically significant spatial variation exists in the distribution and concentration of boda-boda-related crime across the study area.

The findings from this hypothesis test was important in determining whether boda-boda-related crime is geographically concentrated in specific areas and whether crime prevention efforts should be spatially targeted. Evidence of clustering and hotspot formation would suggest the need for place-based interventions, focused policing strategies, and geographically informed planning. On the other hand, a random distribution would imply that boda-boda-related crime is more diffusely spread and may require broader county-wide preventive approaches.

Summary of Hypotheses and Test Models. For clarity, the hypotheses and their corresponding analytical tests are summarized below:

Hypothesis	**Analytical test/model**
H01: There is no significant difference in the manifestations and patterns of boda-boda-related crime across the selected counties.	Chi-square, ANOVA, Kruskal-Wallis
H02: There is no significant relationship between socio-economic factors and boda-boda-related crime in the selected counties.	Chi-square, Pearson/Spearman correlation, multiple linear regression, binary logistic regression, ordinal logistic regression
H03: Institutional and contextual conditions do not significantly influence the evolution of organised criminal activity within the boda-boda sector.	Multiple linear regression, logistic regression
H04: There is no significant spatial variation in the distribution and concentration of boda-boda-related crime across the selected counties.	Moran's I, Nearest Neighbour Analysis, Gettis-Ord Gi*, KDE

Interpretation of hypothesis test results noted rely solely on statistical significance. In addition to p-values, the study considered the direction, magnitude, and substantive meaning of observed relationships, differences, and spatial patterns. Regression coefficients, odds ratios, explanatory power, and spatial clustering characteristics were also examined and discussed in relation to the study objectives, research questions, and theoretical framework.

Interpretation of results was guided by the study objectives, research questions, hypotheses, and theoretical framework. The analysis noted only establish whether statistically significant relationships or spatial patterns exist, but also explained their practical, social, and policy significance. This means that findings were interpreted not merely in terms of whether effects exist, but in terms of what those effects mean for understanding boda-boda-related crime as a social, institutional, and spatial phenomenon in Kenya.

Interpretation focused on the dominant manifestations and patterns of boda-boda-related crime, the distinction between incidental misuse and organised criminal involvement, the socio-economic

drivers that increase vulnerability or participation, the institutional and contextual factors enabling criminal evolution, and the spatial logic of crime concentration and hotspot formation. The results were discussed in relation to existing literature and the Kenyan security and transport context. In particular, the discussion considered whether the evidence suggests that boda-boda-related crime is primarily episodic and localised, or whether in some counties it reflects more entrenched and organised criminal structures.

Interpretation also drew on integrated evidence from quantitative, qualitative, and spatial findings. Where findings converge, the study highlighted the strengthened validity of the evidence. Where they complement each other, the study showed how different methods contribute to deeper explanation. Where findings diverge, the discussion explored whether the divergence reflects local complexity, measurement limitations, underreporting, or hidden institutional processes. In this way, interpretation moved beyond isolated results toward a coherent and evidence-based understanding of the dynamics of boda-boda-related crime across the selected counties.

Summary Matrix Linking Objectives, Research Questions, Variables, Data Type, and Analytical Technique. To provide a clear methodological overview of the study, this section presents a summary matrix linking the study objectives, research questions, key variables, data types, methods of analysis, and presentation formats. The matrix is intended to demonstrate the internal consistency of the study design by showing how each objective is operationalized analytically and how each research question was answered using appropriate forms of evidence. It also serves as a guide to the alignment between the variables under study, the data generated, and the analytical procedures selected for testing the hypotheses and interpreting the findings.

Study Objective	**Research Question**	**Key Variables**	**Type of Data**	**Analytical Technique**	**Presentation Format**
Objective i: Analyse the manifestations and patterns of boda-boda-related crime across the selected counties	What are the main manifestations and patterns of boda-boda-related crime across the selected counties in Kenya?	Crime type, frequency, timing, offender profile, victim profile, operational mode, county	Quantitative, qualitative, secondary data	Frequencies, percentages, cross-tabulations, Chi-square, ANOVA/Kruskal-Wallis, thematic analysis	Frequency tables, cross-tabulations, bar charts, clustered charts, thematic narratives

Objective ii: Examine the conceptual and empirical indicators that distinguish incidental criminal use of boda-boda transport from organised criminal activity	What conceptual and empirical indicators distinguish incidental criminal use of boda-boda transport from organised criminal activity?	Level of planning, regularity of involvement, group coordination, role specialization, territorial control, criminal linkages, concealment, financial gain patterns, collusion	Quantitative, qualitative	Descriptive statistics, composite index construction, factor analysis, cluster analysis, typology building, thematic analysis	Statistical tables, typology summaries, analytic matrices, conceptual summaries, verbatim quotations
Objective iii: Evaluate the socio-economic factors associated with boda-boda-related crime in the selected counties	What socio-economic factors are associated with boda-boda-related crime in the selected counties?	Age, gender, education, employment, income, household conditions, migration, peer influence, substance abuse, poverty, livelihood insecurity	Quantitative, qualitative	Descriptive statistics, Chi-square, Pearson/Spearman correlation, multiple linear regression, binary logistic regression, ordinal logistic regression, thematic analysis	Tables, correlation matrices, regression tables, charts, thematic narratives
Objective iv: Assess the institutional and contextual conditions that facilitate the evolution of organised criminal activity within the boda-boda sector	What institutional and contextual conditions facilitate the evolution of organised criminal activity within the boda-boda sector?	Regulation and licensing effectiveness, law enforcement response, corruption/collusion, strength of associations, road infrastructure, political interference, border proximity, illicit market demand, local insecurity	Quantitative, qualitative, secondary data	Means, percentages, rankings, regression analysis, ANOVA/t-test where applicable, thematic analysis	Summary tables, rankings, regression outputs, narrative interpretation, analytic matrices
Objective v: Examine the spatial distribution, concentration, and hotspot patterns of boda-boda-related crime across the selected counties	What are the spatial distribution, concentration, and hotspot patterns of boda-boda-related crime across the selected counties?	Geo-referenced incidents, coordinates, administrative units, crime density, clustering, hotspot intensity, transport corridors, border zones	Spatial, quantitative, qualitative	Point mapping, choropleth mapping, Kernel Density Estimation, Moran's I, Nearest Neighbour Analysis, Getis-Ord Gi*, thematic interpretation	Choropleth maps, dot density maps, hotspot maps, kernel density surfaces, spatial clustering diagrams, explanatory narratives

The matrix above demonstrates that the study employs a logically integrated analytical framework in which each research objective is linked to a specific question, a defined set of variables, a relevant type of data, and an appropriate analytical procedure. This ensures methodological coherence and strengthens the validity of the study by making clear how the empirical investigation proceeded from data collection through analysis to interpretation.

Linkage Between Objectives, Hypotheses, and Analytical Models. The summary matrix may further be extended to show the relationship between the study objectives, hypotheses, and analytical models applied in the study. This supplementary linkage is useful in demonstrating how the inferential and spatial procedures relate directly to the hypotheses formulated in Chapter One.

Objective	Related Hypothesis	Main Variables	Model/Test Applied
Objective I	H01: There is no significant difference in the manifestations and patterns of boda-boda-related crime across the selected counties	County, crime manifestations, crime pattern indices	Chi-square, ANOVA, Kruskal-Wallis
Objective III	H02: There is no significant relationship between socio-economic factors and boda-boda-related crime in the selected counties	Socio-economic variables and crime outcome	Chi-square, Pearson/Spearman correlation, multiple linear regression, binary logistic regression, ordinal logistic regression
Objective IV	H03: Institutional and contextual conditions do not significantly influence the evolution of organised criminal activity within the boda-boda sector	Institutional/contextual factors and organised criminality outcome	Multiple linear regression, logistic regression, ANOVA/t-test where applicable
Objective V	H04: There is no significant spatial variation in the distribution and concentration of boda-boda-related crime across the selected counties	Spatial crime variables and location-based measures	Moran's I, Nearest Neighbor Index, KDE, Getis-Ord Gi*

This additional matrix reinforces the analytical consistency of the study by showing that each hypothesis is supported by a clearly defined test model and variable structure. It also clarifies that not all objectives are tested through formal null hypotheses; some, such as Objective ii, are addressed primarily through classification, typology development, and thematic interpretation rather than through a single inferential hypothesis test.

3.8 **Ethical Considerations**

Ethical considerations were central to this study because it addressed crime, insecurity and potentially sensitive experiences involving boda-boda riders and other stakeholders. The study was guided by the principles of informed consent, voluntary participation, confidentiality, anonymity, non-maleficence and respect for the dignity and rights of participants. Standard methodology texts emphasise these principles for social research involving human subjects. (Kothari, 2004; Creswell & Plano Clark, 2018).

Before fieldwork begins, the researcher obtained the necessary ethical clearance and research authorization from the relevant university, ethics review structures and government agencies. Permission to conduct the study in the selected counties were also sought from relevant county authorities and local administrative offices where necessary. All participants were informed of the

purpose of the study, the nature of participation, and their right to decline or withdraw at any stage without penalty.

3.8.1 **Confidentiality and anonymity**

Confidentiality and anonymity were strictly observed. Respondents were not required to disclose unnecessary personal identifiers, and where identifiers are collected for operational reasons, they were separated from the main dataset and securely protected. Because the study concerns crime and organised criminal activity, special care were taken to minimize risk to respondents. Victims or survivors were to be included where this was ethically appropriate and safe. Sensitive GIS data were generalised or aggregated where necessary so that exact respondent-linked or incident-linked locations are not publicly disclosed.

The study also avoided stigmatizing the boda-boda sector or specific counties and communities. The aim is to understand patterns, contexts, and enabling conditions of crime, not to criminalize boda-boda riders as a group. Findings were therefore interpreted and presented in a balanced, evidence-based, and non-prejudicial manner.

3.9 **Chapter Summary**

This chapter has presented the methodology that guided the study on boda-boda crime and its evolution into organised criminal activity in selected counties in Kenya. It has outlined the mixed-methods comparative research design adopted for the study and explained why this design is appropriate for investigating a phenomenon that is at once measurable, socially embedded, institutionally shaped, and spatially distributed. The chapter has also described the study sites, target population, sample size determination, and sampling procedures that was used to identify respondents and study locations across the six selected counties.

In addition, the chapter has explained the data collection methods and instruments that was used in the study, including questionnaires, key informant interviews, focus group discussions, document review, observation, and GIS-based spatial data collection. It has further discussed the pilot study to be undertaken in Migori and Nairobi Counties, together with the measures that were applied to strengthen the validity, reliability, and trustworthiness of the instruments and procedures. These methodological steps are intended to ensure that the study generates data that are clear, relevant, dependable, and suitable for addressing the study objectives.

The chapter has also described the procedures that was used to analyse the data, including quantitative, qualitative, and spatial analysis, as well as the integration of the three strands of evidence during interpretation. Particular emphasis has been placed on the treatment of each county as an independent analytical unit before comparative analysis is undertaken across urban, rural, and border settings. Finally, the chapter has outlined the ethical considerations that guided the conduct of the study, especially with regard to voluntary participation, confidentiality, the handling of sensitive information, and the responsible use of spatial data. Taken together, the methodological procedures presented in this chapter provide the framework through which the study generated systematic, credible, and context-sensitive evidence on boda-boda crime and its organised criminal dimensions across the selected counties in Kenya.

CHAPTER FOUR

FINDINGS AND INTERPRETATIONS

4.0 Introduction

This chapter presents and discusses the empirical findings on boda-boda-related crime and security dynamics across the selected counties. The results are organised around the five study objectives and their corresponding hypotheses so that the evidence is presented in a clear, systematic, and analytically coherent manner.

Consistent with the mixed-methods design of the study, the chapter integrates quantitative, qualitative, observational and spatial evidence. Questionnaire data are analysed using descriptive and inferential statistical techniques, including frequencies, cross-tabulations, composite indices, Chi-square tests, non-parametric tests and regression models. Qualitative data from interviews, focus group discussions, and open-ended responses are analysed thematically to capture participants' experiences and contextual interpretations, while spatial analysis is used to identify geographical patterns, hotspots and county-level variations in risk.

The findings are presented in a logical sequence aligned with the study objectives. The first section examines the patterns of boda-boda-related crime, including exposure, frequency, spatial variation and qualitative dynamics. The second section focuses on the level and nature of organised criminality within the sector, including its classification, indicators and structural characteristics. Subsequent sections address the drivers of crime, institutional responses and the spatial distribution of security risks, respectively.

The integration of multiple data sources provides a multidimensional and evidence-based account of boda-boda-related crime. Methodological triangulation strengthens the validity and credibility of the findings by showing how crime is experienced, structured, explained and spatially distributed across different county contexts.

Overall, the chapter establishes the empirical foundation for the study. It demonstrates that boda-boda-related crime is complex, context-dependent, and spatially differentiated, shaped by the interaction of mobility systems, socio-economic conditions, institutional capacity and local

opportunity structures. These findings provide the basis for the conclusions and policy recommendations presented in the subsequent chapter.

4.1 Response Rate, Data Overview and Analytical Methods

This section presents the response rate for the questionnaire survey, provides an overview of the datasets used in the study, and outlines the analytical methods applied. The aim is to demonstrate the adequacy, reliability, and methodological rigour of the empirical foundation underpinning the findings presented in this chapter.

4.1.1 Questionnaire Response and Sample Achievement

The quantitative component of the study was designed to generate county-comparative evidence on boda-boda-related crime, organised criminal indicators, socio-economic drivers, institutional conditions and spatial risk patterns. The original study protocol targeted 2,687 boda-boda riders across seven counties: Mombasa, Machakos, Nyeri, Bomet, Busia, Kirinyaga and Marsabit. This target was based on a minimum sample of 384 respondents per county. The equal county allocation was adopted to ensure that each county had sufficient observations for within-county analysis and cross-county comparison.

After field data collection, cleaning, and merging, 2,631 usable questionnaire responses were retained for analysis. These records covered seven counties: Bomet, Busia, Kirinyaga, Machakos, Marsabit, Mombasa, and Nyeri. For the six counties originally included in the study protocol, 2,274 usable questionnaire responses were retained against the planned target of 2,304, giving a sample achievement rate of 98.70%. This indicates that the study substantially achieved the intended quantitative coverage for the original six-county comparative framework.

Table 4.1 Planned and Achieved Usable Questionnaire Responses, by County

County	Planned sample	Usable questionnaires retained	Difference ^a	Achievement (%) ^b
Mombasa	385	385	0	**100.0**
Machakos	385	384	–1	**99.7**
Nyeri	385	353	–32	**91.7**
Bomet	385	388	+3	**100.8**
Busia	385	383	–2	**99.5**
Marsabit	385	381	–4	**99.0**
Kirinyaga	357	357	0	**100.0**
Subtotal (original six counties)	**2 310**	**2 274**	–36	**98.4**

Grand total (all seven counties)	**2 667**	**2 631**	–36	**98.7**

As Table 4.1 indicates, the fieldwork achieved the intended questionnaire coverage in almost every county. Mombasa and Bomet registered modest overshoots (+0 % and +0.8 %, respectively), Machakos matched its target exactly, while Busia and Marsabit fell short by no more than four forms each (≤ 1 %). Nyeri retained 353 usable questionnaires about 8 % below plan but still well above the minimum often cited for county-level descriptive and inferential work. The addition of 357 fully-validated questionnaires from Kirinyaga an expansion site not foreseen in the original protocol—raised the consolidated dataset to 2 631 cases. In reporting, Kirinyaga is therefore flagged as a supplementary county and analysed alongside, but distinct from, the six protocol counties.

Overall, the cleaned dataset provides a strong empirical platform: its size allows robust descriptive statistics, cross-county comparisons, and the inferential tests described later in Chapter 4. Because the study retained only vetted records (rather than a complete log of forms distributed in the field), Table 4.1 reports sample achievement usable questionnaires versus planning targets rather than a conventional response-rate metric.

4.1.2 **GIS and Spatial-Data Coverage**

The GIS component was designed to map the geography of boda-boda crime by sampling 222 strategic nodes (stages, junctions, markets, border corridors, etc.) across the six protocol counties. After cleaning, the uploaded spatial layer contained 100 geocoded records spanning **seven** counties: 85 from the original counties and 15 from Kirinyaga. Valid coordinate checks (complete lat-long pairs, EPSG 21037 projection) left 81 analysable points within the protocol counties; the remaining 19 either lacked coordinates or lay far outside county buffers and were excluded from hotspot mapping. While the final count is smaller than planned, the retained points still cover every targeted county and include the key mobility corridors required for the spatial analyses presented in Sections 4.7–4.8.

Table 4.2: Proposed and Achieved GIS/Spatial Data Coverage by County

County	Proposed Sampled Nodes	Uploaded GIS Records	Coordinate-Valid Records Retained	Difference from Proposed Nodes	Spatial Data Achievement (%)

Mombasa	40	10	10	-30	25.00
Machakos	40	12	12	-28	30.00
Nyeri	36	13	13	-23	36.11
Bomet	36	16	16	-20	44.44
Busia	38	15	15	-23	39.47
Marsabit	32	19	15	-17	46.88
Kirinyaga	Not in original protocol	15	0	—	—
Total: Original six counties	**222**	**85**	**81**	**-141**	**36.49**
Total: All uploaded GIS records	—	**100**	**81 used for protocol-county GIS analysis**	—	—

Source: Planned spatial coverage from the study protocol; achieved coverage from the cleaned GIS dataset.

The achieved GIS coverage was lower than the planned number of sampled nodes. However, the retained records provided spatially usable evidence from all six protocol counties. Marsabit, Bomet, Busia, Nyeri, Machakos, and Mombasa all contributed coordinate-valid records suitable for mapping. The GIS dataset was therefore not treated as a respondent sample in the statistical sense, but as a spatial evidence layer for mapping crime-risk sites, identifying concentration patterns, and triangulating spatial claims made in the questionnaire, observation, and qualitative data.

The spatial data strengthened the study by adding geographical specificity to the analysis. It enabled the study to examine where risk was concentrated, how hotspots related to transport nodes and movement corridors, and how county-specific geography shaped boda-boda-related insecurity. The Kirinyaga spatial records should be treated separately unless the study scope is formally revised to include Kirinyaga as an additional study county.

4.1.3 **Observation Data Coverage and Usability**

Observation was used to provide direct contextual evidence on boda-boda operations and the physical environments in which crime risks emerge. The method was intended to complement the questionnaire, qualitative interviews, focus group discussions, and GIS analysis by recording visible features of boda-boda stages and surrounding spaces. These included stage organisation, rider interactions, passenger flow, security and regulatory presence, operational compliance,

congestion, lighting, proximity to markets or roads, and other environmental conditions relevant to crime opportunity and prevention.

The cleaned observation dataset contained 95 usable observation records across seven counties. Of these, 80 records were from the six counties included in the original protocol, while 15 records were from Kirinyaga. Because observation was not based on a fixed statistical sample, the results are reported as field observation coverage rather than as a response rate.

Table 4.3**:** Observation Data Coverage by County

County	Protocol Status	Usable Observation Records	Percentage of Protocol-County Observation Records (%)
Bomet	Original protocol county	12	15.00
Busia	Original protocol county	15	18.75
Machakos	Original protocol county	12	15.00
Marsabit	Original protocol county	19	23.75
Mombasa	Original protocol county	9	11.25
Nyeri	Original protocol county	13	16.25
Total: Original six counties		**80**	**100.00**
Kirinyaga	Additional/non-protocol county	15	—
Total: All uploaded observation records		**95**	—

Source: Cleaned observation dataset.

Observation coverage was achieved across all six protocol counties. Marsabit contributed the highest number of observation records, followed by Busia, Nyeri, Bomet, Machakos, and Mombasa. These records helped contextualise statistical and spatial findings by showing the visible conditions under which boda-boda activities occurred. For example, observation data helped interpret whether reported insecurity was associated with weak stage control, poor visibility of enforcement actors, congestion, informal passenger loading patterns, limited compliance with operational rules, or proximity to high-risk transport and market nodes.

The observation dataset was therefore useful for triangulation. It allowed the study to compare reported perceptions of insecurity with visible field conditions and to connect spatial risk patterns with actual boda-boda operational environments. As with the questionnaire and GIS data, Kirinyaga observations should be reported as supplementary unless the study is formally expanded beyond the original six-county framework.

4.1.4 **Qualitative Data Coverage and Usability**

Key Informant Interviews and Focus Group Discussions. The qualitative component was designed to explain the processes, meanings, institutional dynamics, and contextual realities underlying the quantitative and spatial patterns. Unlike the questionnaire component, qualitative sampling was not intended to be statistically representative. It was guided by purposive selection, relevance to the study objectives, stakeholder role, county context, information richness, accessibility, and thematic saturation.

The original protocol proposed key informant interviews with actors who were strategically positioned to provide informed perspectives on boda-boda operations and insecurity. These included stage leaders, SACCO or association officials, county transport officers, National Government Administrative Officers, police officers, prosecutors, border security personnel, community leaders, and civil society or non-governmental organisation representatives. Focus group discussions were planned to capture shared experiences and collective interpretations among riders, stage actors, community members, and other relevant groups.

Table 4.4: Planned Qualitative Fieldwork Coverage by County

County	Planned KIIs	Planned FGDs	Planned FGD Participants
Mombasa	11	3	24–30
Machakos	9	3	24–30
Nyeri	6	2	16–20
Bomet	6	3	24–30
Busia	8	2	16–20
Marsabit	6	2	16–20
Kirinyaga	Not in original protocol	Not in original protocol	Not in original protocol
Total: Original six counties	**46**	**15**	**120–150**

Source: Study protocol.

The uploaded qualitative evidence was organised into five objective-based transcript-summary datasets. These files contained 182 usable qualitative transcript-summary entries across seven counties. The entries were evenly distributed by county, with each county contributing 26 objective-linked summaries. Objective I contributed 28 entries, Objective II contributed 35, Objective III contributed 35, Objective IV contributed 42, and Objective V contributed 42.

Table 4.5: Objective-Based Qualitative Transcript Summaries by County

County	Objective I	Objective II	Objective III	Objective IV	Objective V	Total Transcript Summaries	County Status
Bomet	4	5	5	6	6	26	Original protocol county
Busia	4	5	5	6	6	26	Original protocol county
Machakos	4	5	5	6	6	26	Original protocol county
Marsabit	4	5	5	6	6	26	Original protocol county
Mombasa	4	5	5	6	6	26	Original protocol county
Nyeri	4	5	5	6	6	26	Original protocol county
Kirinyaga	4	5	5	6	6	26	Additional/non-protocol county
Total	**28**	**35**	**35**	**42**	**42**	**182**	

Source: Cleaned objective-based qualitative transcript-summary datasets.

The qualitative files were complete for the fields required at this stage of analysis. Each entry contained a transcript identifier, source file, county, respondent-type label, and text field. No duplicate transcript identifiers were identified, and the key fields required for objective-based thematic interpretation were complete. This made the files suitable for cross-county thematic comparison and triangulation with the questionnaire, GIS, and observation datasets.

However, the uploaded qualitative files are best described as objective-based transcript summaries rather than raw KII or FGD transcripts. They should therefore not be used on their own to report the exact number of completed key informant interviews or focus group discussions. A direct KII/FGD completion table would require a separate fieldwork log showing interview type, county, respondent category, date, transcript code, and completion status. In the absence of that log, the present section reports the planned qualitative design and the available objective-based qualitative evidence.

Despite this limitation, the qualitative dataset provided an important interpretive layer for the study. It helped explain how respondents understood the manifestations of boda-boda-related crime, the distinction between incidental offending and organised criminal activity, the socio-economic pressures influencing crime vulnerability, the institutional weaknesses enabling criminal evolution, and the spatial conditions associated with hotspots. The qualitative evidence therefore

strengthened the mixed-methods design by linking statistical patterns to local meanings, institutional processes, and county-specific realities.

Methodological note on county scope. The original study protocol was based on six counties: Mombasa, Machakos, Nyeri, Bomet, Busia, and Marsabit. The cleaned datasets, however, include Kirinyaga in the questionnaire, observation, qualitative files, and uploaded GIS records. For coherence, this report formally treats Kirinyaga as an additional analytical county while recognising that the original sampling protocol was designed around six counties. This clarification is important for methodological transparency, consistency of tables, and defensibility of cross-county comparisons.

4.1.5 **Study Area Coverage**

The study was conducted in seven selected counties in Kenya: Bomet, Busia, Kirinyaga, Machakos, Marsabit, Mombasa, and Nyeri. These counties were purposively selected to capture diversity in geographical location, urban–rural characteristics, transport systems, security contexts, and boda-boda operational environments.

The selected counties represent a broad spectrum of socio-economic and spatial contexts. For instance, counties such as Mombasa reflect urban and coastal dynamics with high population density and intense transport activity, while Marsabit represents sparsely populated, remote, and borderland conditions characterised by limited infrastructure and security challenges. Busia, as a border county, captures cross-border mobility and trade dynamics, whereas counties such as Bomet, Kirinyaga, Machakos, and Nyeri represent predominantly rural and peri-urban settings with varying levels of economic activity and institutional capacity.

This diversity enabled the study to examine how boda-boda-related crime and security dynamics vary across different geographical, economic, and institutional contexts. It allowed for comparative analysis of crime patterns, organised criminality, socio-economic drivers, institutional responses, and spatial risk distribution across counties with distinct operational environments.

The inclusion of counties from different regional settings also enhances the external validity and generalisability of the findings, as it captures variations that are likely to exist across the broader Kenyan context. By incorporating both high-mobility and low-mobility environments, as well as

areas with differing levels of regulatory enforcement and economic activity, the study provides a more comprehensive understanding of the factors influencing boda-boda-related crime.

Overall, the study area coverage ensures that the analysis reflects the complex and context-dependent nature of boda-boda-related crime, allowing for more nuanced interpretation and policy-relevant conclusions.

4.1.6 **Data Sources**

The study adopted a mixed-methods approach, integrating multiple data sources to provide a comprehensive understanding of boda-boda-related crime and security dynamics. The quantitative component consisted of questionnaire data, which provided measurable information on respondent characteristics, boda-boda operations, crime exposure, perceptions of organised criminality, socio-economic vulnerability, institutional effectiveness, and spatial/security risk factors.

The qualitative component comprised data derived from Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) conducted across the selected counties. FGDs were used to capture collective perspectives, shared experiences, and community-level dynamics of boda-boda operations and crime patterns. In contrast, KIIs provided expert insights from key stakeholders, including law enforcement officers, local administrators, boda-boda leaders, and other relevant actors with specialized knowledge of the sector.

These qualitative data were further supplemented by open-ended questionnaire responses, enabling the study to capture both individual and group-level perspectives. The qualitative datasets provided in-depth insights into crime patterns, criminal organisation, socio-economic pressures, political influences, policing challenges, and institutional responses.

In addition, observation data were used to document real-world boda-boda operational environments, behavioural patterns, and visible indicators of crime and security conditions. These observations served as an important validation mechanism, strengthening the credibility of the findings.

The study also incorporated spatial/GIS data, which enabled the analysis of geographical distribution, identification of hotspots, and examination of spatial variation in crime patterns across the selected counties.

4.1.7 **Analytical Methods**

Quantitative data were analysed using a combination of descriptive and inferential statistical techniques. Descriptive statistics, including frequencies, percentages, and means—were used to summarise the data. Cross-tabulations were applied to compare responses across counties.
Composite indices were developed to measure key constructs such as crime exposure, organised criminality, socio-economic vulnerability, institutional effectiveness, and spatial risk. Reliability analysis was conducted to assess the internal consistency of these indices.

Inferential statistical methods included Chi-square tests to assess associations between categorical variables, with Cramér's V used to measure the strength of these associations. Non-parametric tests, particularly the Kruskal–Wallis test, were applied where data did not meet parametric assumptions. In addition, logistic regression analysis was used to examine predictors of organised criminality.

Qualitative data were analysed using thematic analysis, enabling the identification of recurring themes related to crime patterns, criminal organisation, socio-economic pressures, and institutional responses.

Spatial data were analysed using GIS techniques, including mapping and spatial interpretation, to identify geographical patterns and variations in crime and security risks.

Summary of Data and Methods. The data sources and analytical approaches used in the study are summarised in Table 4.1.

Table 4.6: Summary of Response Rate, Data Sources, and Analytical Methods

Data Component	**Description**	**Coverage / Sample Size**	**Analytical Purpose**	**Method of Analysis**
Questionnaire Data	Structured responses from participants across seven counties	2,631 respondents	Measure crime exposure, frequency, perceptions, and risk	Descriptive & inferential statistics
Qualitative Transcripts	Interview and open-ended responses across all study objectives	5 thematic datasets	Provide contextual explanations and deeper insights	Thematic analysis
Observation Data	Field observations of boda-boda operations and environments	Multi-county coverage	Validate behavioural patterns and environmental conditions	Descriptive interpretation
Spatial / GIS Data	Geographic data on locations, transport networks, and risk distribution	7 counties	Identify spatial patterns, hotspots, and regional variation	Spatial analysis and mapping

Note: The integration of multiple data sources enabled methodological triangulation, thereby enhancing the validity, reliability, and comprehensiveness of the study findings.

4.1.8 **Data Integration and Triangulation**

The integration of quantitative, qualitative, observational, and spatial datasets enabled methodological triangulation, which significantly strengthened the analytical rigour of the study. By combining multiple data sources, the study was able to examine boda-boda-related crime and security dynamics from complementary perspectives, thereby reducing reliance on a single method and enhancing the robustness of the findings.

The quantitative data provided measurable and generalisable evidence on patterns of crime, perceptions, and risk factors across the selected counties. The qualitative data, derived from Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs), offered in-depth insights into participants' experiences, perceptions, and contextual interpretations, thereby explaining the underlying mechanisms behind the observed statistical patterns.

The inclusion of observation data added a critical layer of validation by capturing real-world conditions of boda-boda operations, behavioural practices, and environmental characteristics. This helped to corroborate self-reported data and provided direct evidence of operational realities on the ground.

Furthermore, spatial/GIS data enabled the analysis of geographical distribution and variation in crime and security risks, facilitating the identification of hotspots and spatial clustering. This spatial dimension enhanced the understanding of how crime patterns are influenced by location, mobility systems, and environmental factors.

The convergence of findings across these data sources strengthens the internal validity, reliability, and credibility of the study. Consistent patterns observed across quantitative, qualitative, observational, and spatial analyses provide strong evidence that the findings are not artefacts of a single method but reflect underlying real-world dynamics.

Overall, this multi-source and multi-method approach produced a comprehensive, nuanced, and context-sensitive understanding of boda-boda-related crime. It demonstrates that the phenomenon is best understood through an integrated analytical framework that captures its statistical patterns, social meanings, and spatial distribution.

4.1.9 **Demographic Characteristics of Respondents**

This section presents the demographic characteristics of respondents, including county of residence, gender, age, level of education, and years of experience within the boda-boda sector. These characteristics provide an important contextual foundation for interpreting the study findings, as they shape respondents' exposure to crime, perceptions of security, and engagement within the boda-boda system.

The summary of demographic characteristics is presented in Table 4.2.

Table 4.7: Demographic Characteristics of Respondents

Source: Field Data, 2026; n = 2,631

Variable	Category	Frequency (n)	Percentage (%)
County	Bomet	388	14.7
	Busia	383	14.6
	Kirinyaga	357	13.6
	Machakos	384	14.6
	Marsabit	381	14.5
	Mombasa	385	14.6
	Nyeri	353	13.4
Gender	Male	2,621	99.6
	Female	5	0.2
	Missing	5	0.2
Age Group	18–24 years	443	16.8
	25–34 years	1,291	49.1
	35–44 years	632	24.0
	45–54 years	209	7.9
	55 years and above	46	1.7
Education Level	Primary	649	24.7
	Secondary	1,407	53.5
	University/College/TVET	446	17.0
	No formal education	95	3.6
	Missing	34	1.3
Years of Experience	Less than 1 year	196	7.4
	1–3 years	713	27.1
	4–6 years	905	34.4
	7–10 years	474	18.0
	More than 10 years	318	12.1

The distribution of respondents across the seven selected counties is relatively balanced, with each county contributing approximately 13–15% of the total sample. This even distribution enhances the comparability of findings and ensures that the results reflect diverse geographical and operational contexts.

The gender distribution indicates a highly male-dominated sector, with 99.6% of respondents being male, reflecting the structural realities of boda-boda operations in Kenya. While female representation is minimal, it remains important for capturing perspectives on vulnerability and safety.

The age profile shows that the majority of respondents fall within the 25–34 years age group (49.1%), followed by 35–44 years (24.0%), indicating that the sector is dominated by young and economically active individuals. This aligns with the role of the boda-boda sector as a key source of employment for young people.

Educational attainment is concentrated at the secondary level (53.5%), with smaller proportions having primary (24.7%) and tertiary education (17.0%). This suggests moderate levels of formal education, which may influence awareness of regulations, risk perception, and interaction with institutional frameworks.

In terms of experience, the majority of respondents have 4–6 years (34.4%) or 1–3 years (27.1%) of experience, indicating that most participants possess moderate familiarity with boda-boda operations. This level of experience is sufficient to provide informed perspectives on crime patterns and sector dynamics.

Overall, the demographic profile highlights the youthful, male-dominated, and moderately experienced nature of the boda-boda sector, with participants drawn from diverse geographical and educational backgrounds. These characteristics are critical in shaping exposure to crime, perceptions of risk, and engagement with security systems, thereby providing a strong foundation for interpreting the findings presented in subsequent sections.

4.2 Patterns and Forms of Boda-Boda-Related Crime Across Counties

This section presents the findings for Objective One, which examined the patterns and forms of boda-boda-related crime across Bomet, Busia, Kirinyaga, Machakos, Marsabit, Mombasa, and Nyeri counties. The objective focuses on how boda-boda-related crime manifests across county contexts in terms of exposure, frequency, spatial concentration, timing, victim profile, and specific crime forms. The analysis integrates quantitative survey results, inferential tests, graphical outputs, and qualitative transcript themes so that the descriptive patterns, statistical differences, and lived meanings of crime are interpreted together.

Boda-boda-related crime was found to be unevenly distributed across the study counties. Instead of following a uniform pattern, it varied by county, type of crime, frequency of occurrence, crime location, time of occurrence, and victim category. This finding is consistent with environmental criminology, which argues that crime is not randomly distributed but tends to cluster around particular routes, nodes, activity spaces, and poorly guarded locations where offenders and targets converge (Brantingham, Brantingham, & Andresen, 2017). In the boda-boda context, such spaces include motorcycle stages, remote roads, border points, markets, highways, residential estates, informal settlements, and entertainment areas.

The findings also align with Routine Activity Theory, which explains crime as a product of the convergence of motivated offenders, suitable targets, and absence of capable guardianship (Cohen & Felson, 1979). Boda-boda operations involve frequent movement of riders, passengers, motorcycles, cash, and goods across both formal and informal spaces. Where these movements occur at night, along remote roads, near border corridors, or in areas with limited policing and weak stage regulation, the opportunity for theft, robbery, assault, intimidation, smuggling, extortion, and related offences may increase.

Previous transport scholarship further helps explain why boda-boda-related crime should be understood within the broader structure of informal transport. Cervero and Golub (2007) argue that informal transport systems often emerge where formal public transport is inadequate, inaccessible, or weakly regulated. Kumar (2011) similarly observes that the growth of commercial motorcycles in African cities is linked to transport-service gaps, unemployment, congestion, poor road networks, and the need for flexible mobility. In Kenya, Mutiso and Behrens (2011) show that boda-boda services occupy an important transport niche by providing short-distance travel, feeder services, and access to areas where larger vehicles cannot easily operate.

However, the same flexibility that makes boda-bodas useful can also create security risks. Their ability to move quickly, access narrow or remote routes, operate informally, and avoid easy traceability can make motorcycles attractive both to legitimate transport users and to criminal actors. The National Crime Research Centre (2018) similarly reported that Kenya's boda-boda sub-sector has been associated with security concerns, weak regulation, impunity, and challenges

in monitoring operators. This supports the present study's finding that boda-boda-related crime varies by exposure, crime type, location, time, and victim profile.

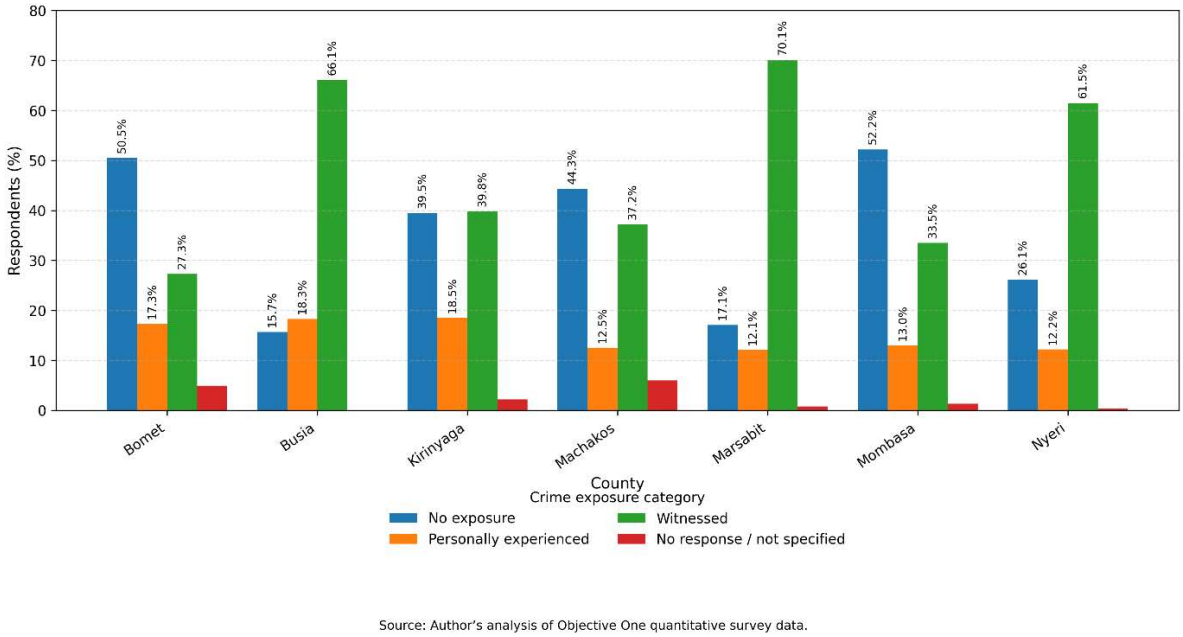
Goodfellow (2015) also argues that informal transport sectors in East Africa are shaped by transport politics, regulation, state effectiveness, and relations between operators and authorities. This is important because the counties in this study differ in road networks, border proximity, urbanisation, enforcement practices, stage-control systems, and local governance conditions. Therefore, county differences in boda-boda-related crime should not be interpreted only as differences in rider behaviour; they also reflect broader differences in policing, mobility patterns, local economies, stage organisation, and community surveillance.

At the same time, the findings should not be interpreted as evidence that all boda-boda riders are offenders. Doherty (2017) shows that boda-boda riders often work under precarious conditions and are themselves exposed to insecurity, bodily risk, social stigma, and livelihood instability. This is relevant to the present study because riders appear not only as possible perpetrators or facilitators of crime, but also as victims of motorcycle theft, robbery, assault, extortion, and attacks on isolated routes. Boda-boda-related crime should therefore be understood as a complex phenomenon involving offenders, riders, passengers, residents, criminal networks, transport governance, and vulnerable livelihoods.

Overall, Objective One demonstrates that boda-boda-related crime is a spatially differentiated, socially embedded, and county-specific security issue. It includes direct victimisation, witnessed crime, motorcycle theft, theft from passengers, robbery, assault, political intimidation, smuggling, drug transport, bribery, extortion, and other offences that vary by county context. The section is organised sequentially: exposure establishes the public visibility of crime; frequency and the crime-pattern index show intensity and structure; crime type, location, time, and victim profile explain how the crime is manifested; qualitative themes provide interpretive depth; statistical tests confirm whether county differences are significant; and the integrated discussion links the findings to theory, previous scholarship, and policy implications.

4.2.1 **Crime Exposure by County**

Crime exposure was measured using three main categories: respondents who had personally experienced boda-boda-related crime, respondents who had witnessed such crime, and respondents who reported no exposure. The purpose of this analysis was to determine whether boda-boda-related crime affected respondents directly, indirectly, or not at all. This distinction is important because crime can influence public insecurity even where direct victimisation is limited.



Source: Author's analysis of Objective One quantitative survey data.

Figure 4.1: Crime Exposure by County

Figure 4.1 presents respondents' exposure to boda-boda-related crime across Bomet, Busia, Kirinyaga, Machakos, Marsabit, Mombasa, and Nyeri counties. The figure shows that exposure differed considerably across counties, with witnessed crime emerging as the most common form of exposure in most counties. This subsection therefore establishes the public visibility of boda-boda-related crime before the next subsection assesses how frequently such crime was perceived to occur.

Table 4.8: Summary of Crime Exposure Patterns by County

County	**Main exposure pattern**	**Key interpretation**
Marsabit	Witnessed crime was highest at 70.1%	Indicates very high public visibility of boda-boda-related crime
Busia	Witnessed crime was 66.1%	Suggests strong exposure linked to mobility, trade, stages, and border movement

County	Main exposure pattern	Key interpretation
Nyeri	Witnessed crime was 61.5%	Shows high community awareness of boda-boda-related crime
Mombasa	No exposure was highest at 52.2%	Suggests lower general exposure or spatially concentrated crime
Bomet	No exposure was 50.5%	Indicates comparatively lower public visibility, although crime still exists
Kirinyaga	Witnessed crime was 39.8%; no exposure was 39.5%	Shows a balanced or intermediate exposure profile
Machakos	Personal exposure was relatively low at 12.5%	Suggests lower direct victimisation compared with witnessed exposure

Source: Author's analysis of Objective One quantitative survey data.

4.2.1.1 ***Dominance of Witnessed Crime***: The dominance of witnessed crime is an important finding. It suggests that boda-boda-related crime affects communities not only through direct victimisation but also through public visibility. In criminological literature, indirect exposure to crime is important because people may develop fear, mistrust, and insecurity even when they have not personally been attacked or robbed. Hale (1996) observes that fear of crime is shaped not only by actual victimisation but also by perceptions, community experiences, and awareness of crime events. Therefore, respondents who witnessed boda-boda-related crime may still experience insecurity even if they were not direct victims.

4.2.1.2 ***Marsabit:*** Marsabit recorded the highest proportion of respondents who had witnessed boda-boda-related crime, at 70.1%. This indicates that boda-boda-related crime was highly visible in Marsabit. The high level of witnessed exposure suggests that criminal incidents involving boda-boda operations are not isolated or hidden but are sufficiently common or public for many respondents to have observed them. This pattern can be interpreted through Crime Pattern Theory, which argues that crime tends to cluster around movement paths, nodes, and awareness spaces (Brantingham *et al*., 2017). In Marsabit, expansive geography, remote transport corridors, borderland movement, and limited surveillance may create conditions in which boda-boda-related crime becomes publicly visible.

4.2.1.3 ***Busia:*** Busia recorded the second highest level of exposure witnessed, at 66.1%. This places Busia among the counties with the most visible boda-boda-related crime patterns. Busia's border location is analytically important because boda-boda transport historically developed in

relation to cross-border mobility in East Africa. Goodfellow (2015) notes that boda-boda transport is closely connected to informal transport politics and state regulation, while Doherty (2017) links boda-boda livelihoods to flexible mobility and everyday insecurity. In this study, Busia's high witnessed exposure may reflect the interaction between motorcycle transport, border mobility, commercial activity, and security challenges.

4.2.1.4 ***Nyeri:*** Nyeri also recorded a high level of witnessed crime, at 61.5%. This suggests that although Nyeri may not have the highest level of personal victimisation, boda-boda-related crime remains highly visible within the county. The high witnessed exposure may be linked to crimes occurring in public areas such as residential estates, market centres, road corridors, and boda-boda stages. From the perspective of Crime Pattern Theory, this indicates that boda-boda-related crime may be concentrated around routine activity spaces where riders, passengers, residents, and potential offenders interact.

4.2.1.5 ***Mombasa and Bomet:*** In contrast, Mombasa and Bomet recorded the highest proportions of respondents reporting no exposure to boda-boda-related crime. In Mombasa, 52.2% of respondents reported no exposure, while in Bomet the proportion was 50.5%. These findings suggest that, compared with Marsabit, Busia, and Nyeri, a larger proportion of respondents in Mombasa and Bomet had neither personally experienced nor witnessed boda-boda-related crime. However, this should not be interpreted to mean that boda-boda-related crime is absent in these counties. Rather, it may indicate that crime is less widely distributed, more concentrated in specific areas, or less visible to some respondents.

4.2.1.6 ***Kirinyaga:*** Kirinyaga displayed a relatively balanced exposure profile. About 39.8% of respondents reported having witnessed boda-boda-related crime, while 39.5% reported no exposure. This near balance suggests that Kirinyaga occupies an intermediate position between high-exposure counties and lower-exposure counties. Crime is visible to a substantial proportion of respondents, but an almost equal proportion reported no exposure. This may mean that boda-boda-related crime in Kirinyaga is unevenly distributed across localities, with some areas experiencing visible incidents while others remain less affected.

4.2.1.7 ***Personal Exposure and Experience:*** Personal experience of boda-boda-related crime was lower than witnessed crime across all counties. The highest personal exposure was reported in Kirinyaga at 18.5%, followed by Busia at 18.3% and Bomet at 17.3%. These figures show that although witnessed crime dominated, a notable minority of respondents had personally experienced crime involving boda-boda operations. Kirinyaga's relatively high personal exposure suggests that respondents were not only observing crime but were also directly affected by incidents such as theft, robbery, assault, or passenger targeting.

The lowest personal exposure levels were recorded in Marsabit at 12.1%, Nyeri at 12.2%, Machakos at 12.5%, and Mombasa at 13.0%. These figures show that direct victimisation was comparatively lower in these counties. However, in Marsabit and Nyeri, low personal exposure occurred alongside very high witnessed exposure. This contrast is analytically important because it shows that boda-boda-related crime may create a broad public-security concern even where fewer respondents are direct victims.

The difference between witnessed crime and personal experience highlights the need to distinguish between direct exposure and indirect exposure. Direct exposure refers to situations where an individual is personally victimised. Indirect exposure refers to witnessing, observing, or becoming aware of crime incidents in the community. Both forms are important. Direct exposure affects victims materially, physically, psychologically, and economically. Indirect exposure affects fear of crime, perceptions of public safety, trust in boda-boda operators, confidence in police, and willingness to use motorcycle transport.

The findings therefore suggest that boda-boda-related crime produces a broader social climate of insecurity. In counties such as Marsabit, Busia, and Nyeri, even respondents who were not personally victimised may still perceive boda-boda-related crime as a serious community problem because they have witnessed it. This visibility may contribute to the stigmatisation of boda-boda riders, reduced willingness to use motorcycle transport at night, increased suspicion of unfamiliar riders, and greater demand for policing or regulation.

However, high exposure to boda-boda-related crime does not mean that all boda-boda riders are criminals. Previous scholarship warns against treating informal transport workers only as

disorderly or criminal actors. Doherty (2017) shows that boda-boda riders often work under precarious conditions and are exposed to injury, insecurity, stigma, and economic vulnerability. The National Crime Research Centre (2018) also recognises that riders may be victims of crimes such as motorcycle theft, robbery, assault, kidnapping, and extortion. Therefore, the exposure findings should be interpreted as evidence of crime within and around the boda-boda sector, not as evidence that the entire sector is criminal.

In summary, Figure 4.3.1 shows that boda-boda-related crime exposure varies significantly across counties. Marsabit, Busia, and Nyeri recorded the highest levels of witnessed crime, indicating strong public visibility of boda-boda-related crime. Mombasa and Bomet recorded the highest proportions of no exposure, suggesting lower general exposure or more spatially concentrated crime patterns. Kirinyaga showed a balanced profile, with almost equal proportions of witnessed crime and no exposure. Personal victimisation was lower than witnessed exposure in all counties, confirming that boda-boda-related crime affects communities not only through direct victimisation but also through public visibility and perceived insecurity. This exposure pattern provides the basis for the frequency analysis that follows, because a crime may be visible to the public yet differ in how regularly it is perceived to occur.

4.2.2 **Crime frequency score by county**

Figure 4.3.2 presents the distribution of crime frequency scores across the seven study counties. The figure compares respondents' perceptions of how often boda-boda-related crime occurs and illustrates county-level differences in the intensity of reported crime occurrence. By using a frequency score, the analysis moves beyond exposure and indicates how regularly such crimes are believed to take place within each county. This is important because frequency captures the repetitive nature of insecurity and helps distinguish counties where crime is perceived as occasional from those where it is perceived as more persistent.

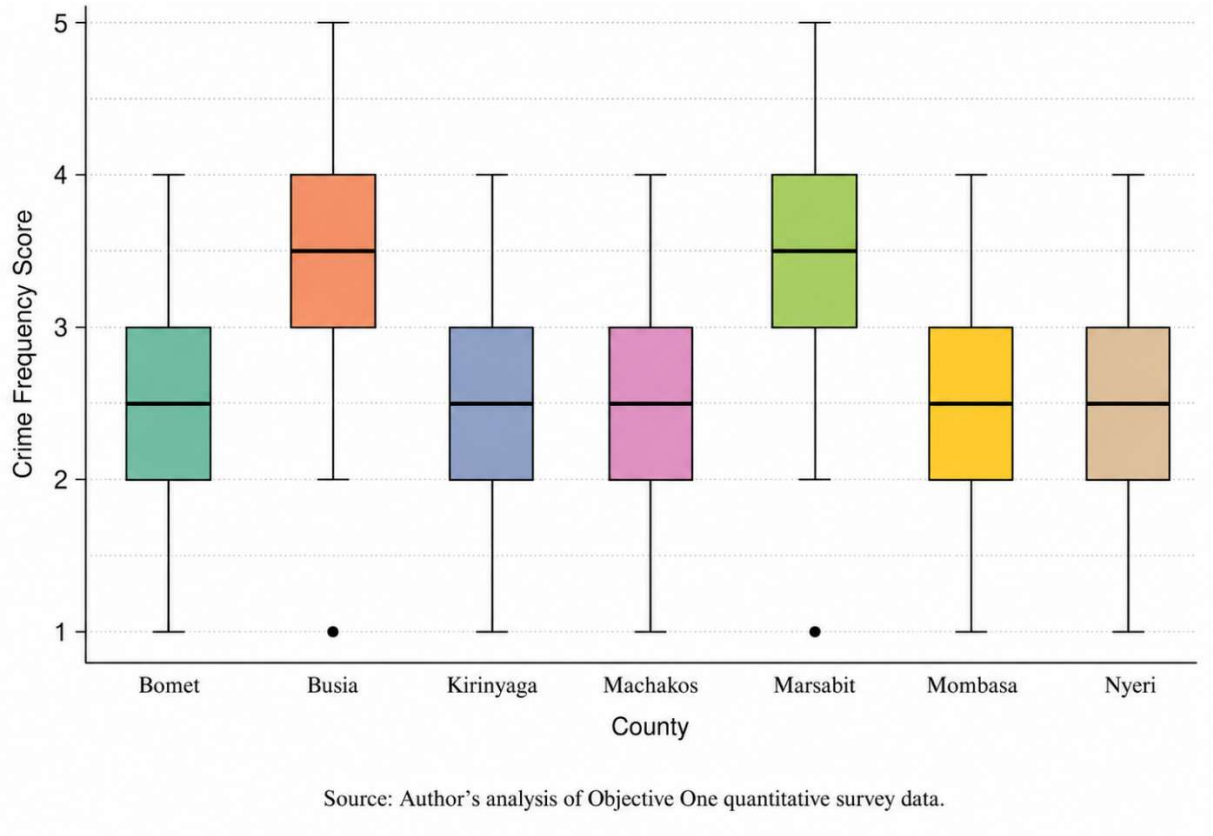


Figure 4.2: Crime Frequency Score by County

The figure shows clear variation in perceived crime frequency across the counties. Overall, Marsabit recorded the highest crime frequency levels, with a mean score of 3.51, followed by Busia with a mean score of 3.19. These two counties therefore stand out as the locations where respondents perceived boda-boda-related crime to occur more frequently. The comparatively higher scores in Marsabit and Busia suggest that crime associated with boda-boda operations is not viewed as isolated or sporadic in these counties, but rather as a more recurrent and visible feature of everyday life. This finding reinforces the earlier results on crime exposure, where Marsabit and Busia also recorded high levels of witnessed crime, indicating that crime in these counties is not only frequent but also publicly observable.

Marsabit's position as the county with the highest frequency score is particularly significant. A mean score of 3.51 indicates that respondents generally perceived boda-boda-related crime to occur at moderate-to-high levels of frequency. The boxplot distribution for Marsabit also suggests that many responses clustered around the higher categories, with the median positioned relatively

high compared to the other counties. This implies that perceptions of frequent crime were not limited to a few isolated responses but were shared by a broad segment of respondents. In substantive terms, this suggests that Marsabit experiences a persistent security challenge linked to boda-boda operations. Such a pattern may reflect the county's wide geographical spread, remote transport routes, sparse surveillance, and borderland dynamics, all of which may create repeated opportunities for theft, robbery, and related offences.

Busia also recorded a relatively high mean crime frequency score of 3.19, placing it second after Marsabit. This indicates that respondents in Busia perceived boda-boda-related crime as occurring fairly often. The score is consistent with Busia's high level of witnessed exposure and may reflect the interaction between intense mobility, trade activity, cross-border movement, and informal transport operations. The relatively elevated crime frequency in Busia suggests that boda-boda-related crime is embedded within routine transport and commercial activities, rather than being confined to rare or exceptional incidents. This supports the interpretation that Busia is a county where transport mobility and criminal opportunity may intersect more strongly than in some of the other study sites.

A middle cluster of counties recorded moderate crime frequency scores. Machakos had a mean score of 2.88**,** Bomet 2.83**,** Nyeri 2.72, and Kirinyaga 2.71. These counties did not reach the high levels observed in Marsabit and Busia, but neither did they reflect low or negligible crime frequency. Instead, the findings suggest that boda-boda-related crime is still a meaningful concern in these counties, even if it is perceived as occurring less often than in the leading counties. The moderate mean scores imply that respondents in these counties experience boda-boda-related crime as an intermittent but recurring issue. This may reflect a situation in which crime is present and socially recognised, but less intense, less widespread, or more spatially concentrated than in Marsabit and Busia.

Machakos, with a mean score of 2.88, occupies the upper end of this middle group. This suggests that respondents perceived boda-boda-related crime to occur with moderate regularity. The frequency score is important when interpreted alongside the earlier finding that Machakos was especially marked by motorcycle theft. This may mean that while the range of crime forms in Machakos may not be as broad as in some counties, certain forms of boda-boda-related crime occur regularly enough to shape public perception of insecurity.

Bomet, with a mean score of 2.83, also falls within the moderate range. Although Bomet had a relatively high proportion of respondents reporting no exposure in the previous analysis, the crime frequency score indicates that for those who did encounter or perceive boda-boda-related crime, it was not necessarily rare. This suggests an important distinction: lower general exposure does not automatically mean low frequency among those affected. Instead, it may mean that crime is concentrated in certain localities or social groups, while still occurring repeatedly in those contexts.

Nyeri and Kirinyaga recorded mean scores of 2.72 and 2.71, respectively. These counties therefore displayed similar levels of perceived crime frequency. In Nyeri, this is especially noteworthy because the county had one of the highest levels of witnessed crime exposure. This suggests that although many respondents in Nyeri observed boda-boda-related crime, they may have perceived it as occurring at a moderate rather than extremely high rate. In Kirinyaga, the similar mean score complements the earlier finding of a relatively balanced exposure profile. Thus, Kirinyaga appears to occupy an intermediate position: crime is visible and present but not perceived as occurring at the highest frequency levels seen in Marsabit and Busia.

Mombasa recorded the lowest mean crime frequency score at 2.65. This suggests that respondents in Mombasa perceived boda-boda-related crime to occur less frequently than in the other counties. However, this should not be interpreted as evidence that crime is absent or insignificant in Mombasa. Rather, it indicates that the overall perceived regularity of boda-boda-related crime was comparatively lower. This may reflect the fact that crime in Mombasa is more spatially concentrated in urban hotspots, such as entertainment areas, informal settlements, or specific transport nodes, rather than being widely experienced across the broader county population. In other words, Mombasa may exhibit lower overall frequency but still contain serious and concentrated pockets of boda-boda-related criminal activity.

Beyond the mean scores, the boxplots in Figure 4.2 also provide important information about the distribution of responses within counties. The medians for Marsabit and Busia appear higher than those of most other counties, reinforcing the interpretation that crime is more frequently perceived in those locations. The interquartile ranges suggest that while there is some internal variation within each county, the general pattern remains consistent: Marsabit and Busia are positioned at the higher end, while the other counties cluster at more moderate levels. The presence of upper-end values and outliers across several counties further indicates that in every county there were

some respondents who perceived boda-boda-related crime as occurring very frequently. Thus, even counties with lower mean scores still contain pockets of high perceived crime intensity.

The inferential test confirms that these differences are statistically significant. The Kruskal-Wallis rank sum test showed a significant difference in crime frequency scores across counties, $\chi^2(6) = 245.75$, $p < 0.001$. This result indicates that the observed variation in crime frequency is unlikely to have occurred by chance. In other words, respondents' perceptions of how frequently boda-boda-related crime occurs differ systematically across the seven counties. The statistical significance of this finding is important because it demonstrates that county context has a meaningful influence on perceived crime frequency.

The choice of the Kruskal-Wallis test is also appropriate because crime frequency scores are ordinal or non-normally distributed and are being compared across more than two independent groups. By showing a highly significant result, the test confirms that the counties do not share a common pattern of crime frequency. This strengthens the broader argument of the study that boda-boda-related crime is spatially differentiated and shaped by local circumstances rather than being a uniform national phenomenon.

From a theoretical perspective, the differences in crime frequency can be interpreted through Routine Activity Theory. Cohen and Felson (1979) argue that crime is likely to occur where motivated offenders, suitable targets, and the absence of capable guardianship converge in time and space. Counties such as Marsabit and Busia may present stronger opportunity conditions for boda-boda-related crime because of characteristics such as remote transport corridors, high mobility, cross-border flows, weak enforcement, and night-time activity. In these contexts, motorcycles, riders, passengers, and transported goods may become suitable targets, while limited guardianship increases vulnerability. By contrast, counties with lower frequency scores may experience either fewer such opportunities or stronger forms of social and institutional control.

The findings are also consistent with Crime Pattern Theory, which holds that crime tends to cluster around routine movement paths, nodes, and awareness spaces. Where boda-boda transport is heavily used in poorly regulated or weakly guarded environments, repeated opportunities for crime may emerge. Higher frequency scores in some counties therefore suggest not only more crime events, but also more entrenched opportunity structures that reproduce criminal activity over time.

These results have important practical implications. Counties with higher crime frequency scores, especially Marsabit and Busia, require more urgent and sustained intervention. Because crime is perceived as recurring rather than occasional, security responses in such counties should not be limited to one-off crackdowns. Instead, they require continuous strategies such as enhanced patrols, improved rider registration, better stage management, route surveillance, stronger cross-border coordination where relevant, and targeted interventions during high-risk periods. Counties with moderate frequency scores also require attention, but interventions may need to focus more specifically on known hotspots, recurring theft patterns, or vulnerable user groups.

In summary, Figure 4.3.2 shows that the perceived frequency of boda-boda-related crime differed significantly across the seven counties. Marsabit recorded the highest mean crime frequency score, followed by Busia, indicating that respondents in these counties perceived boda-boda-related crime as occurring more regularly. Bomet, Kirinyaga, Machakos, Mombasa, and Nyeri recorded comparatively lower but still meaningful frequency scores, showing that crime remained present across all counties. The Kruskal-Wallis test confirmed that these differences were statistically significant. The next subsection extends the analysis from frequency to the crime-pattern index, which captures whether crime-related experiences were more strongly structured or concentrated within particular county contexts.

4.2.3 **Crime Pattern Index by County**

Figure 4.3 presents the crime pattern index across the seven study counties. The index provides a composite measure of the relative strength, concentration, and overall configuration of boda-boda-related crime patterns. Unlike simple crime counts or exposure measures, the crime pattern index captures the broader structure of crime by reflecting how strongly crime-related experiences and characteristics are concentrated within each county. It therefore provides a bridge between perceived frequency and the more detailed analysis of crime forms, locations, timing, and victim profiles that follows.

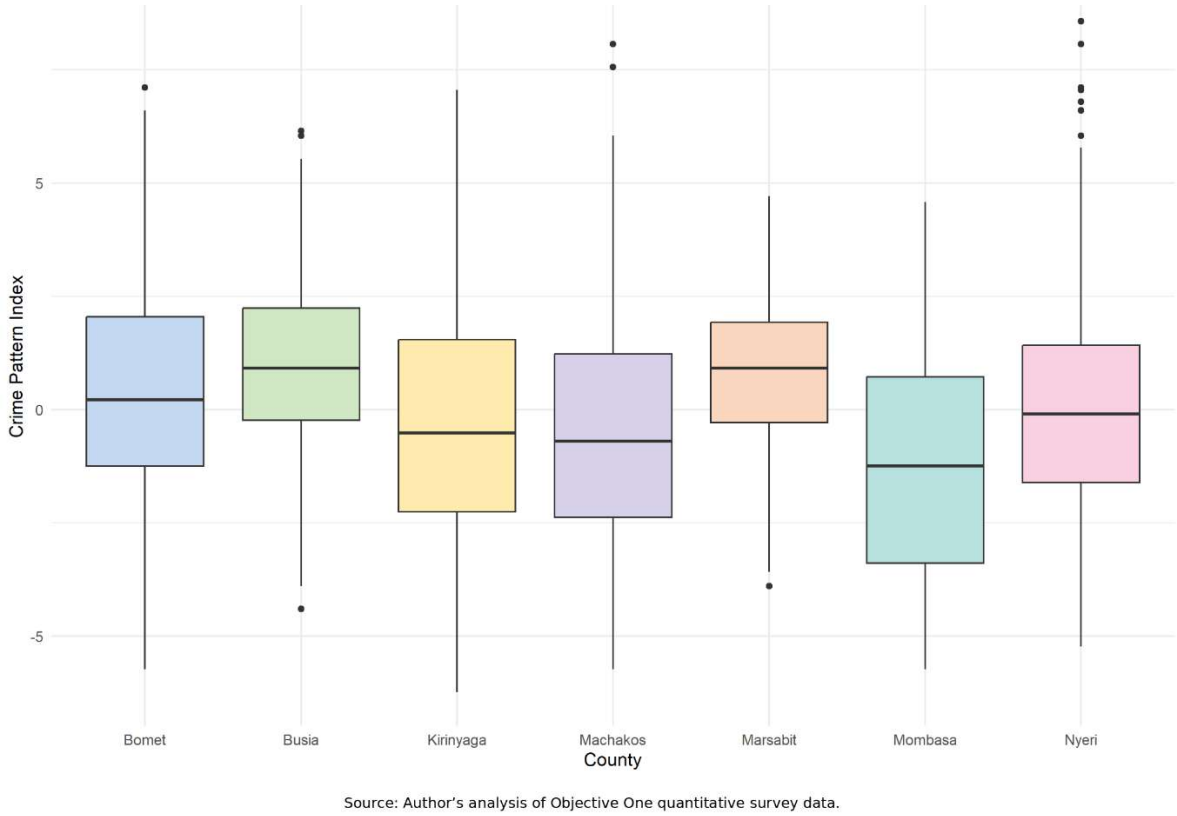


Figure 4.3: Crime Pattern Index by County

The figure shows clear variation in crime pattern index values across counties, confirming that boda-boda-related crime is not distributed uniformly. Instead, the results indicate that counties differ not only in the extent to which crime is present, but also in the way crime is structured and concentrated. Some counties display relatively stronger and more coherent crime patterns, while others show weaker or less intense configurations. This variation is important because it suggests that boda-boda-related crime is shaped by local opportunity structures, transport environments, and social conditions rather than by a single uniform national pattern.

Among the seven counties, Busia recorded the highest mean crime pattern index at 0.96, followed by Marsabit at 0.78 and Bomet at 0.51. These three counties therefore emerge as the counties with the strongest boda-boda-related crime-pattern intensity. Their positive index values indicate that crime-related characteristics were more concentrated or more strongly expressed in these counties than in the others. In practical terms, this suggests that crime in these counties is not merely present but is organised in ways that make it more visible, more recurrent, or more strongly embedded in local transport and mobility systems.

Busia's position at the top of the ranking is particularly significant. A mean crime pattern index of 0.96**,** with a median of 0.92**,** indicates that the county had the strongest overall concentration of boda-boda-related crime patterns in the study. This result complements the earlier findings that Busia also recorded high witnessed exposure and a relatively high crime frequency score. Taken together, these results suggest that boda-boda-related crime in Busia is not only visible and frequent, but also structurally pronounced. In other words, crime in Busia appears to follow a recognisable pattern rather than occurring as isolated, scattered incidents. This may reflect the county's border position, intense transport activity, commercial circulation, and the interaction between mobility networks and criminal opportunity.

Marsabit recorded the second highest mean crime pattern index at 0.78, with a median of 0.92. This finding reinforces the earlier observation that Marsabit experienced high levels of witnessed crime and the highest mean crime frequency score. The relatively strong crime pattern index suggests that boda-boda-related crime in Marsabit is not only frequent but also spatially and socially concentrated in a way that gives it a distinctive pattern. The county's vast territory, long and remote transport corridors, sparse settlement pattern, and limited surveillance may all contribute to a crime environment in which criminal opportunities are repeated across specific routes and locations. Thus, Marsabit emerges as a county where boda-boda-related crime appears especially entrenched within mobility systems.

Bomet, with a mean crime pattern index of 0.51 and a median of 0.22, recorded the third highest value. Although Bomet did not rank as high as Busia or Marsabit, its positive index indicates that boda-boda-related crime still displayed a noticeable pattern and concentration. This is an important finding because Bomet had previously shown a relatively high proportion of respondents reporting no exposure. The crime pattern index therefore adds nuance to the interpretation: although crime may be less widely visible across the county population, it may still be concentrated strongly enough in certain settings to produce a positive overall pattern. This suggests that Bomet's boda-boda-related crime may be clustered in particular locations, activities, or victim groups rather than being absent or insignificant.

By contrast, the remaining counties recorded lower or negative mean crime pattern index values. Nyeri had a mean index of -0.02, indicating a nearly neutral position relative to the overall distribution. This suggests that boda-boda-related crime in Nyeri was present, but its overall

pattern intensity was close to the study average and less strongly concentrated than in Busia, Marsabit, or Bomet. Nyeri's near-zero value is analytically important because the county had earlier recorded high levels of witnessed exposure. This indicates that although crime was highly visible in Nyeri, its underlying pattern intensity was less concentrated than in the leading counties. In other words, crime in Nyeri may be publicly noticeable without necessarily being as strongly structured or clustered.

Kirinyaga recorded a mean crime pattern index of -0.31, while Machakos recorded -0.56. These results suggest comparatively lower levels of overall crime-pattern intensity than those recorded in Busia, Marsabit, and Bomet. However, negative values should not be interpreted as meaning that crime does not occur. Rather, they indicate that the structure and concentration of crime-related experiences in these counties were relatively weaker when compared with the counties at the top of the distribution. In Kirinyaga, this finding aligns with the earlier evidence of a balanced exposure profile, suggesting that crime is present but less strongly concentrated. In Machakos, the lower index may indicate that although certain crimes such as motorcycle theft are important, the broader overall crime configuration is less intense than in the higher-ranked counties.

Mombasa recorded the lowest mean crime pattern index at -1.13, with a median of -1.24. This places Mombasa at the bottom of the county distribution in terms of overall crime-pattern intensity. At first glance, this may suggest relatively lower concentration of boda-boda-related crime compared with the other counties. However, this finding should be interpreted carefully. A low crime pattern index does not imply that crime is absent, unimportant, or harmless. Instead, it suggests that the overall structure and concentration of crime-related experiences in Mombasa were weaker than in the other counties. This may mean that crime in Mombasa is more fragmented, more localised, or concentrated in specific hotspots such as entertainment areas, informal settlements, transport nodes, or nightlife spaces rather than being broadly patterned across the county as a whole.

The boxplot distribution in Figure 4.3 further illustrates these county differences. Busia and Marsabit show higher central values, indicating stronger concentration of crime-pattern intensity. Bomet also appears above the counties with negative values, reinforcing its relatively stronger position. Nyeri, Kirinyaga, Machakos, and Mombasa are positioned lower, with Mombasa clearly showing the weakest central tendency. The spread of the distributions also suggests that each

county contains internal variation. This is important because it means that counties are not homogeneous; even within lower-index counties, some respondents or localities may still report relatively high crime-pattern intensity. Similarly, counties with higher averages may still include areas of lower intensity. Therefore, the crime pattern index should be interpreted as summarising county tendencies rather than implying total uniformity within each county.

The standard deviation values also provide useful insight into internal variation. Nyeri (SD = 2.49), Kirinyaga (SD = 2.58), and Mombasa (SD = 2.42) display relatively wide dispersion, suggesting greater internal diversity in how crime patterns were experienced or perceived. Bomet (SD = 2.38) and Machakos (SD = 2.35) also show substantial variation. By contrast, Marsabit (SD = 1.61) has a somewhat narrower spread, implying a more consistent pattern across respondents. This may suggest that in Marsabit the crime pattern is more uniformly recognised, while in counties with wider variation, experiences may differ more significantly between localities or groups.

The inferential test confirms that these observed differences are statistically significant. The Kruskal-Wallis rank sum test showed a significant difference in the crime pattern index across counties, $\chi^2(6) = 235.23$, $p < 0.001$. This result indicates that the county-level variation in crime pattern index is highly unlikely to have occurred by chance. In other words, the structure and intensity of boda-boda-related crime differed significantly across the seven counties. This is a major finding because it statistically validates the descriptive patterns observed in the figure and supports the argument that county context matters in shaping boda-boda-related crime.

The significance of the Kruskal-Wallis test is especially important because it shows that differences in crime-pattern intensity are systematic rather than random. Counties do not simply vary slightly around a common average; instead, they show distinct patterns in the way boda-boda-related crime is configured. This strengthens the broader interpretation that boda-boda-related crime is geographically and socially differentiated.

From a theoretical perspective, the results strongly support Crime Pattern Theory. Brantingham and Brantingham argue that crime is spatially patterned rather than randomly distributed, and that it tends to cluster around the everyday movement paths, nodes, and activity spaces of offenders and victims. In the context of boda-boda transport, these nodes and paths may include stages, market centres, border points, highways, residential estates, remote roads, and entertainment zones. Counties such as Busia and Marsabit may exhibit stronger crime pattern indices because

these opportunity structures are more pronounced, more repeated, or more weakly guarded. Thus, the higher crime pattern values in these counties suggest a stronger alignment between transport mobility spaces and criminal opportunity.

The results can also be linked to Routine Activity Theory, which holds that crime occurs where motivated offenders, suitable targets, and absence of capable guardianship converge. A stronger crime pattern index may indicate that this convergence happens more regularly or more systematically in certain counties. For example, counties characterised by high mobility, weak surveillance, poor road conditions, night-time transport dependence, or border movement may provide more opportunities for repeated crime encounters. Conversely, lower index values may indicate either fewer such convergence points or stronger forms of community or institutional guardianship.

These findings have important policy implications. Counties with stronger crime pattern indices, particularly Busia, Marsabit, and Bomet, require targeted interventions aimed not only at reducing crime incidents but also at disrupting the structures that sustain recurring patterns of crime. Such interventions may include improved monitoring of high-risk routes, better regulation of boda-boda stages, stronger identification and registration systems for riders, enhanced night-time patrols, and increased collaboration between local authorities, security agencies, and boda-boda associations. In border counties such as Busia and Marsabit, cross-border coordination and surveillance may be especially important.

For counties with lower indices, such as Kirinyaga, Machakos, Nyeri, and especially Mombasa, interventions should not be abandoned. Rather, the lower indices suggest that crime may be more localised or concentrated in specific pockets. In such cases, hotspot-focused strategies may be more appropriate than county-wide general approaches. Mombasa, for example, may require targeted attention to entertainment areas, informal settlements, and urban transport nodes, where specific crime patterns may still be serious despite the lower overall county index.

In summary, Figure 4.3.3 shows that the crime pattern index differed significantly across counties. Busia recorded the highest mean index, followed by Marsabit and Bomet, indicating stronger boda-boda-related crime-pattern intensity in these counties. Nyeri occupied a near-neutral position, while Kirinyaga and Machakos recorded moderately lower values. Mombasa recorded the lowest crime pattern index, suggesting weaker overall pattern intensity, though not absence of crime. The

Kruskal-Wallis test confirmed that these differences were statistically significant. Having established overall pattern intensity, the analysis now disaggregates the crime environment by examining the specific forms of boda-boda-related crime reported in each county.

4.2.4 **Crime Frequency and Pattern Index by County in Percentages**

The percentage-based presentation complements the earlier descriptive and statistical analyses by translating the raw scores into a common metric that facilitates cross-county comparison. The findings confirm that boda-boda-related crime is a matter not merely of presence or absence but of degree, intensity and structural concentration, all of which vary significantly by county.

The crime pattern index, expressed as a percentage of the maximum observed index value, ranged from 2.0 % to 96.0 % across the seven counties. Busia recorded the highest pattern index at 96.0 %, followed by Marsabit at 78.0 %, Machakos at 56.0 % and Bomet at 51.0 %. Kirinyaga recorded 31.0 %, Mombasa 25.0 % and Nyeri 2.0 %. The wide dispersion of 94.0 % points between the highest and lowest counties provides strong empirical support for the study's central argument that boda-boda-related crime is a county-contingent phenomenon.

Crime Pattern Index by County as Percentage of Maximum Index Value

The crime frequency score, expressed as a percentage of the five-point scale maximum, ranged from 53.0 % to 70.2 % across the seven counties. Marsabit recorded the highest crime frequency at 70.2 %, followed by Busia at 63.8 % and Machakos at 57.6 %. Bomet recorded 56.6 %, Nyeri 54.4 %, Kirinyaga 54.2 %, and Mombasa 53.0 %. All seven counties recorded scores above fifty per cent, indicating that the perception of recurrent crime was broadly shared across the study sites. The range of 17.2 % points between the highest (Marsabit, 70.2%) and lowest (Mombasa, 53.0%) scoring counties underscores the degree of county-level variation in perceived crime frequency.

Crime Frequency Score by County as Percentage of Maximum Scale Score

While the preceding subsections reported mean crime frequency scores and crime pattern index values in their raw form, presenting these measures as percentages allows for a more intuitive comparison of crime intensity across counties. ~~Table 4.8a presents the crime frequency score by county expressed as a percentage of the maximum possible score on the five-point frequency scale,~~

~~while Table 4.8b presents the crime pattern index by county as a percentage of the maximum observed index value.~~ These percentage-based presentations are intended to complement the earlier descriptive, inferential and qualitative analyses.

4.2.5 **Forms of Boda-Boda-Related Crime by County**

Figure 4.4 presents the distribution of different forms of boda-boda-related crime across Bomet, Busia, Kirinyaga, Machakos, Marsabit, Mombasa, and Nyeri counties. The crime forms analysed include theft of motorcycles, theft from passengers, robbery with violence, assault, bribery and corruption, political violence or intimidation, drug transport and distribution, smuggling, extortion, kidnapping or abduction, facilitation of escape after crime, and sexual harassment or violence. The figure shows that although the counties share some common crime forms, the relative importance of each crime type differs considerably from one county to another. This subsection therefore explains what crimes dominate before the subsequent subsection examines where those crimes occur.

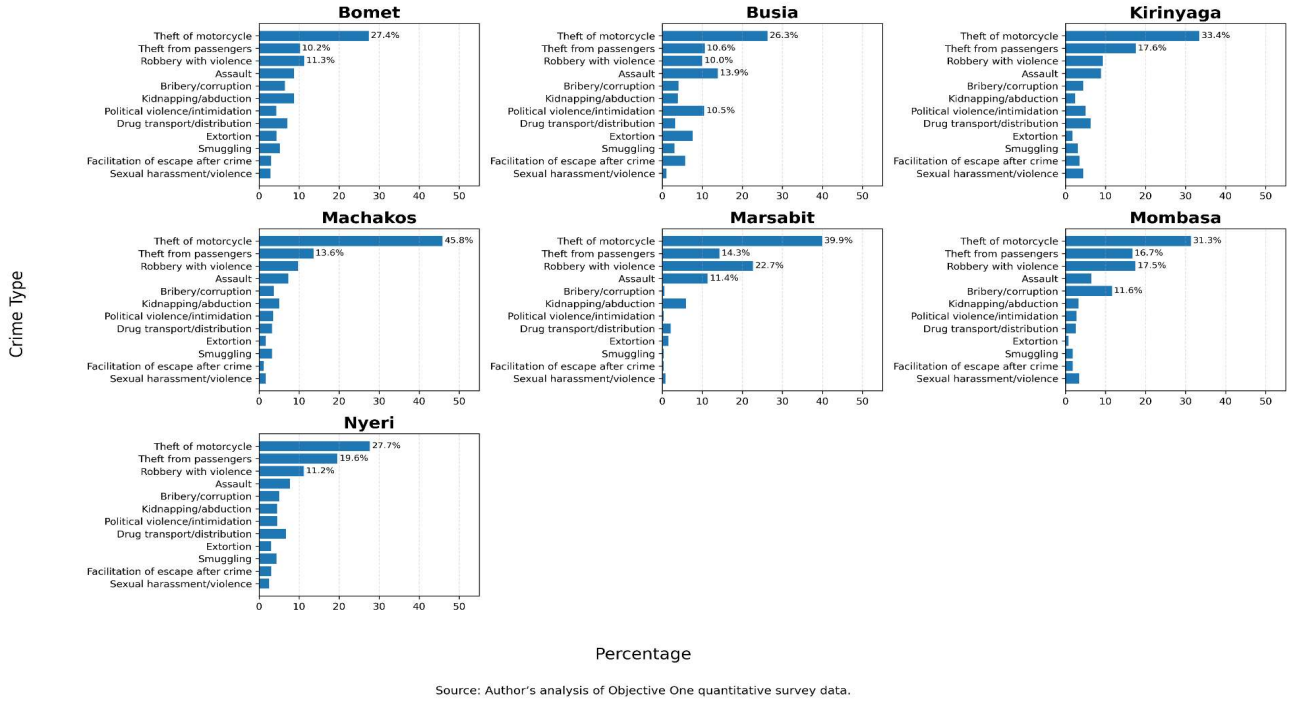


Figure 4.4: Forms of Boda-Boda-Related Crime by County

Table 4.9**:** Leading Forms of Boda-Boda-Related Crime by County

County	**Most common crime form**	**Second most common crime form**	**Third most common crime form**	**Key interpretation**
Bomet	Theft of motorcycle, 27.4%	Robbery with violence, 11.3%	Theft from passengers, 10.2%	Mixed pattern involving rider victimisation, robbery, and passenger targeting
Busia	Theft of motorcycle, 26.3%	Assault, 13.9%	Theft from passengers, 10.6%	Diverse pattern with theft, assault, passenger victimisation, and political intimidation
Kirinyaga	Theft of motorcycle, 33.4%	Theft from passengers, 17.6%	Robbery with violence, 9.3%	Strong theft-oriented pattern affecting riders and passengers
Machakos	Theft of motorcycle, 45.8%	Theft from passengers, 13.6%	Robbery with violence, 9.8%	Highly concentrated motorcycle-theft pattern
Marsabit	Theft of motorcycle, 39.9%	Robbery with violence, 22.7%	Theft from passengers, 14.3%	High-risk pattern combining motorcycle theft and violent robbery
Mombasa	Theft of motorcycle, 31.3%	Robbery with violence, 17.5%	Theft from passengers, 16.7%	Urban pattern involving theft, robbery, passenger targeting, and bribery
Nyeri	Theft of motorcycle, 27.7%	Theft from passengers, 19.6%	Robbery with violence, 11.2%	Broad crime mix involving riders, passengers, and multiple secondary offences

Source: Author's analysis of Objective One quantitative survey data.

The results show that theft of motorcycles was the dominant form of boda-boda-related crime across the study counties. Overall, motorcycle theft accounted for 32.0% of all reported crime forms, making it the most common offence associated with the boda-boda sector. This finding is significant because it shows that boda-boda riders are not only potential suspects or facilitators of crime; they are also major victims. A motorcycle is a productive asset, a source of household income, and the main tool through which many riders sustain their livelihoods. Therefore, motorcycle theft has both security and economic consequences. It can deprive riders of income, increase debt burdens, undermine family livelihoods, and discourage continued participation in the sector.

This finding is consistent with the argument by Doherty (2017), who observes that boda-boda riders often operate under precarious conditions and face insecurity as part of their everyday work. It also supports the National Crime Research Centre's observation that boda-boda operators in

Kenya face multiple security threats, including robbery, motorcycle theft, assault, and extortion (National Crime Research Centre, 2018). Therefore, motorcycle theft should not be interpreted only as a property crime; it should also be understood as a livelihood crime because it directly attacks the economic foundation of riders and their households.

The dominance of motorcycle theft was especially evident in Machakos, where it accounted for 45.8% of reported crime forms. This was the highest proportion recorded across all counties. The Machakos pattern suggests that boda-boda-related crime in the county is highly concentrated around motorcycle theft. Although other crimes were present, the exceptionally high proportion of motorcycle theft indicates that the main security concern in Machakos is the targeting of motorcycles as valuable assets. This may reflect the attractiveness of motorcycles for resale, dismantling spare parts, illegal transfer, or use in other criminal operations. From a routine activity perspective, motorcycles represent suitable targets because they are mobile, valuable, and often operated in areas where guardianship may be weak, especially at night or along isolated routes (Cohen & Felson, 1979).

Marsabit also recorded a very high proportion of motorcycle theft at 39.9%, followed by robbery with violence at 22.7% and theft from passengers at 14.3%. This crime profile is particularly serious because it combines asset theft with violent crime. Marsabit therefore appears not only as a county where motorcycles are targeted, but also as a county where crime may involve force, intimidation, or physical danger. This supports the earlier findings showing that Marsabit had high levels of witnessed crime, the highest mean crime frequency score, and a high crime pattern index. The concentration of motorcycle theft and violent robbery suggests that boda-boda-related crime in Marsabit has a strong security dimension and may be linked to remote routes, long-distance mobility, weak surveillance, and limited response capacity in sparsely populated areas.

Kirinyaga recorded motorcycle theft at 33.4%, followed by theft from passengers at 17.6% and robbery with violence at 9.3%. This indicates that crime in Kirinyaga affects both riders and passengers. The prominence of theft from passengers suggests that boda-boda users may be vulnerable during travel, especially where routes are poorly monitored or where offenders exploit the mobility and informality of motorcycle transport. Kirinyaga's pattern therefore reflects both operator-centred and passenger-centred victimisation.

Mombasa recorded motorcycle theft at 31.3%, robbery with violence at 17.5%, and theft from passengers at 16.7%. Although Mombasa had the lowest overall crime pattern index in the earlier analysis, Figure 4.3.4 shows that specific serious crimes remain important in the county. The prominence of robbery with violence and theft from passengers suggests that boda-boda-related crime in Mombasa may be concentrated in urban spaces, such as nightlife zones, informal settlements, transport corridors, and commercial areas. This supports Crime Pattern Theory, which argues that crime clusters around activity nodes, movement paths, and places where suitable targets repeatedly converge with offenders (Brantingham, Brantingham, & Andresen, 2017).

Mombasa also recorded the highest proportion of bribery and corruption, at 11.6%. This is an important county-specific finding because it suggests a stronger connection between boda-boda operations, regulation, enforcement, and informal payments. In urban transport systems, informal operators often interact frequently with enforcement officers, local authorities, stage leaders, and regulatory structures. Goodfellow (2015) argues that informal transport sectors in East Africa are deeply shaped by regulation, politics, and the relationship between operators and authorities. The Mombasa findings may therefore indicate that crime and insecurity in the boda-boda sector are not limited to street-level offences but may also include governance-related problems such as bribery, informal protection, and weak enforcement.

Nyeri recorded motorcycle theft at 27.7%, theft from passengers at 19.6%, and robbery with violence at 11.2%. Nyeri's crime profile appears more diversified than that of Machakos. While motorcycle theft remained the leading crime form, theft from passengers was also very prominent. This suggests that both riders and passengers are important victim groups in Nyeri. The presence of other crime forms, including drug transport and distribution, bribery and corruption, political violence or intimidation, kidnapping or abduction, smuggling, extortion, facilitation of escape after crime, and sexual harassment or violence, indicates that the county's boda-boda-related crime profile is broad and not limited to one dominant offence.

Bomet recorded motorcycle theft at 27.4%, robbery with violence at 11.3%, theft from passengers at 10.2%, kidnapping or abduction at 8.8%, and assault at 8.7%. This suggests a mixed pattern involving property crime, violent crime, and personal-security threats. The relatively high proportion of kidnapping or abduction is notable because it indicates that boda-boda-related crime

in Bomet may include more serious forms of personal insecurity beyond ordinary theft. Although Bomet recorded a high proportion of respondents reporting no exposure in the earlier analysis, the crime-type results show that where boda-boda-related crime occurs, it may include serious offences affecting both riders and the public.

Busia recorded motorcycle theft at 26.3%, assault at 13.9%, theft from passengers at 10.6%, political violence or intimidation at 10.5%, and robbery with violence at 10.0%. Busia's pattern is distinctive because political violence or intimidation was more prominent than in most other counties. This suggests that boda-boda operations in Busia may intersect with political mobilisation, intimidation, group violence, or election-related activity. This finding is consistent with scholarship showing that informal transport sectors can become entangled with local politics, patronage, and state regulation (Goodfellow, 2015). It also indicates that boda-boda-related crime in Busia should not be understood only as economic or opportunistic crime; it may also have political and organizational dimensions.

The second most common overall crime form was theft from passengers, accounting for 14.6% of all reported crime forms. This finding shows that passengers are also vulnerable within the boda-boda transport environment. Theft from passengers may occur during trips, at boarding points, near stages, along isolated routes, or in areas where riders and passengers interact without effective oversight. This form of crime can reduce public trust in boda-boda transport and affect mobility choices, especially for women, traders, students, and night-time travellers.

The third most common overall crime form was robbery with violence, accounting for 12.9% of reported crime forms. This offence is particularly important because it combines property crime with physical threat or force. Robbery with violence was especially prominent in Marsabit at 22.7% and Mombasa at 17.5%. These results suggest that some counties face a more severe violent-crime dimension within the boda-boda sector. The presence of robbery with violence also indicates that crime prevention should not focus only on theft recovery or registration systems, but also on personal safety, route surveillance, night-time policing, and rapid response mechanisms.

Assault accounted for 9.3% of all reported crime forms. Assault was especially prominent in Busia at 13.9%, Marsabit at 11.4%, Kirinyaga at 8.9%, and Bomet at 8.7%. Assault may reflect conflicts

involving riders, passengers, stage groups, criminal actors, or members of the public. In some cases, assault may be linked to robbery, disputes over fares, stage control, mob justice, political intimidation, or enforcement encounters. Its presence in the data shows that boda-boda-related crime includes interpersonal violence and not only theft.

Other crimes were less dominant overall but remain important because they indicate the broader criminal uses and vulnerabilities of the boda-boda sector. Bribery and corruption accounted for 5.3% overall, with the highest level in Mombasa. Kidnapping or abduction accounted for 4.9%, with Bomet showing a comparatively high figure. Drug transport and distribution accounted for 4.7%, while political violence or intimidation also accounted for 4.7%. Smuggling and extortion each accounted for 3.2%, while facilitation of escape after crime accounted for 2.8% and sexual harassment or violence for 2.4%. Although these categories are smaller than theft or robbery, they are important because they show that motorcycles may be used not only as targets of crime but also as tools or facilitators of broader criminal activity.

The presence of drug transport, smuggling, and facilitation of escape after crime is consistent with the idea that motorcycles can support criminal mobility. Their speed, flexibility, and ability to access narrow paths, remote roads, and informal routes may allow offenders to move quickly, avoid detection, or transport illicit goods. Cervero and Golub (2007) argue that informal transport often develops where formal transport is inadequate and regulation is weak. While this flexibility provides important mobility benefits, it can also create opportunities for misuse where monitoring is limited.

The county variation observed in Figure 4.3.4 was statistically tested using the Pearson chi-square test. The test confirmed a statistically significant association between county and crime type, $\chi^2(66) = 837.74$, $p < 0.001$. This means that the distribution of boda-boda-related crime forms differed significantly across counties. In other words, the types of crime reported in Busia, Marsabit, Mombasa, Machakos, Bomet, Kirinyaga, and Nyeri were not identical. County context therefore plays an important role in shaping the form that boda-boda-related crime takes.

However, the effect size, measured using Cramer's V, was 0.149. This indicates a small to moderate association between county and crime type. The implication is that although county differences

are statistically significant, county alone does not fully explain the forms of boda-boda-related crime. Other factors are also likely to influence crime type, including road networks, border proximity, urbanisation, night-time movement, stage organisation, rider registration, policing capacity, youth unemployment, informal regulation, and local criminal opportunity structures.

This interpretation is consistent with Routine Activity Theory and Crime Pattern Theory. Routine Activity Theory suggests that crime occurs when suitable targets, motivated offenders, and weak guardianship converge (Cohen & Felson, 1979). Crime Pattern Theory adds that crime clusters around familiar movement paths, nodes, and activity spaces (Brantingham et al., 2017). In the boda-boda sector, these spaces may include stages, market centres, remote roads, border areas, informal settlements, highways, residential estates, and nightlife zones. Therefore, different counties produce different crime forms because they have different combinations of mobility patterns, guardianship levels, economic pressures, and spatial opportunity structures.

In summary, Figure 4.4 shows that theft of motorcycles was the leading form of boda-boda-related crime across the study counties, confirming that riders are major victims within the sector. Theft from passengers, robbery with violence, and assault were also important, showing that both riders and transport users are affected. County-level differences were clear: Machakos was strongly characterised by motorcycle theft; Marsabit and Mombasa showed stronger violent-robbery dimensions; Busia displayed a distinctive pattern involving assault and political intimidation; Mombasa showed a notable bribery and corruption component; and Nyeri presented a broader mix of crime forms. The chi-square test confirmed that these differences were statistically significant, while the modest Cramer's V indicated that crime type is shaped by county context together with other social, spatial, economic, and institutional factors. These crime forms are spatially embedded, making the analysis of crime locations the next logical step.

4.2.5.1 ***Crime Location by County*****:** Crime location analysis examined the specific spaces where boda-boda-related crimes were reported to occur across Bomet, Busia, Kirinyaga, Machakos, Marsabit, Mombasa, and Nyeri counties. The analysis focused on remote roads, market centres, boda-boda stage points, residential estates, highways and main roads, border areas, entertainment and nightlife zones, and informal settlements. These locations are important because crime is rarely distributed randomly across space. Instead, criminal activity tends to concentrate in places where

routine movement, suitable targets, weak surveillance, and limited guardianship converge (Brantingham et al., 2017; Cohen & Felson, 1979).

The location findings show that boda-boda-related crime was concentrated in spaces rather than spread evenly across all county environments. Across the counties, remote roads, market centres, stage points, residential estates, informal settlements, border areas, highways, and entertainment zones emerged as the main crime spaces. These findings are consistent with Crime Pattern Theory, which argues that crime is spatially structured around "nodes," "paths," and "edges" that form part of people's everyday movement patterns (Brantingham, Brantingham, & Andresen, 2017). In the boda-boda sector, nodes include markets, stages, residential areas, and entertainment zones; paths include roads, highways, and remote routes; while edges may include borders, informal settlements, and transitional spaces between rural and urban areas.

Table 4.10**:** Leading Boda-Boda-Related Crime Locations by County

County	**Leading crime location**	**Second location**	**Third location**	**Key interpretation**
Bomet	Market centres, 20.2%	Stage points, 18.6%	Remote roads, 17.6%	Crime is concentrated around commercial and transport nodes
Busia	Remote roads, 21.4%	Market centres, 17.3%	Residential estates, 13.6%	Crime reflects mobility corridors, trade spaces, and settlement areas
Kirinyaga	Remote roads, 27.9%	Residential estates, 17.3%	Entertainment/nightlife, 13.1%	Crime is linked to isolated routes, residences, and night economy spaces
Machakos	Remote roads, 32.8%	Residential estates, 14.1%	Market centres, 13.5%	Strong remote-road pattern, suggesting risk along less monitored routes
Marsabit	Remote roads, 29.9%	Border areas, 19.7%	Stage points, 16.2%	Crime reflects remote corridors, border movement, and transport nodes
Mombasa	Entertainment/nightlife, 21.8%	Remote roads, 19.3%	Informal settlements, 14.8%	Urban crime pattern linked to nightlife, isolated roads, and informal settlements
Nyeri	Remote roads, 21.6%	Residential estates, 20.6%	Market centres, 13.2%	Crime is concentrated around routes, residences, and commercial spaces

Source: Author's analysis of Objective One quantitative survey data.

The results show that remote roads were the most common crime location across most counties. Remote roads were the leading crime location in Busia, Kirinyaga, Machakos, Marsabit, and Nyeri, and were also important in Bomet and Mombasa. This finding is significant because remote roads are often characterised by low population density, limited surveillance, poor lighting, weak police visibility, and delayed emergency response. These conditions create opportunities for theft, robbery, assault, motorcycle hijacking, and attacks on both riders and passengers. From a Routine Activity Theory perspective, remote roads may bring together suitable targets, motivated offenders, and absence of capable guardianship (Cohen & Felson, 1979).

Machakos recorded the highest proportion of crimes occurring on remote roads, at 32.8%. This was the strongest remote-road concentration among all counties. The finding suggests that boda-boda-related crime in Machakos is highly associated with isolated routes. This is consistent with the earlier finding that motorcycle theft was especially dominant in Machakos. Remote roads may provide suitable conditions for offenders to target riders, steal motorcycles, or attack passengers with reduced risk of immediate detection. Therefore, the Machakos pattern points to the need for route-based crime prevention, including patrols along known risky roads, improved lighting, rider tracking, and community reporting mechanisms.

Marsabit also recorded a high proportion of crimes on remote roads, at 29.9%. This is important because Marsabit had already shown high levels of witnessed crime, high crime frequency, and a strong crime pattern index. The location findings further show that boda-boda-related crime in Marsabit is strongly connected to remote movement corridors. Marsabit's expansive geography, sparse settlement patterns, and long-distance transport routes may increase vulnerability by reducing natural surveillance and slowing security response. The county also recorded a high proportion of crimes in border areas, at 19.7%, indicating that its crime-location profile combines remote-road vulnerability with borderland dynamics.

The Marsabit pattern can be interpreted through Crime Pattern Theory. Remote roads and border areas act as movement paths and edges where offenders and targets may converge repeatedly. The border-area concentration suggests that boda-boda-related crime may be linked to cross-border movement, informal trade, smuggling routes, livestock movement, or mobility across poorly monitored spaces. This does not mean that all border movements are criminal; rather, it shows that

border environments can create opportunity spaces where legitimate mobility and criminal activity overlap.

Kirinyaga recorded remote roads as the leading location at 27.9%, followed by residential estates at 17.3% and entertainment/nightlife areas at 13.1%. This indicates that boda-boda-related crime in Kirinyaga has both route-based and settlement-based dimensions. The prominence of residential estates suggests that crime may occur near homes, estate access roads, or local neighbourhood movement points. The presence of entertainment and nightlife areas also indicates that night-time economic activities may create additional risk. These findings suggest that Kirinyaga requires both road-based interventions and neighbourhood-level safety strategies.

Nyeri recorded remote roads at 21.6%, followed very closely by residential estates at 20.6%. This shows that crime in Nyeri is not only associated with isolated routes but also with residential spaces. The high proportion of crime in residential estates suggests that boda-boda-related crime may affect residents near homes, estate roads, entry points, and local access routes. This may involve motorcycle theft, passenger theft, robbery, assault, or crimes occurring during evening and night movement. Since Nyeri also recorded high levels of witnessed crime, the residential-estate pattern may partly explain why crime is highly visible to community members.

Busia recorded remote roads as the leading location at 21.4%, followed by market centres at 17.3%, residential estates at 13.6%, and stage points at 13.2%. This pattern suggests that boda-boda-related crime in Busia is spread across mobility corridors, commercial nodes, residential areas, and transport stages. Busia's border location and high mobility environment may create complex crime opportunities involving transport routes, markets, and cross-border movement. The relatively low proportion recorded for border areas in the location table, at 2.8%, should not necessarily be read as absence of border influence. Rather, it may suggest that border-related risks are expressed through nearby roads, markets, stages, and commercial spaces rather than only at the formal border itself.

4.2.5.2 ***Bomet presented a different pattern:*** Unlike most counties, the leading crime location in Bomet was market centres, accounting for 20.2% of reported crime locations. This was followed by stage points at 18.6% and remote roads at 17.6%. This indicates that boda-boda-related crime

in Bomet is strongly linked to commercial and transport nodes. Market centres attract riders, passengers, traders, cash transactions, goods, and frequent movement. These features may create suitable targets and repeated opportunities for theft, robbery, extortion, and passenger-related crime. Stage points are also important because they are the organizational centres of boda-boda operations. Weakly regulated stages may create opportunities for disputes, criminal infiltration, unregistered riders, and targeting of both riders and passengers.

The Bomet pattern therefore suggests that interventions should focus on market-centre security and stage management. This may include stage registration, rider identification, improved lighting around markets, collaboration between market committees and boda-boda associations, and routine patrols during market days and peak travel hours. The finding also shows that crime prevention should not only focus on remote roads; in some counties, public commercial spaces are equally important.

4.2.5.3 ***Mombasa had the most distinctive location profile:*** The leading crime location in Mombasa was entertainment and nightlife areas, accounting for 21.8% of reported crime locations. This was followed by remote roads at 19.3% and informal settlements at 14.8%. This pattern reflects Mombasa's urban and coastal character, where night-time economies, tourism-related movement, entertainment areas, dense settlements, and informal transport networks intersect. Entertainment zones may increase exposure because people travel late at night, carry cash or mobile phones, may be less alert, and move through areas where guardianship may be uneven. This supports Routine Activity Theory, which emphasises the role of time and place in shaping crime opportunities.

The presence of informal settlements as a major crime location in Mombasa is also important. Informal settlements may be associated with narrow access routes, limited lighting, congested movement, weak formal surveillance, and high reliance on motorcycle transport. Boda-bodas often provide mobility in areas where larger vehicles cannot operate easily. However, these same conditions may also create opportunities for robbery, theft, assault, and escape after crime. This finding supports the argument by Cervero and Golub (2007) that informal transport systems are closely tied to urban accessibility gaps and weak formal regulation.

Highways and main roads also appeared as crime locations across the counties, though generally at lower levels than remote roads, markets, stages, or residential estates. Bomet recorded 13.2% of crimes on highways and main roads, while Busia recorded 8.9%, Kirinyaga 8.2%, Machakos 9.1%, Marsabit 6.5%, Mombasa 7.9%, and Nyeri 7.3%. These figures indicate that boda-boda-related crime is not restricted to small roads or informal paths; it can also occur along major transport corridors. However, the lower percentages suggest that highways may have higher visibility, more movement, or stronger guardianship compared with remote roads.

4.2.5.4 ***Stage points were another important crime location:*** They accounted for 18.6% in Bomet, 16.2% in Marsabit, 13.2% in Busia, 12.1% in Mombasa, 11.4% in Nyeri, 10.3% in Kirinyaga, and 9.5% in Machakos. Boda-boda stages are central to rider organisation, passenger access, fare negotiation, and informal regulation. They can improve order when well managed, but they may also become crime-risk spaces if poorly regulated, infiltrated by criminal actors, or controlled by informal groups. Goodfellow (2015) argues that informal transport sectors are shaped by local regulation, political relationships, and governance arrangements. The stage-point findings therefore point to the importance of stage governance in reducing boda-boda-related crime.

Residential estates also featured prominently, especially in Nyeri at 20.6%, Kirinyaga at 17.3%, Machakos at 14.1%, Busia at 13.6%, Bomet at 11.7%, Marsabit at 10.8%, and Mombasa at 9.7%. This indicates that boda-boda-related crime is not only a road or market problem but also a neighbourhood security issue. Residential-estate crime may involve theft of motorcycles parked near homes, robbery of passengers near destination points, attacks during late-night drop-offs, or crimes committed by offenders using motorcycles to enter and exit neighbourhoods quickly. This finding has important implications for community policing and neighbourhood surveillance.

Informal settlements were also important, particularly in Mombasa at 14.8%, Nyeri at 12.0%, Busia at 11.0%, and Kirinyaga at 9.5%. Informal settlements may be vulnerable because of dense settlement layouts, limited street lighting, narrow pathways, weak formal policing, and high dependence on flexible transport. However, interpretation must avoid stigmatising residents of informal settlements. The finding should be understood in terms of infrastructure, surveillance, service gaps, and mobility conditions rather than blaming communities.

The chi-square test confirmed that crime locations differed significantly by county, $\chi^2(42) = 654.62$, $p < 0.001$. This means that the spatial distribution of boda-boda-related crime varied significantly across the study counties. The result supports the descriptive evidence showing that different counties had different dominant crime locations. For example, Machakos, Marsabit, Kirinyaga, Nyeri, and Busia were strongly associated with remote roads; Bomet was more associated with market centres and stage points; while Mombasa was strongly associated with entertainment/nightlife areas and informal settlements.

However, Cramer's V was 0.149, indicating a small to moderate association between county and crime location. This means that although county differences were statistically significant, county alone does not fully explain where boda-boda-related crime occurs. The spatial distribution of crime is also shaped by local movement patterns, land use, road structure, market activity, stage organisation, urbanisation, border proximity, night-time economy, policing, lighting, and community guardianship. Therefore, the results should be interpreted as evidence of county-level spatial variation within a wider set of environmental and institutional factors.

From a theoretical perspective, the findings strongly support Crime Pattern Theory. Boda-boda-related crime was concentrated around routine activity spaces such as roads, markets, stages, residential estates, border corridors, and entertainment zones. These are not random places. They are locations where riders, passengers, traders, residents, goods, money, and offenders may repeatedly converge. The findings also support Routine Activity Theory because many of the leading crime locations are areas where suitable targets are exposed and guardianship may be weak, especially at night, on remote roads, in informal settlements, or around poorly regulated stages.

The practical implication is that crime prevention should be spatially targeted. Counties where remote roads dominate require route surveillance, lighting, emergency reporting mechanisms, rider tracking, and patrols on high-risk corridors. Counties where market centres and stages dominate require market security, stage registration, rider identification, and coordination between county authorities, police, market committees, and boda-boda associations. Urban counties such as Mombasa require interventions around nightlife zones, informal settlements, transport nodes, and

late-night movement. Border counties such as Marsabit require stronger attention to cross-border coordination, remote corridors, and border-area surveillance.

In summary, the crime location analysis shows that boda-boda-related crime is spatially patterned. Remote roads were the most common crime location across most counties, especially in Machakos, Marsabit, Kirinyaga, Nyeri, and Busia. Bomet showed a commercial-node pattern, with market centres and stage points leading. Mombasa showed a distinct urban pattern, with entertainment/nightlife areas and informal settlements featuring prominently. Nyeri and Kirinyaga showed strong residential-estate dimensions, while Marsabit showed a clear border-area component. The chi-square test confirmed that these differences were statistically significant, while the small to moderate Cramer's V indicates that crime location is shaped by county context together with local mobility patterns, land use, guardianship, and transport governance.

4.2.5.4 ***Time of Occurrence.*** The time-of-occurrence analysis examined when boda-boda-related crimes were most likely to occur across the seven study counties. The analysis considered four main time categories: daytime, evening, early morning, and night/late night/very early morning. Understanding the timing of crime is important because crime opportunities are not only spatially distributed but also temporally patterned. In other words, boda-boda-related crime does not occur with equal likelihood at all times of the day. Instead, certain periods create greater vulnerability for riders, passengers, residents, and other road users.

The findings showed that boda-boda-related crime was strongly associated with night-time, late-night, and very early morning periods. Across all counties, the night/late night/very early morning category accounted for the largest proportion of reported crime timing. This indicates that boda-boda-related crime is highly time-sensitive and is more likely to occur during periods of reduced visibility, weaker community surveillance, lower pedestrian movement, and limited security presence.

Table 4.11: Time of Occurrence of Boda-Boda-Related Crime by County

County	Daytime	Evening	Early morning	Night/late night/very early morning	Key interpretation
Bomet	10.6%	15.5%	7.2%	63.7%	Night-time crime dominates, but evening and daytime crime are also notable
Busia	16.2%	11.5%	6.3%	66.1%	Night-time crime dominates, with the highest daytime proportion among counties
Kirinyaga	7.3%	5.9%	2.8%	80.7%	Strong night-time concentration
Machakos	4.9%	3.4%	1.6%	75.8%	Crime is largely night-based, though some responses were unspecified
Marsabit	0.5%	6.0%	2.6%	90.8%	Extremely strong night-time concentration
Mombasa	2.6%	2.3%	4.2%	88.8%	Very strong night-time concentration, consistent with urban night-economy risks
Nyeri	4.2%	2.8%	1.1%	90.7%	Extremely strong night-time concentration
Overall pattern	Lower	Lower to moderate	Low	Dominant	Boda-boda-related crime is mainly a night-time security issue

Source: Author's analysis of Objective One quantitative survey data.

The dominance of night-time crime is a major finding. In Marsabit, 90.8% of reported boda-boda-related crimes occurred at night, late night, or very early morning. This was the highest proportion recorded across the counties. Nyeri followed very closely at 90.7%, while Mombasa recorded 88.8%. These three counties therefore show an extremely strong night-time concentration of boda-boda-related crime. Such high percentages indicate that crime in these counties is not evenly spread across the day but is heavily concentrated during hours when visibility, mobility control, and guardianship are weakest.

The high night-time concentration in Marsabit is particularly important because the county also recorded high witnessed exposure, the highest crime frequency score, and a strong crime pattern index. Taken together, these findings suggest that boda-boda-related crime in Marsabit is not only frequent and visible but also strongly concentrated in poorly guarded temporal settings. Night travel along remote roads, borderland routes, sparsely populated areas, and long-distance corridors may increase vulnerability because potential victims are less protected and offenders may face a lower risk of being identified or apprehended.

Nyeri also showed a very strong night-time crime pattern, with 90.7% of reported crimes occurring at night, late night, or very early morning. This finding is significant because Nyeri had earlier recorded high levels of witnessed crime. The time-of-occurrence result suggests that much of this visible insecurity may be associated with night-time movement, residential access routes, estate roads, and local transport activity after dark. Since Nyeri also showed notable crime around residential estates, the night-time pattern may reflect risks associated with late arrivals, night drop-offs, parked motorcycles, and movement through neighbourhood access routes.

Mombasa recorded 88.8% of crimes during night/late night/very early morning periods. This finding is consistent with the earlier location analysis, which showed that entertainment and nightlife areas were the leading crime locations in Mombasa. The Mombasa pattern therefore suggests that boda-boda-related crime in the county may be closely linked to the urban night economy. Late-night travel from entertainment areas, movement through informal settlements, isolated roads, and reduced police visibility may create opportunities for robbery, theft from passengers, assault, and other offences. In this sense, Mombasa's lower overall crime pattern index does not eliminate the seriousness of night-time hotspot risks.

Kirinyaga also recorded a strong night-time pattern, with 80.7% of reported crimes occurring at night, late night, or very early morning. This indicates that, although Kirinyaga had a relatively balanced exposure profile in the earlier analysis, its crime timing is strongly concentrated after dark. The low proportions recorded during daytime, evening, and early morning show that night-time conditions are central to understanding boda-boda-related crime in the county. This suggests the need for improved route surveillance, lighting, and stage-level monitoring during high-risk hours.

Machakos recorded 75.8% of crimes during the night/late night/very early morning category. This confirms that boda-boda-related crime in Machakos is also largely night-based. However, the interpretation should consider that 14.3% of responses in Machakos were unspecified or not recorded under the main timing categories. Even with this limitation, night-time remained by far the dominant reported period. Since Machakos was strongly associated with motorcycle theft and remote-road crime, the night-time pattern suggests that offenders may be exploiting isolated routes and low-visibility conditions to target riders and motorcycles.

Busia recorded 66.1% of crimes during night/late night/very early morning periods. Although this still shows night-time dominance, Busia had the highest daytime proportion among all counties at 16.2%. It also recorded 11.5% during evening and 6.3% during early morning. This indicates that while night remains the leading risk period, Busia's crime timing is somewhat more spread across the day than in counties such as Marsabit, Nyeri, and Mombasa. This may reflect the county's high mobility environment, market activity, transport circulation, and border-related movement, where crime opportunities may emerge during both day and night.

Bomet recorded 63.7% of crimes during night/late night/very early morning periods, making it the county with the lowest night-time concentration among the seven counties. However, night-time still remained the dominant category. Bomet also recorded relatively notable evening crime at 15.5% and daytime crime at 10.6%. This suggests that boda-boda-related crime in Bomet may be more temporally spread than in the other counties. The earlier location analysis showed that Bomet crime was strongly linked to market centres and stage points. These are spaces where crime may occur during both daytime and evening periods, especially during market days, peak passenger movement, or commercial activity.

The findings demonstrate that time of occurrence interacts strongly with crime location. Remote roads become more dangerous at night because of darkness, isolation, and limited patrols. Market centres and stage points may become vulnerable during evening hours when traders, riders, and passengers are moving with cash or goods. Entertainment and nightlife zones become riskier late at night because of reduced alertness, increased movement of cash and valuables, and weaker informal guardianship. Residential estates may become vulnerable during late-night arrivals, drop-offs, and motorcycle parking. Thus, the timing of boda-boda-related crime cannot be separated from the spatial environments in which it occurs.

From a theoretical perspective, the findings strongly support Routine Activity Theory. Cohen and Felson argue that crime occurs when motivated offenders, suitable targets, and absence of capable guardianship converge in time and space. Night-time conditions intensify this convergence. Riders, passengers, motorcycles, mobile phones, cash, and goods become suitable targets. Offenders may be more motivated by the lower probability of detection. Guardianship is weakened because there are fewer witnesses, lower police visibility, poor lighting, and reduced community

presence. Therefore, night-time creates a more favourable opportunity structure for boda-boda-related crime.

The findings also support Crime Pattern Theory, which emphasises that crime is structured around routine movement paths and activity nodes. In the boda-boda sector, night-time movement does not occur randomly. It follows predictable routes between markets, homes, entertainment areas, stages, highways, informal settlements, and remote roads. Offenders may learn these patterns and exploit repeated opportunities. For example, they may know which roads are poorly lit, which stages operate late, which routes passengers use after entertainment hours, and where riders are likely to be isolated. This explains why time and place must be analysed together when interpreting boda-boda-related crime.

The statistical evidence confirms that crime timing varied significantly across counties. The Pearson chi-square test showed a statistically significant difference in time of occurrence across counties, $\chi^2(18) = 239.48$, $p < 0.001$. This means that the timing of boda-boda-related crime was not identical across the seven counties. Although night-time crime dominated everywhere, the strength of night-time concentration differed. Marsabit, Nyeri, and Mombasa showed extremely high night-time concentration, while Bomet and Busia showed comparatively more temporal spread across daytime, evening, and early morning periods.

The significance of the chi-square result is important because it shows that county context shapes not only what types of crime occur and where they occur, but also when they occur. This reinforces the broader argument of Objective One: boda-boda-related crime is county-specific, spatially patterned, and temporally structured. The timing of crime reflects local mobility routines, economic activity, road conditions, policing patterns, nightlife, border movement, and the organisation of boda-boda transport.

The policy implications are clear. Since night-time crime dominates across all counties, security interventions should prioritise night and late-night operations. This may include improved street lighting, night patrols, monitoring of remote roads, emergency response systems, rider identification, stage-level registers, reflective rider identification, and stronger collaboration between police, county authorities, community policing structures, and boda-boda associations. In

counties such as Marsabit, Nyeri, and Mombasa, where night-time crime exceeds 88%, interventions should focus heavily on night routes, late-night stages, and known hotspots. In Busia and Bomet, where crime is still night-dominant but more temporally spread, strategies should also cover daytime and evening commercial spaces such as markets, stages, and transport corridors.

In addition, night-time interventions should protect both passengers and riders. Riders are vulnerable to motorcycle theft, robbery, assault, and attacks on isolated roads. Passengers are vulnerable to theft, robbery, harassment, and assault during night movement. Therefore, crime-prevention strategies should avoid treating riders only as suspects. Instead, they should combine regulation with protection. Rider registration, stage organisation, and route monitoring should be paired with mechanisms that allow riders to report threats, identify risky passengers, and access rapid assistance.

In summary, the time-of-occurrence analysis shows that boda-boda-related crime is strongly concentrated during night, late-night, and very early morning periods. Marsabit, Nyeri, and Mombasa recorded the highest night-time crime concentration, while Kirinyaga and Machakos also showed strong night-based patterns. Busia and Bomet recorded comparatively more spread across daytime and evening periods, but night-time still remained the leading category. The chi-square test confirmed significant county-level differences in crime timing, $\chi^2(18) = 239.48$, $p < 0.001$. Overall, these findings show that boda-boda-related crime is not only spatially patterned but also temporally patterned, requiring security responses that are sensitive to both place and time.

Victim Profiles. Victim-profile analysis examined the categories of people most affected by boda-boda-related crime across Bomet, Busia, Kirinyaga, Machakos, Marsabit, Mombasa, and Nyeri counties. The analysis considered different victim groups, including riders, passengers, residents, youth, traders or businesspeople, and women or girls. This analysis is important because boda-boda-related crime is often discussed in public debate mainly in terms of riders as offenders, accomplices, or facilitators of crime. However, the findings from this study show a more complex picture. Riders were not only associated with the boda-boda crime environment; they were also the leading victims in all the study counties.

The findings show that boda-boda riders were the most affected victim group across all counties. This is a major finding because it challenges one-sided narratives that portray riders only as perpetrators. Instead, the data show that riders are highly vulnerable to crime, especially motorcycle theft, robbery, assault, extortion, and attacks along isolated routes. Since motorcycles are both transport tools and livelihood assets, crimes against riders have direct economic, social, and household consequences.

Table 4.12: Victim Profiles of Boda-Boda-Related Crime by County

County	Riders	Passengers	Residents	Youth	Traders/business people	Women/girls	Unspecified	Key interpretation
Bomet	41.0%	12.9%	8.0%	25.5%	6.2%	2.1%	4.4%	Riders were the leading victims, but youth victimisation was also notably high
Busia	63.4%	14.1%	8.4%	4.2%	8.6%	1.0%	0.3%	Riders dominated the victim profile, followed by passengers and traders
Kirinyaga	63.0%	11.2%	6.2%	8.7%	5.0%	0.6%	5.3%	Rider victimisation was dominant, with passengers and youth also affected
Machakos	56.0%	18.2%	4.9%	—	4.7%	—	16.1%	Riders were the leading victims, while passengers formed a notable second group
Marsabit	64.6%	1.8%	23.6%	0.5%	3.4%	0.5%	5.5%	Riders were the leading victims, with residents forming a major secondary group
Mombasa	63.4%	15.1%	7.0%	11.2%	1.3%	0.3%	1.8%	Riders, passengers, and youth were the main affected groups
Nyeri	68.6%	7.1%	4.8%	11.3%	4.2%	3.1%	0.8%	Nyeri recorded the highest rider-victim proportion among all counties

Source: Author's analysis of Objective One quantitative survey data.

The table shows that riders were the leading victims in every county. The highest proportion of rider victimization was recorded in Nyeri, where riders accounted for 68.6% of victims. This was followed by Marsabit at 64.6%, Busia and Mombasa at 63.4%, Kirinyaga at 63.0%, Machakos at

56.0%, and Bomet at 41.0%. Although Bomet recorded the lowest proportion of rider victims among the counties, riders remained the largest victim category in the county.

The dominance of rider victimization is a key finding because it reframes the boda-boda crime problem. It shows that riders are not only possible offenders or facilitators but also exposed workers operating in insecure transport environments. This supports Doherty's (2017) argument that boda-boda riders often work under precarious and risky conditions. Riders are exposed to bodily harm, livelihood instability, theft, and social suspicion. The findings also align with the National Crime Research Centre's observation that boda-boda operators in Kenya face threats such as motorcycle theft, robbery, assault, extortion, and even murder (National Crime Research Centre, 2018).

Nyeri's high rider-victim proportion of 68.6% suggests that boda-boda-related crime in the county strongly affects operators themselves. This is important when read alongside earlier findings showing that Nyeri had high witnessed crime exposure and a strong night-time crime pattern. The implication is that many incidents witnessed in the county may involve attacks on riders, motorcycle theft, robbery of operators, or crimes occurring around routes and residential areas where riders operate. Since riders often work late into the evening or night, their exposure increases when they travel through isolated roads, residential estates, and poorly lit areas.

Marsabit recorded the second highest rider victimization level at 64.6%. This finding is significant because Marsabit also recorded high crime exposure, the highest crime frequency score, a strong crime pattern index, and high night-time crime concentration. The victim-profile result therefore confirms that riders are central victims within Marsabit's boda-boda-related crime environment. The county's remote roads, borderland routes, sparse settlements, and limited guardianship may increase the vulnerability of riders to motorcycle theft, robbery, assault, and attacks during night or long-distance travel. In this context, crime against riders is not only a transport-security issue but also a livelihood-security issue.

Busia and Mombasa each recorded rider victimization at 63.4%. In Busia, the finding may reflect the county's high mobility environment, border proximity, market activity, and transport corridors. Riders in such settings may be targeted for motorcycles, cash, or involvement in disputes around

stages, trade routes, or local political mobilization. In Mombasa, the rider-victim profile must be interpreted in relation to urban transport risks, entertainment and nightlife areas, informal settlements, and late-night passenger movement. Riders operating in such environments may face risks from robbery, non-payment, assault, false passenger requests, and theft of motorcycles.

Kirinyaga recorded rider victimization at 63.0%. This indicates that although Kirinyaga had a balanced crime-exposure profile, riders still formed the largest affected group. The finding suggests that boda-boda-related crime in Kirinyaga is strongly linked to operator vulnerability, especially where motorcycle theft, passenger-related theft, and route-based risks are present. Since Kirinyaga also recorded remote roads and residential estates as important crime locations, rider victimization may be linked to crimes occurring during movement between rural roads, market areas, and residential destinations.

Machakos recorded rider victimization at 56.0%. This finding is consistent with the earlier result that motorcycle theft was especially dominant in Machakos. If motorcycles are the main targets, then riders are naturally among the most affected victims. The relatively high passenger victimisation in Machakos, at 18.2%, also shows that crime in the county affects both operators and users. This suggests that boda-boda-related crime in Machakos may involve both theft of motorcycles from riders and theft or robbery involving passengers along isolated routes or during trips.

Bomet recorded the lowest rider-victim proportion at 41.0%, but riders remained the largest victim category. What makes Bomet distinctive is the relatively high proportion of youth victims, at 25.5%. This suggests that youth were an important affected group in the county. The youth-victim profile may reflect the involvement of young people as riders, passengers, informal workers, or community members exposed to boda-boda-related crime. It may also indicate that younger populations are more likely to use boda-boda transport, operate motorcycles, or be present in market and stage environments where crime occurs. This finding shows that Bomet's victimisation pattern is more diversified than counties where riders overwhelmingly dominate the profile.

4.2.5.5 ***Passengers were also an important victim group:*** Passenger victimization was highest in Machakos at 18.2%, followed by Mombasa at 15.1%, Busia at 14.1%, Bomet at 12.9%, Kirinyaga

at 11.2%, Nyeri at 7.1%, and Marsabit at 1.8%. The presence of passengers as victims shows that boda-boda-related crime is not limited to operators. Passengers may be vulnerable to theft from passengers, robbery, assault, harassment, abduction, or being targeted during late-night travel. Passenger victimization is especially important because it affects public trust in boda-boda transport and may influence whether residents feel safe using motorcycles for daily mobility.

Machakos recorded the highest passenger victimization, at 18.2%. This suggests that passengers in the county are a particularly important group affected. Since Machakos also showed strong remote-road crime and high motorcycle theft, passenger victimization may occur in contexts where passengers travel through isolated routes, use motorcycles during low-surveillance periods, or are caught in incidents involving robbery or theft. The finding indicates that safety interventions in Machakos should protect both riders and passengers.

Mombasa recorded passenger victimization at 15.1%. This is consistent with the county's urban and nightlife-related crime pattern. Passengers using boda-bodas late at night from entertainment areas, informal settlements, or transport nodes may face higher exposure to theft, robbery, or assault. This suggests a need for passenger-safety measures such as verified riders, registered stages, safe pick-up points, and night-time patrols around entertainment zones.

Residents formed another important victim group, especially in Marsabit, where they accounted for 23.6% of victims. This was considerably higher than in the other counties. The high resident-victim share in Marsabit suggests that boda-boda-related crime affects not only riders and passengers but also the wider community. Residents may be affected through robbery, theft, assault, intimidation, smuggling-related insecurity, or crimes occurring near homes, roads, and borderland settlements. This finding is important because it shows that boda-boda-related crime can produce broader community insecurity beyond the transport transaction itself.

Youth were also affected in several counties. Youth victimization was highest in Bomet at 25.5%, followed by Nyeri at 11.3%, Mombasa at 11.2%, and Kirinyaga at 8.7%. The youth pattern is important because the boda-boda sector is strongly associated with youth employment and informal livelihoods. Many riders are young men, and many users are young people moving for work, school, business, or social activities. Youth may therefore appear as victims because they

are highly exposed to boda-boda environments. This finding also links Objective One to broader socio-economic questions addressed later in the chapter, especially unemployment, poverty, peer networks, and livelihood vulnerability.

Traders and businesspeople were also represented in the victim data. Their highest proportion was recorded in Busia at 8.6%, followed by Bomet at 6.2%, Kirinyaga at 5.0%, Machakos at 4.7%, Nyeri at 4.2%, Marsabit at 3.4%, and Mombasa at 1.3%. Traders may be targeted because they travel with cash, goods, mobile phones, stock, or daily business earnings. The presence of traders as victims is particularly relevant in market centres, border towns, and commercial corridors where boda-bodas support small-scale trade and transport of goods.

Women and girls appeared as a smaller victim category in the quantitative summary, with the highest reported proportion in Nyeri at 3.1%, followed by Bomet at 2.1%, Busia at 1.0%, Kirinyaga at 0.6%, Marsabit at 0.5%, and Mombasa at 0.3%. Although the percentages are low, this category should not be dismissed. Crimes affecting women and girls may be underreported because of stigma, fear, shame, or reluctance to disclose incidents such as sexual harassment or sexual violence. Therefore, the low quantitative proportions should be interpreted cautiously. They indicate recorded victimization, not necessarily the full extent of gendered harm within boda-boda-related crime.

The presence of an unspecified category should also be noted. Machakos had the highest unspecified victim category at 16.1%, followed by Marsabit at 5.5%, Kirinyaga at 5.3%, Bomet at 4.4%, Mombasa at 1.8%, Nyeri at 0.8%, and Busia at 0.3%. This suggests that in some counties, particularly Machakos, a portion of victim responses could not be clearly classified. While this does not invalidate the overall pattern, it indicates that victim-profile interpretation should focus mainly on the clearly identified categories.

The Pearson chi-square test confirmed statistically significant differences in victim profiles across counties, $\chi^2(30) = 449.97$, $p < 0.001$. This means that the type of victims affected by boda-boda-related crime varied meaningfully by county. Although riders were the leading victims everywhere, the secondary victim groups differed. Bomet had a strong youth-victim component; Marsabit had a strong resident-victim component; Machakos and Mombasa had notable passenger

victimization; Busia had relatively higher trader or business victimization; and Nyeri recorded the highest rider-victim proportion.

The statistical significance of the chi-square results shows that victimization patterns are not random. They are shaped by county context, transport use, land use, crime location, timing, and the dominant forms of crime. For example, where motorcycle theft is dominant, riders are more likely to appear as victims. Where theft from passengers or robbery is prominent, passengers become more visible in the victim profile. Where crime occurs in residential estates or community spaces, residents may become more affected. Where crime intersects markets and trade, traders may appear more frequently as victims.

The findings are consistent with Routine Activity Theory. Riders, passengers, traders, and residents become suitable targets when they move through poorly guarded spaces or operate during high-risk periods. Riders are especially vulnerable because they work in public spaces, carry cash, operate valuable motorcycles, respond to passenger requests, travel at night, and sometimes enter remote or unfamiliar areas. Passengers are vulnerable because they may depend on riders they do not know, travel through isolated routes, or carry valuables. Traders are vulnerable because they may move goods and cash between markets and homes. Residents are vulnerable when boda-boda-related crime enters neighborhood spaces.

The findings also support Doherty's (2017) argument that boda-boda riders occupy precarious positions in urban and peri-urban economies. Riders are exposed not only to road accidents and livelihood uncertainty but also to crime and insecurity. The present findings extend this argument by showing that rider vulnerability is not limited to one city or county; it appears across all seven counties in the study. The findings therefore suggest that security interventions should protect riders rather than treating them only as possible offenders.

4.2.5.6 ***These results have important policy implications:*** First, boda-boda crime prevention should include rider protection. Measures such as rider registration, motorcycle tracking, emergency reporting systems, stage-level accountability, safe passenger verification practices, and rapid response mechanisms can help reduce rider vulnerability. Second, passenger safety should be strengthened through registered stages, rider identification, safe pick-up points, public

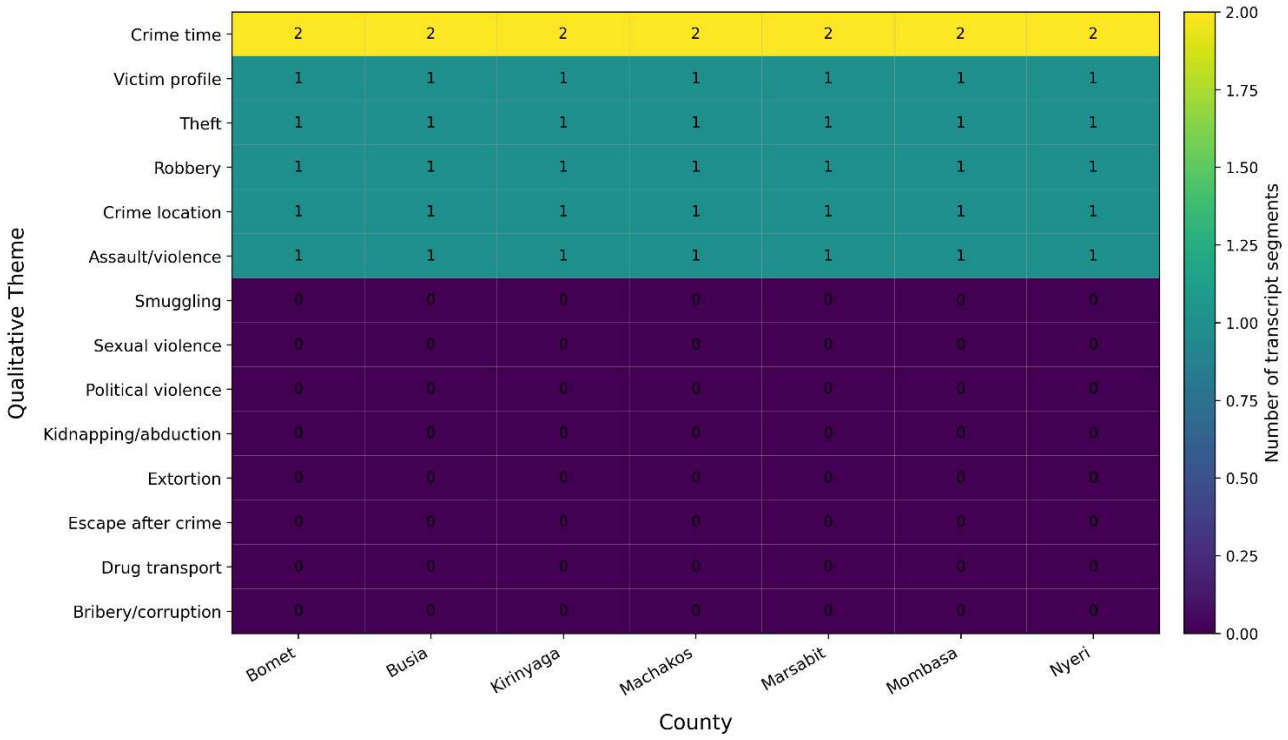
awareness, and night-time surveillance. Third, counties with distinctive secondary victim groups require tailored interventions. Bomet requires attention to youth vulnerability, Marsabit to resident and community insecurity, Machakos and Mombasa to passenger protection, and Busia to trader safety and market-route security.

The findings also suggest that public communication should avoid blanket criminalization of boda-boda riders. While some riders may participate in crime, many riders are victims of the same insecurity affecting the sector. Treating all riders as criminals can weaken cooperation between boda-boda associations, police, county authorities, and communities. A more effective approach would combine regulation, enforcement, and protection. This includes identifying criminal actors without stigmatizing the entire rider population.

In summary, victim-profile analysis shows that boda-boda riders were the leading victims of boda-boda-related crime across all seven counties. Nyeri recorded the highest proportion of rider victims, followed by Marsabit, Busia, Mombasa, Kirinyaga, Machakos, and Bomet. Passengers, residents, youth, traders, and women or girls were also affected, but their prominence varied by county. The chi-square test confirmed statistically significant differences in victim profiles across counties, $\chi^2(30) = 449.97$, $p < 0.001$. These findings demonstrate that boda-boda-related crime affects both operators and users of the sector, and that crime-prevention responses should protect riders, passengers, and wider communities while avoiding the blanket criminalization of boda-boda workers.

4.3 Qualitative Themes Supporting Objective One

The dominant qualitative themes were crime time, victim profile, theft, robbery, crime location, and assault or violence. Other themes included smuggling, political violence, kidnapping or abduction, extortion, drug transport, escape after crime, sexual violence, and bribery or corruption. However, the strongest and most consistently repeated themes across counties were those directly linked to the quantitative findings: theft, robbery, crime location, crime timing, and victim profile.



Source: Author's qualitative analysis of Objective One transcript data.

Figure 4.5 – Objective One: Qualitative Themes by County
Heat-map of coded transcript segments (0 = no segments, 1 = one segment, 2 = two segments) for each theme across the seven study counties. Yellow cells indicate the maximum count observed (2), teal cells denote a single coded segment, and purple cells represent themes not mentioned in that county. The plot shows that the six dominant themes—crime time, victim profile, theft, robbery, crime location, and assault/violence—emerged in every county, whereas all other themes were absent across the dataset. Source: Author's qualitative analysis of Objective One transcript data.

Table 4.13**:** Summary of Qualitative Themes Supporting Objective One

County	**Dominant qualitative themes**	**Key interpretation**
Bomet	Crime time, crime location, theft, robbery, assault/violence, victim profile	Crime narratives emphasised theft, robbery, assault, and the importance of where and when crime occurs
Busia	Crime time, crime location, theft, robbery, assault/violence, victim profile	Qualitative evidence strongly supported the quantitative finding that Busia has visible and frequent boda-boda-related crime
Kirinyaga	Crime time, crime location, theft, robbery, assault/violence, victim profile	Crime narratives reflected a balanced but clear pattern of theft, robbery, and location-based insecurity
Machakos	Crime time, crime location, theft, robbery, assault/violence, victim profile	Qualitative themes supported the strong motorcycle-theft pattern shown in the quantitative data
Marsabit	Crime time, crime location, theft, robbery, assault/violence, victim profile	Qualitative evidence reinforced Marsabit's high-risk profile, especially theft, robbery, remote roads, and night-time crime

County	Dominant qualitative themes	Key interpretation
Mombasa	Crime time, crime location, theft, robbery, assault/violence, victim profile	Narratives pointed to urban and night-time crime risks, including theft, robbery, nightlife areas, and informal settlements
Nyeri	Crime time, crime location, theft, robbery, assault/violence, victim profile	Qualitative evidence supported the high witnessed exposure and rider-victimisation pattern in Nyeri

Source: Author's qualitative analysis of Objective One transcript data.

The qualitative themes confirm that boda-boda-related crime is not experienced as a single uniform offence. Instead, participants' narratives pointed to a combination of crimes and risks occurring around the boda-boda sector. The repeated appearance of theft, robbery, assault or violence, crime location, crime time, and victim profile indicates that respondents understood boda-boda-related crime as both a security problem and a mobility problem. In other words, crime was not only linked to individual offenders but also to movement spaces, time of travel, vulnerable victims, and the use of motorcycles as both livelihood assets and instruments of mobility.

4.3.1 ***The most consistent theme across the qualitative data was crime time****:* This theme appeared strongly across all counties and reinforced the quantitative finding that boda-boda-related crime was concentrated at night, late night, or very early morning. In the quantitative analysis, night-time crime dominated all counties, especially in Marsabit, Nyeri, and Mombasa. The qualitative themes support this pattern by showing that time was repeatedly mentioned as an important condition shaping insecurity. This suggests that respondents did not perceive crime as evenly distributed throughout the day; rather, they associated boda-boda-related crime with particular high-risk periods.

4.3.2 ***The prominence of the crime-time theme is theoretically important:*** It supports Routine Activity Theory, which argues that crime opportunities increase when suitable targets are exposed in poorly guarded settings (Cohen & Felson, 1979). At night, riders and passengers are more vulnerable because there are fewer witnesses, weaker natural surveillance, lower police visibility, poor lighting, and reduced community guardianship. Therefore, the qualitative emphasis on time strengthens the interpretation that boda-boda-related crime is temporally patterned.

4.3.3 ***The second major qualitative theme was crime location:*** Participants' narratives repeatedly referred to places such as stage points, market centres, remote roads, highways, border areas, informal settlements, bars, and nightlife areas. This supports the quantitative location analysis, which showed that boda-boda-related crime was concentrated in specific spaces rather than randomly spread across the counties. Remote roads, market centres, boda-boda stages, residential estates, entertainment zones, and border areas were all identified as important crime spaces.

The qualitative emphasis on location supports Crime Pattern Theory, which argues that crime tends to cluster around routine movement nodes, paths, and edges (Brantingham, Brantingham, & Andresen, 2017). In the context of boda-boda transport, stages and markets function as nodes because riders, passengers, traders, goods, and cash converge there. Roads and highways function as paths because they support repeated movement. Border areas, informal settlements, and remote routes may function as edges or transitional spaces where formal surveillance is weaker. The qualitative findings therefore confirm that boda-boda-related crime is spatially organised around mobility environments.

4.3.4 ***The theme of theft was also central:*** Across all counties, theft appeared as one of the most visible qualitative themes. This supports the quantitative finding that theft of motorcycles was the leading form of boda-boda-related crime overall. The qualitative summaries indicated that respondents repeatedly associated boda-boda-related crime with theft, especially motorcycle theft. This is important because it shows that theft was not only statistically dominant but also prominent in participants' descriptions of crime.

4.3.5 ***Motorcycle theft has serious livelihood implications:*** For boda-boda riders, the motorcycle is not merely a transport object; it is the principal productive asset through which income is generated. When a motorcycle is stolen, the rider may lose employment, income, credit capacity, and household support. This finding therefore supports Doherty's (2017) argument that boda-boda riders often work under precarious and insecure conditions. It also challenges the narrow view that boda-boda riders are mainly offenders. The qualitative evidence shows that riders are also victims of crime.

4.3.6 ***The theme of robbery also appeared consistently across the counties***: This supports the quantitative finding that robbery with violence was one of the most common forms of boda-boda-related crime, especially in counties such as Marsabit and Mombasa. The qualitative material suggests that respondents perceived robbery as a major part of the boda-boda crime environment. Robbery is particularly serious because it involves not only loss of property but also the threat or use of violence. This means that boda-boda-related crime affects physical safety as well as economic security.

4.3.7 ***Robbery was especially important in the interpretation of high-risk countie:*** For example, the qualitative summaries for Marsabit and Busia strongly reinforced the presence of both theft and robbery. This supports quantitative evidence showing that Marsabit and Busia recorded high witnessed exposure, high crime frequency, and strong crime-pattern values. Therefore, the qualitative evidence helps explain why these counties emerged as higher-risk areas: crime was not only reported in survey responses but was also reflected in the thematic narratives.

4.3.8 ***The theme of assault or violence****:* Further confirms that boda-boda-related crime includes interpersonal and physical harm. Assault and violence appeared alongside theft and robbery, suggesting that crime in the sector is not limited to property offences. In some cases, assault may be linked to robbery, fare disputes, stage conflicts, political intimidation, enforcement encounters, or attacks on riders and passengers. This supports the quantitative finding that assault was among the important crime forms, particularly in Busia, Marsabit, Kirinyaga, and Bomet.

4.3.9 ***The theme of victim profile was also repeated across counties***: This theme is important because it shows that participants were not only describing crime events but also identifying who was affected. The qualitative emphasis on victim profile supports the quantitative victim analysis, which showed that riders were the leading victims across all counties. It also confirms that boda-boda-related crime affects passengers, residents, youth, traders, businesspeople, and women or girls, depending on county context.

The victim-profile theme is important for interpretation because it prevents one-sided conclusions. Public narratives often portray boda-boda riders as offenders, accomplices, or facilitators of crime. However, both the quantitative and qualitative findings show that riders are also exposed to crime.

They are vulnerable to motorcycle theft, robbery, assault, extortion, and attacks on isolated roads. The qualitative evidence therefore strengthens the argument that boda-boda-related crime must be understood as a complex problem affecting both transport operators and transport users.

The qualitative findings also showed some county-specific differences. In Marsabit, the qualitative themes strongly supported the quantitative pattern of high crime exposure, high crime frequency, and high night-time concentration. The repeated themes of theft, robbery, crime time, crime location, and victim profile indicate that boda-boda-related crime in Marsabit was both visible and structured. This aligns with the interpretation that Marsabit's remote roads, borderland routes, and sparse surveillance create conditions for recurring crime opportunities.

In Busia, the qualitative themes similarly supported the county's high-risk profile. The presence of theft, robbery, assault or violence, crime time, and location themes corresponds with Busia's high witnessed exposure, elevated crime frequency, and high crime-pattern index. Busia's border and commercial mobility environment may explain why boda-boda-related crime appears as a recurring theme in both quantitative and qualitative findings. The qualitative data therefore reinforces the interpretation that Busia's boda-boda crime problem is linked to movement, trade, transport nodes, and local security conditions.

In Machakos, the qualitative findings supported the quantitative dominance of motorcycle theft. The repeated appearance of theft as a theme is consistent with the earlier finding that theft of motorcycles accounted for the largest share of reported crime forms in Machakos. This suggests that the county's boda-boda-related crime pattern is strongly centred on the targeting of motorcycles. Qualitative evidence therefore helps explain the nature of crime in Machakos: it is not simply general insecurity, but a specific problem in which riders and motorcycles are central targets.

In Mombasa, qualitative themes supported the interpretation that crime may be urban and spatially concentrated. Although Mombasa recorded a lower overall crime pattern index, the qualitative themes of crime location, crime time, theft, robbery, and assault or violence suggest that crime remains serious in specific settings. This aligns with the earlier finding that entertainment and nightlife areas, remote roads, and informal settlements were important crime locations in

Mombasa. Therefore, the qualitative results caution against interpreting lower overall scores as absence of crime.

In Nyeri, the qualitative findings reinforced the county's high witnessed exposure and rider-victimization pattern. The presence of themes such as theft, robbery, crime time, location, and victim profile suggests that boda-boda-related crime in Nyeri is experienced and observed in everyday community settings. Since Nyeri also recorded a high proportion of rider victims, the qualitative evidence supports the interpretation that crime affects riders directly, especially through theft and robbery.

In Bomet, the qualitative themes supported a mixed crime profile involving theft, robbery, assault or violence, crime location, and time. This aligns with the quantitative findings showing that Bomet had a relatively high proportion of respondents reporting no exposure, but still recorded meaningful levels of personal exposure, motorcycle theft, robbery, youth victimization, and market-centre crime. The qualitative evidence therefore shows that boda-boda-related crime exists in Bomet, even if it is less widely visible than in counties such as Marsabit and Busia.

In Kirinyaga, the qualitative results supported an intermediate pattern. Theft, robbery, crime time, location, assault or violence, and victim profile appeared as important themes. This corresponds with Kirinyaga's balanced exposure profile and moderate crime frequency score. The qualitative findings indicate that boda-boda-related crime in Kirinyaga is present and recognizable, though not as intensely concentrated as in Marsabit or Busia.

Table 4.14**:** Integration of Qualitative Themes with Quantitative Findings

Qualitative theme	**Quantitative result supported**	**Interpretation**
Crime time	Night/late night/very early morning was the dominant period of occurrence	Crime is temporally patterned and linked to weak guardianship at night
Crime location	Remote roads, markets, stages, residential estates, border areas, informal settlements, and nightlife zones were major crime spaces	Crime is spatially patterned around mobility nodes, paths, and edges
Theft	Theft of motorcycles was the leading crime form overall	Riders are major victims because motorcycles are valuable livelihood assets

Qualitative theme	Quantitative result supported	Interpretation
Robbery	Robbery with violence was among the leading crime forms	Boda-boda-related crime includes physical danger and not only property loss
Assault/violence	Assault was a notable crime form across counties	Crime includes interpersonal violence, disputes, intimidation, and physical harm
Victim profile	Riders were the leading victims across all counties	The boda-boda sector should not be viewed only through offender-centred narratives
Political violence/intimidation	Political violence was visible in some county-level crime patterns, especially Busia	Boda-boda operations may intersect with local political mobilisation and intimidation
Drug transport, smuggling, escape after crime	These appeared as lower-frequency but important crime forms	Motorcycles may sometimes be used to facilitate broader criminal mobility
Bribery/corruption	Bribery and corruption appeared in county-level crime-type patterns, especially Mombasa	Crime patterns also reflect regulatory and governance weaknesses

Source: Author's integration of quantitative findings and qualitative transcript themes.

The integration of qualitative and quantitative findings strengthens the credibility of Objective One. The quantitative data showed statistically significant differences in crime type, crime location, time of occurrence, victim profile, crime frequency, and crime pattern index. The qualitative themes explain what those statistical differences mean in practice. They show that people described boda-boda-related crime through repeated references to theft, robbery, night-time risk, risky locations, victim vulnerability, and violence.

This integration follows the logic of mixed-methods triangulation. Quantitative data show the distribution and statistical significance of patterns, while qualitative data provide contextual meaning and experiential interpretation. The convergence between the two forms of evidence suggests that the findings are not isolated artefacts of one method. Instead, they reflect a consistent pattern across survey data, statistical outputs, graphical results, and transcript themes. This strengthens the validity of the conclusion that boda-boda-related crime is measurable, visible, and experienced across the study counties.

The qualitative results also help explain why county-specific analysis is necessary. While the same broad themes appeared across counties, their meaning differed by context. In Marsabit, the themes pointed to remote routes, night-time risk, and high insecurity. In Busia, they suggested border

mobility, political intimidation, and repeated crime exposure. In Machakos, they reinforced the dominance of motorcycle theft. In Mombasa, they pointed to urban night-time and hotspot-related crime. In Nyeri, they emphasized high visibility and rider victimization. In Bomet and Kirinyaga, they reflected mixed and intermediate patterns. Thus, qualitative evidence shows that similar crime themes may take different forms depending on county context.

4.3.10 ***The findings are also important for policy interpretation:*** Since participants repeatedly identified time, location, theft, robbery, violence, and victim profile, interventions should not be generic. Night-time crime requires improved lighting, patrols, and late-night stage monitoring. Location-based crime requires hotspot mapping, route surveillance, and targeted policing around remote roads, markets, stages, border corridors, residential estates, informal settlements, and nightlife zones. Theft and robbery require rider protection, motorcycle tracking, registration, and rapid reporting systems. Victim-profile findings require protection of riders, passengers, traders, residents, youth, and women or girls.

The qualitative findings also caution against blanket criminalization of boda-boda riders. Since victim profile emerged as a major theme, and quantitative data showed riders as the leading victims, security interventions should recognize riders as both stakeholders and vulnerable workers. Boda-boda associations, stage leaders, county authorities, police, and community policing structures should therefore be involved in designing prevention strategies. Treating the entire sector as criminal would weaken cooperation and may fail to address the actual patterns of victimizations and vulnerability.

In summary, Figure 4.3.5 shows that the main qualitative themes supporting Objective One were crime time, victim profile, theft, robbery, crime location, and assault or violence. These themes closely match the quantitative results, confirming that boda-boda-related crime is both statistically measurable and experientially visible. The qualitative data reinforced the importance of night-time crime, rider victimizations, motorcycle theft, robbery, assault, and spatial concentration around stages, remote roads, markets, residential areas, border corridors, informal settlements, and nightlife spaces. The integration of qualitative and quantitative evidence therefore strengthens the conclusion that boda-boda-related crime is spatially patterned, temporally concentrated, county-specific, and embedded within the everyday mobility systems of the boda-boda sector.

4.3.11 ***Statistical Tests for Objective One:*** This subsection presents the inferential statistical results for Objective One. While the preceding subsections described the observed patterns of boda-boda-related crime across counties, this section determines whether the county-level differences were statistically significant. The purpose of the inferential tests was to establish whether variations in crime type, crime frequency, crime location, time of occurrence, victim profile, and crime pattern index were random, or whether they reflected meaningful differences across the seven study counties.

The inferential tests confirmed that boda-boda-related crime patterns differed significantly across counties. Chi-square tests showed significant county-level variation in crime type, crime location, crime time, and victim profile. Kruskal-Wallis tests showed significant county-level differences in crime frequency score and crime pattern index. These findings provide statistical support for the descriptive results presented earlier in the section, which showed that Marsabit, Busia, Bomet, Mombasa, Kirinyaga, Machakos, and Nyeri had different boda-boda-related crime profiles.

Table 4.15: Statistical Tests for County-Level Differences in Boda-Boda-Related Crime Patterns

Variable tested	**Statistical test**	**Test statistic**	**df**	**p-value**	**Interpretation**
Crime type by county	Pearson chi-square	837.74	66	$p < 0.001$	Crime type differs significantly by county
Crime type association strength	Cramer's V	0.149	—	—	Small to moderate association
Crime frequency score by county	Kruskal-Wallis	245.75	6	$p < 0.001$	Crime frequency differs significantly by county
Crime location by county	Pearson chi-square	654.62	42	$p < 0.001$	Crime locations differ significantly by county
Crime location association strength	Cramer's V	0.149	—	—	Small to moderate association
Crime time by county	Pearson chi-square	239.48	18	$p < 0.001$	Crime timing differs significantly by county
Victim profile by county	Pearson chi-square	449.97	30	$p < 0.001$	Victim profiles differ significantly by county
Crime pattern index by county	Kruskal-Wallis	235.23	6	$p < 0.001$	Crime-pattern intensity differs significantly by county

Source: Author's analysis of Objective One quantitative survey data.

The statistical evidence in Table 4.14 shows that county context was significantly associated with boda-boda-related crime patterns. All the inferential tests produced statistically significant results at $p < 0.001$, indicating that the observed differences across counties were highly unlikely to have occurred by chance. This means that boda-boda-related crime was not evenly distributed across the study area. Instead, nature, frequency, location, timing, and victim profile of crime varied meaningfully from one county to another.

The Pearson chi-square test for crime type by county was statistically significant, $\chi^2(66) = 837.74$, $p < 0.001$. This indicates that the forms of boda-boda-related crime differed significantly across counties. The descriptive findings showed that theft of motorcycles was the dominant crime form overall, but its intensity varied by county. For example, Machakos recorded a particularly high proportion of motorcycle theft, while Marsabit and Mombasa showed stronger robbery-with-violence components. Busia had a more distinctive pattern involving assault and political violence or intimidation, while Mombasa showed a notable bribery and corruption component. The significant chi-square result therefore confirms that these county-level differences in crime type were statistically meaningful.

However, the Cramer's V value for crime type was 0.149, indicating a small to moderate association. This is an important qualification. It means that although county and crime type were significantly related, county location alone did not strongly determine the type of boda-boda-related crime reported. Other factors are also likely to shape crime type, including socio-economic conditions, unemployment, policing capacity, road networks, stage organisation, border proximity, night-time movement, rider registration, and local criminal opportunity structures. Therefore, the statistical significance should not be interpreted as implying that county alone explains boda-boda-related crime.

The Kruskal-Wallis test for crime frequency score by county was also statistically significant, $\chi^2(6) = 245.75$, $p < 0.001$. This result shows that perceived crime frequency differed significantly across counties. The descriptive analysis showed that Marsabit had the highest mean crime frequency score, followed by Busia. Other counties such as Machakos, Bomet, Nyeri, Kirinyaga, and Mombasa recorded comparatively lower scores. The Kruskal-Wallis result confirms that these

differences in perceived frequency were not random. Instead, respondents in different counties reported significantly different levels of boda-boda-related crime frequency.

The use of the Kruskal-Wallis test was appropriate because the crime frequency score is ordinal or non-normally distributed and was compared across more than two independent county groups. Unlike a simple comparison of means, the Kruskal-Wallis test ranks the observations and tests whether the distribution of scores differs significantly across groups. The significant result therefore supports the conclusion that some counties experienced or perceived boda-boda-related crime as more frequent than others.

The Pearson chi-square test for crime location by county was significant, $\chi^2(42) = 654.62$, $p < 0.001$. This means that the places where boda-boda-related crimes occurred differed significantly by county. Earlier analysis showed that remote roads were the leading crime location in several counties, including Machakos, Marsabit, Kirinyaga, Nyeri, and Busia. Bomet showed a stronger market-centre and stage-point pattern, while Mombasa showed a distinctive urban pattern involving entertainment/nightlife areas and informal settlements. The significant chi-square result therefore confirms that the spatial distribution of boda-boda-related crime was county-specific.

The Cramer's V value for crime location was 0.149, again indicating a small to moderate association. This suggests that while county differences in crime location were statistically significant, the strength of association was modest. In practical terms, county context matters, but it does not fully explain where crime occurs. Crime location is also shaped by road design, market activity, population density, land use, border movement, lighting, stage management, police visibility, and community guardianship. This interpretation is consistent with Crime Pattern Theory, which argues that crime clusters around routine movement spaces such as nodes, paths, and edges.

The Pearson chi-square test for crime time by county was statistically significant, $\chi^2(18) = 239.48$, $p < 0.001$. This confirms that the timing of boda-boda-related crime differed significantly across counties. Although night-time, late-night, and very early morning periods dominated across the study area, the intensity of this night-time concentration varied. Marsabit, Nyeri, and Mombasa showed very high night-time crime concentration, while Bomet and Busia showed slightly more

spread across daytime, evening, and early morning periods. The significant test result shows that crime timing is also shaped by county-specific mobility routines, economic activity, security presence, and transport patterns.

The Pearson chi-square test for victim profile by county was also significant, $\chi^2(30) = 449.97$, $p < 0.001$. This means that the categories of people affected by boda-boda-related crime varied significantly across counties. Riders were the leading victims in all counties, but secondary victim groups differed. Bomet showed a strong youth-victim component, Marsabit had a notable resident-victim component, Machakos and Mombasa had relatively high passenger victimizations, and Busia had a more visible trader or business-victim component. The significant chi-square result confirms that victimizations patterns were not uniform across counties.

The Kruskal-Wallis test for the crime pattern index by county was statistically significant, $\chi^2(6) = 235.23$, $p < 0.001$. This shows that the overall structure and intensity of boda-boda-related crime patterns differed significantly across counties. Busia recorded the highest mean crime pattern index, followed by Marsabit and Bomet. Mombasa recorded the lowest mean index, while Nyeri was close to neutral, and Kirinyaga and Machakos recorded lower values. The significant Kruskal-Wallis result confirms that these differences in crime-pattern intensity were statistically meaningful.

Taken together, the tests show that boda-boda-related crime is a differentiated phenomenon. The counties differed significantly in terms of what crimes occurred, how frequently they occurred, where they occurred, when they occurred, who was victimized, and how strongly crime patterns were concentrated. This strengthens the central finding of Objective One: boda-boda-related crime is not a single uniform problem across counties, but a county-specific security issue shaped by local conditions.

At the same time, the results should be interpreted carefully. Statistical significance does not automatically mean that the association is strong. The Cramer's V values for crime type and crime location were approximately 0.149, indicating small to moderate effect sizes. This means that county context is important, but it explains only part of the variation in boda-boda-related crime. The findings therefore point to a multi-factor explanation. County differences interact with other

factors such as policing, socio-economic pressure, unemployment, poverty, border proximity, road networks, night-time activity, stage organisation, rider registration, informal regulation, and community surveillance.

4.3.12 ***The results also support the theoretical framing used in this study:*** From a Routine Activity Theory perspective, the significant differences across counties suggest that the convergence of motivated offenders, suitable targets, and absence of capable guardianship varies by local context. Counties with remote roads, weak surveillance, border movement, active night-time economies, or poorly regulated stages may create stronger opportunities for certain crimes. From a Crime Pattern Theory perspective, the findings show that boda-boda-related crime clusters around specific activity spaces, including roads, markets, stages, border corridors, residential estates, informal settlements, and entertainment areas. Thus, the statistical findings support the argument that boda-boda-related crime is both spatially and temporally patterned.

4.3.13 ***The findings also have methodological importance:*** The use of both chi-square and Kruskal-Wallis tests allowed the study to examine different types of variables appropriately. Chi-square tests were used for categorical variables, including crime type, crime location, crime time, and victim profile. Kruskal-Wallis tests were used for ordinal or continuous non-parametric comparisons, including crime frequency score and crime pattern index. This combination of tests provides a stronger statistical basis for interpreting Objective One than descriptive percentages alone.

4.3.14 ***The results also reinforce the value of integrating quantitative and qualitative evidence:*** The statistical tests confirmed significant county-level differences, while the qualitative themes explained the lived meaning of those differences. For example, the quantitative tests showed significant variation in crime time and location, while the qualitative findings highlighted night-time crime, risky routes, stage points, markets, and remote roads. Similarly, the victim-profile test showed significant county differences, while qualitative themes reinforced the vulnerability of riders, passengers, and communities. The convergence of these findings strengthens the validity of the overall interpretation.

In terms of policy, the statistical findings imply that uniform crime-prevention responses are unlikely to be sufficient. Since counties differ significantly in crime type, location, timing, frequency, and victim profile, interventions should be county-specific. Marsabit and Busia may require stronger attention to high-frequency and high-visibility crime patterns. Machakos may require targeted interventions against motorcycle theft. Mombasa may require hotspot-based responses around nightlife areas, informal settlements, and urban transport nodes. Bomet may require interventions around markets and stage points, while Nyeri and Kirinyaga may require attention to residential and remote-route crime risks.

In conclusion, the inferential statistical tests confirmed that boda-boda-related crime patterns differed significantly across the seven study counties. Crime type, crime frequency, crime location, crime timing, victim profile, and crime pattern index all showed statistically significant county-level differences. However, the modest Cramer's V values indicate that county context is only one part of the explanation. Boda-boda-related crime is also shaped by spatial opportunity structures, socio-economic pressures, policing, night-time mobility, border dynamics, road networks, stage organisation, and informal regulation. These findings provide strong statistical support for the conclusion that boda-boda-related crime is county-specific, spatially patterned, temporally structured, and influenced by multiple interacting factors.

4.3.15 ***Integrated Discussion of Objective One:*** The findings for Objective One show that boda-boda-related crime is both a security problem and a livelihood problem. The security dimension is evident in the range of crimes associated with the sector, including motorcycle theft, robbery with violence, theft from passengers, assault, bribery and corruption, drug transport and distribution, political violence or intimidation, smuggling, extortion, kidnapping or abduction, facilitation of escape after crime, and sexual harassment or violence. The livelihood dimension is equally important because the findings show that boda-boda riders are not only associated with crime as possible offenders or facilitators, but are also among the main victims, especially in cases involving motorcycle theft, robbery, assault, and attacks on isolated routes.

This dual character of boda-boda-related crime is central to the interpretation of Objective One. On one hand, motorcycles may be used to facilitate crime because they are fast, flexible, relatively easy to manoeuvre, and able to access narrow roads, informal settlements, remote routes, border

corridors, and crowded urban spaces. On the other hand, the same characteristics expose riders to crime because motorcycles are valuable livelihood assets and because riders often operate at night, in isolated areas, or in spaces with weak guardianship. Therefore, boda-boda-related crime should not be understood only as criminality within the sector; it should also be understood as insecurity affecting the sector.

The analysis showed that crime exposure varied considerably across counties. Marsabit, Busia, and Nyeri recorded high levels of witnessed crime, indicating that boda-boda-related crime was highly visible in these counties. Marsabit recorded the highest witnessed exposure, followed by Busia and Nyeri. This suggests that in these counties, boda-boda-related crime is not only experienced by direct victims but is also observed by the wider public. Such visibility can shape perceptions of insecurity, reduce trust in boda-boda transport, and contribute to fear among residents, passengers, traders, and riders.

The dominance of witnessed crime over personal victimizations is particularly important. Across the counties, more respondents reported witnessing boda-boda-related crime than personally experiencing it. This means that the social impact of boda-boda-related crime extends beyond direct victimizations. People who witness robbery, theft, assault, intimidation, or attacks may develop fear and mistrust even if they are not personally harmed. This supports Hale's (1996) argument that fear of crime is shaped not only by direct victimizations but also by community awareness, observed incidents, and perceptions of risk. In the boda-boda context, crime visibility can affect how communities view riders, how passengers choose transport, and how residents interpret safety in public spaces.

Marsabit and Busia emerged as the counties with the strongest overall crime-risk profile under Objective One. Marsabit recorded the highest crime frequency score and one of the strongest crime pattern index values. It also showed high witnessed exposure, strong night-time concentration, high motorcycle theft, and prominent robbery with violence. These findings suggest that boda-boda-related crime in Marsabit is both visible and recurrent. The county's remote roads, borderland environment, sparse settlement pattern, and limited surveillance may create opportunities for crime, particularly at night or along isolated transport routes.

Busia also recorded high witnessed exposure, a high crime frequency score, and the highest mean crime pattern index. The county's crime profile included motorcycle theft, assault, theft from passengers, robbery with violence, and political violence or intimidation. Busia's border location and high mobility environment suggest that boda-boda-related crime may be linked to transport corridors, market activity, cross-border movement, stage activity, and local political dynamics. The presence of political violence or intimidation as a notable crime form suggests that the boda-boda sector may also intersect with local mobilisation, group-based intimidation, or political patronage.

Nyeri presented a distinctive pattern. It recorded high witnessed exposure and the highest proportion of rider victims, but its overall crime pattern index was close to neutral. This indicates that crime was highly visible in Nyeri, but its overall pattern intensity was not as strong as in Busia or Marsabit. The county also showed a strong night-time pattern and a notable residential-estate dimension. This suggests that boda-boda-related crime in Nyeri may be publicly visible because it occurs in everyday community spaces such as residential areas, roads, markets, and transport nodes.

Mombasa recorded lower general exposure and the lowest crime pattern index, but this does not mean that boda-boda-related crime was absent or insignificant. Rather, the findings suggest that crime in Mombasa may be more spatially concentrated around specific urban hotspots, particularly entertainment and nightlife areas, informal settlements, remote roads, and transport nodes. Mombasa also recorded notable levels of robbery with violence, theft from passengers, and bribery or corruption. This indicates that the county's boda-boda-related crime profile may be less widespread across the population but serious in particular locations and time periods.

Machakos was strongly characterized by motorcycle theft. The county recorded the highest proportion of theft of motorcycles among the study counties. This indicates that the primary boda-boda-related crime concern in Machakos is the targeting of motorcycles as valuable livelihood assets. Since motorcycles are often acquired through savings, loans, or hire-purchase arrangements, theft can have severe economic consequences for riders and their households. The Machakos findings therefore show that some county crime profiles may be dominated by one major crime type rather than a broad spread of offences.

Bomet showed a mixed profile. Although it recorded a relatively high proportion of respondents reporting no exposure, it still showed meaningful levels of personal exposure, motorcycle theft, robbery with violence, kidnapping or abduction, assault, youth victimisation, and crimes around market centres and stage points. This suggests that boda-boda-related crime in Bomet may be less publicly visible than in Marsabit or Busia, but still serious in specific spaces and among specific victim groups. The prominence of market centres and stages indicates that commercial and transport nodes are important locations for crime prevention in the county.

Kirinyaga occupied an intermediate position. Its exposure profile was relatively balanced, with almost equal proportions of respondents reporting witnessed crime and no exposure. It recorded moderate crime frequency and a lower crime pattern index than Busia, Marsabit, and Bomet. However, it still showed clear evidence of motorcycle theft, theft from passengers, robbery, remote-road crime, residential-estate risks, and night-time crime. This suggests that boda-boda-related crime in Kirinyaga is present and recognisable, even if it is not as intense or as publicly visible as in the highest-risk counties.

The crime-type analysis showed that *theft of motorcycles was the dominant form of boda-boda-related crime across the study counties.* This finding is important because it highlights rider victimisation. Public narratives often frame boda-boda riders mainly as offenders, but the data show that riders are also central victims. Theft of motorcycles affects riders directly because the motorcycle is a productive asset, a source of daily income, and often the basis of household survival. This supports Doherty's (2017) argument that boda-boda riders often work under precarious conditions and are exposed to insecurity, bodily risk, and livelihood instability.

The victim-profile findings further confirm that riders were the leading victims across all counties. Nyeri recorded the highest proportion of rider victims, followed by Marsabit, Busia, Mombasa, Kirinyaga, Machakos, and Bomet. These finding challenges one-sided interpretations of boda-boda-related crime. Riders may be involved in crime in some cases, but they are also highly vulnerable to theft, robbery, assault, extortion, and attacks. Effective security policy should therefore avoid blanket criminalisation of the sector. Instead, it should distinguish between criminal actors and ordinary riders who depend on boda-boda work for livelihood.

The location analysis showed that boda-boda-related crime is spatially patterned. Remote roads were the leading crime location in several counties, including Machakos, Marsabit, Kirinyaga, Busia, and Nyeri. This indicates that isolated routes, weak lighting, low police visibility, and limited community surveillance create crime opportunities. Bomet showed a stronger market-centre and stage-point pattern, while Mombasa showed a distinctive urban pattern linked to nightlife areas and informal settlements. These findings support Crime Pattern Theory, which argues that crime clusters around movement paths, activity nodes, and edges where offenders, targets, and weak guardianship converge.

The time-of-occurrence analysis showed that boda-boda-related crime is also temporally patterned. Night, late night, and very early morning were the dominant periods of occurrence across all counties. Marsabit, Nyeri, and Mombasa recorded especially high night-time concentration. This finding supports Routine Activity Theory, which argues that crime opportunities increase when motivated offenders, suitable targets, and absence of capable guardianship converge in time and space. Night-time movement reduces visibility, weakens community surveillance, lowers the number of witnesses, and increases the vulnerability of riders and passengers.

The qualitative findings supported and deepened the quantitative results. The dominant qualitative themes included crime time, victim profile, theft, robbery, crime location, and assault or violence. These themes closely matched the statistical findings. For example, the quantitative analysis showed that theft of motorcycles was the dominant crime form, while the qualitative data repeatedly identified theft as a major theme. The quantitative analysis showed night-time crime dominance, while qualitative themes repeatedly referred to crime time. The quantitative analysis showed rider victimisation, while qualitative themes included victim profile and theft. This convergence strengthens the validity of the findings.

The statistical tests confirmed that the observed county-level differences were significant. Crime type differed significantly by county, crime frequency differed significantly by county, crime locations differed significantly by county, crime timing differed significantly by county, victim profiles differed significantly by county, and crime pattern index differed significantly by county. These results show that boda-boda-related crime is not evenly distributed and cannot be explained

by a single uniform pattern. Instead, it is shaped by county-specific conditions such as road networks, border proximity, urbanisation, night-time activity, stage organisation, policing, socio-economic pressure, informal regulation, and local criminal opportunity structures.

However, the Cramer's V values for crime type and crime location were approximately 0.149, indicating small to moderate associations. This is an important qualification. It means that county context matters, but it does not fully explain boda-boda-related crime. Other factors must also be considered. These may include unemployment, poverty, youth vulnerability, peer networks, weak rider registration, limited police presence, poor lighting, lack of stage accountability, informal transport governance, and criminal networks. Therefore, a complete explanation of boda-boda-related crime must integrate spatial, social, economic, institutional, and temporal factors.

The findings support the view that boda-boda-related crime should be addressed through county-specific responses. Counties with high witnessed exposure, such as Marsabit, Busia, and Nyeri, require visible community policing, stronger reporting systems, improved public confidence, stage-level monitoring, and rider identification. Counties with high crime frequency and strong crime-pattern intensity, particularly Marsabit and Busia, require sustained security interventions rather than occasional crackdowns. Counties with spatially concentrated risks, such as Mombasa, require hotspot-based interventions around nightlife areas, informal settlements, transport nodes, and late-night routes.

Border and frontier counties require special attention because border movement, remote roads, and weak surveillance can create opportunities for smuggling, robbery, motorcycle theft, and escape after crime. Marsabit and Busia therefore require stronger cross-border coordination, route surveillance, intelligence sharing, and collaboration between security agencies, county authorities, and boda-boda associations. Urban counties such as Mombasa require attention to entertainment areas, informal settlements, late-night movement, bribery and corruption, and passenger safety. Rural and peri-urban counties require improved road surveillance, lighting, and stage accountability.

The findings also imply that boda-boda associations should be involved in crime prevention. Riders have knowledge of local routes, suspicious passengers, stage conflicts, stolen motorcycles,

and risky times of operation. If properly organised, boda-boda associations can support rider registration, route monitoring, reporting of suspicious activity, enforcement of stage discipline, and protection of members. However, this requires trust between riders, police, county authorities, and communities. Heavy-handed enforcement that treats all riders as criminals may undermine cooperation and reduce the effectiveness of crime prevention.

The integrated findings also point to the need for balanced regulation. Regulation should not only focus on controlling riders; it should also protect them. Rider identification, stage registers, motorcycle tracking, passenger-safety awareness, lighting, community policing, and rapid response systems can reduce risks for both riders and passengers. Since riders are often victims, protective measures should include mechanisms for reporting motorcycle theft, verifying suspicious passenger requests, responding to distress calls, and recovering stolen motorcycles.

Table 4.16: Integrated Interpretation of Objective One Findings

Finding	**Quantitative evidence**	**Qualitative support**	**Scholarly interpretation**	**Policy implication**
Crime exposure varies across counties	Marsabit, Busia, and Nyeri recorded high witnessed exposure	Participants repeatedly referred to visible crime, theft, robbery, and risky locations	Crime clusters around activity spaces and weakly guarded locations	Use county-specific crime-prevention strategies
Witnessed crime exceeds personal victimisation	Witnessed exposure was higher than direct experience in most counties	Crime visibility appeared in narratives of fear, insecurity, and public observation	Fear of crime is shaped by both direct and indirect exposure	Improve public confidence, reporting, and community policing
Crime frequency differs significantly by county	Kruskal-Wallis test significant at $p < 0.001$	High-frequency counties were also prominent in qualitative narratives	Routine activities and opportunity structures vary by locality	Prioritise high-frequency counties for intervention
Crime types differ by county	Chi-square test significant at $p < 0.001$	Theft, robbery, assault, and crime location were repeated themes	Informal transport creates both mobility benefits and crime opportunities	Combine regulation with rider protection
Riders are also victims	Victim-profile analysis showed rider vulnerability	Transcript themes included victim profile and theft	Boda-boda riders operate under precarious and insecure conditions	Avoid criminalising the entire sector; protect riders as well
Location and time matter	Crime location and time tests were significant	Night-time crime and risky locations appeared in qualitative themes	Crime is patterned around nodes, paths, and low guardianship	Strengthen night patrols, lighting, stage control, and route surveillance

Finding	Quantitative evidence	Qualitative support	Scholarly interpretation	Policy implication
Crime is county-specific	County differences appeared in exposure, frequency, crime type, location, timing, victim profile, and pattern index	Qualitative themes showed different local emphases across counties	Local transport systems, governance, socio-economic conditions, and opportunity structures shape crime	Design county-specific and hotspot-specific interventions
Lower overall crime intensity does not mean absence of crime	Mombasa recorded lower overall exposure and crime pattern index	Qualitative themes still showed theft, robbery, risky locations, and night-time insecurity	Crime may be concentrated in particular hotspots rather than widely spread	Use targeted hotspot mapping rather than general assumptions
Motorcycle theft is a livelihood threat	Theft of motorcycles was the leading crime form overall	Theft appeared consistently as a major qualitative theme	Motorcycles are productive assets and their theft creates household economic vulnerability	Improve motorcycle tracking, recovery systems, and rider protection
Night-time crime is a major risk	Night/late night/very early morning dominated crime timing	Crime-time themes reinforced night-time insecurity	Weak guardianship at night increases crime opportunities	Prioritise night patrols, lighting, safe stages, and emergency reporting

Source: Author's integration of quantitative findings, qualitative themes, and reviewed literature.

In conclusion, Objective One demonstrates that boda-boda-related crime is heterogeneous, spatially patterned, temporally concentrated, and county-specific. Theft of motorcycles was the dominant crime form, but each county displayed a distinct exposure and crime-pattern profile. Marsabit and Busia showed stronger overall risk, Nyeri showed high witnessed exposure and rider victimisation, Mombasa showed lower general exposure but possible urban hotspot risks, Kirinyaga showed a balanced exposure profile, Machakos was strongly characterised by motorcycle theft, and Bomet showed lower public visibility but meaningful direct victimisation and market-centre risks. These findings provide a foundation for the next section, which examines the organisation and structure of boda-boda-related criminality.

4.4 Classification of Boda-Boda-Related Crime as Organised or Incidental Criminal Activity

The second objective of the study classified boda-boda-related crime in the selected counties as incidental, opportunistic, semi-organised, or organised criminal activity. This objective was necessary because boda-boda-related crime is often discussed as a general security problem, yet

the degree of structure behind such crime is not always clear. Some offences may be committed by individual actors exploiting immediate opportunities, while others may involve repeated methods, coordination, role allocation, territorial control, protection by influential actors, or links to wider illicit markets. Objective Two therefore moves from identifying the presence of crime to explaining its organisation, patterning, and county-level variation.

The distinction between incidental crime and organised criminal activity is analytically and practically important. Incidental crime refers to offences that are individual, spontaneous, situational, or weakly coordinated. Organised criminal activity implies a higher level of structure, including repeated operations, coordination among actors, assigned roles, leadership or controllers, control over stages and routes, protection systems, sharing of proceeds, fake registration, concealment of identity, or links to smugglers and other illicit actors. This continuum-based approach is consistent with organised-crime scholarship, which treats organised crime as a contested and variable phenomenon rather than a single fixed institutional form (Paoli & Vander Beken, 2014; United Nations, 2000; von Lampe, 2016).

This distinction is especially relevant to the boda-boda sector because motorcycles provide speed, flexibility, anonymity, and access to spaces that may be difficult for conventional vehicles or formal security agencies to reach. These features support legitimate transport, emergency movement, passenger mobility, and income generation, but they may also be exploited for theft, robbery, drug transport, smuggling, political intimidation, escape from crime scenes, surveillance of victims, and movement of stolen property. Earlier transport-governance and security studies similarly show that commercial motorcycle transport in Africa is both a livelihood system and a regulatory challenge (Kumar, 2011; National Crime Research Centre, 2018).

The objective also recognized that the boda-boda sector is not criminal in itself. Most riders depend on the sector for employment, income generation, family support, and daily survival. Many riders are themselves victims of crime, especially in cases involving motorcycle theft, robbery, assault, and extortion. It was therefore important not to criminalize the entire sector. Instead, the analysis aimed to identify whether particular forms of crime within the sector show signs of organisation, and whether such signs vary across counties. This approach allowed the study to separate legitimate livelihood activity from criminal misuse of boda-boda mobility.

To achieve this, the analysis classified boda-boda-related crime at three related levels. The first level relied on respondents' direct classification of the crime. Respondents were asked whether they perceived boda-boda-related crime as mostly individual and opportunistic, sometimes group-based but irregular, organised and repeated, or whether they were not sure. This classification provided an initial understanding of how communities, riders, and other respondents interpreted the structure of crime in their county contexts. It also allowed the study to identify counties where the public perception of organised or repeated crime was stronger.

The second level of analysis used an organised-criminality index. This index was developed from several indicators associated with organised criminal behaviour. These indicators included repeated similar crimes, coordination among riders, assignment of specific roles, existence of leaders or controllers, territorial control, protection by influential people, links to smugglers, sharing of proceeds, and fake registration. The purpose of the index was to provide a more systematic measure of organised criminality rather than relying only on general perception. Through this index, respondents could be grouped into categories such as incidental or weakly organised crime, transitional or semi-organised crime, and organised criminal activity.

The third level of analysis used qualitative evidence to interpret and explain the quantitative patterns. The qualitative themes helped to show how organised or semi-organised crime appeared in actual county settings. Themes such as territorial control, role specialization, repeated crime, leadership control, protection systems, illicit market links, coordination, identity concealment, and incidental crime were used to deepen the interpretation of the survey findings. This mixed-method approach was important because organised criminality is not always visible through numerical indicators alone. Qualitative accounts helped explain the mechanisms through which boda-boda-related crime may become structured, repeated, protected, or linked to wider criminal networks.

The analysis was also guided by the understanding that organised crime does not always appear as a highly formal or hierarchical structure. In the boda-boda context, organisation may be loose, informal, flexible, and locally embedded. It may appear through informal agreements among riders, repeated cooperation between offenders, protection by stage leaders, control of specific routes, use of unregistered motorcycles, or selective collaboration with thieves, smugglers, gangs, or corrupt actors. The study therefore did not limit organised criminality to formal gangs or

permanent syndicates, but examined a continuum from opportunistic individual offending to semi-organised and organised criminal activity (Paoli & Vander Beken, 2014; von Lampe, 2016).

This continuum is central to the interpretation of Objective Two. At one end of the continuum are individual and opportunistic offences that may occur because of poverty, unemployment, weak surveillance, or immediate opportunity. At the middle are irregular group-based offences, where offenders may cooperate temporarily without belonging to stable organisations. At the other end are organised and repeated offences, where crime shows signs of coordination, planning, leadership, protection, territorial control, and repeated execution. The value of this continuum is that it avoids oversimplifying boda-boda-related crime. It allows the study to show that different counties may experience different levels and forms of criminal organisation.

County variation was a major concern in this objective. The study covered Bomet, Busia, Kirinyaga, Machakos, Marsabit, Mombasa, and Nyeri, each with different social, economic, spatial, and governance conditions. These differences were expected to influence the organisation of boda-boda-related crime. For example, border counties may present opportunities for smuggling and cross-border escape; urban counties may have complex transport nodes, nightlife spaces, informal settlements, and protection networks; rural or frontier counties may have long distances, sparse policing, and limited transport alternatives; and agriculturally or commercially active counties may have dense local movement patterns that create opportunities for theft, robbery, and informal group action.

The objective therefore examined not only whether organised criminal activity existed, but also where it was more visible and how it differed across counties. This is important because security interventions should not be uniform. A county where crime is mainly opportunistic may require stronger rider identification, public awareness, patrols, victim protection, and opportunity reduction. A county where crime is group-based but irregular may require stage-level regulation, rider association discipline, conflict prevention, and monitoring of peer-group behaviour. A county where crime is organised and repeated may require intelligence-led policing, disruption of criminal networks, regulation of routes and stages, investigation of protection systems, and stronger action against illicit market linkages. This differentiated approach reflects situational crime-prevention thinking, which emphasizes reducing opportunity, increasing detection risk, and strengthening guardianship (Felson & Clarke, 1998).

The findings presented in this section therefore provide a deeper understanding of the nature of boda-boda-related crime. While Objective One established the forms, frequency, and spatial visibility of crime, Objective Two explains whether such crime appears incidental, semi-organised, or organised. This distinction strengthens the overall analysis because high crime exposure does not necessarily mean high organisation, and low public visibility does not necessarily mean absence of organised criminal actors. Some forms of organised criminality may be hidden, spatially concentrated, or protected by influential actors, while some highly visible crimes may still be opportunistic and weakly organised.

The findings are presented sequentially so that each subsection builds on the preceding one. The direct classification of crime establishes how respondents perceived the structure of boda-boda-related crime. The organised-criminality index then provides a more systematic measure of the degree of organisation. The indicator analysis explains the mechanisms of organisation, the county-level indicator analysis shows how those mechanisms vary spatially, the qualitative themes explain how respondents described the mechanisms, and the statistical tests determine whether the observed differences were empirically meaningful. The discussion then links the findings to previous scholarship and draws out the policy meaning of the results.

4.4.1 **Classification of Boda-Boda-Related Crime by County**

Figure 4.4.1 presents respondents' classification of boda-boda-related crime by county. The figure shows that perceptions varied considerably across the seven study counties and did not support a single uniform interpretation of boda-boda-related crime as either fully organised or purely opportunistic. Instead, the results suggest a continuum: some offences were viewed as mostly individual and opportunistic, some as sometimes group-based but irregular, and others as organised and repeated. This distinction is important because it protects the analytical separation between legitimate boda-boda livelihood activity and criminal misuse of motorcycles, stages, and routes.

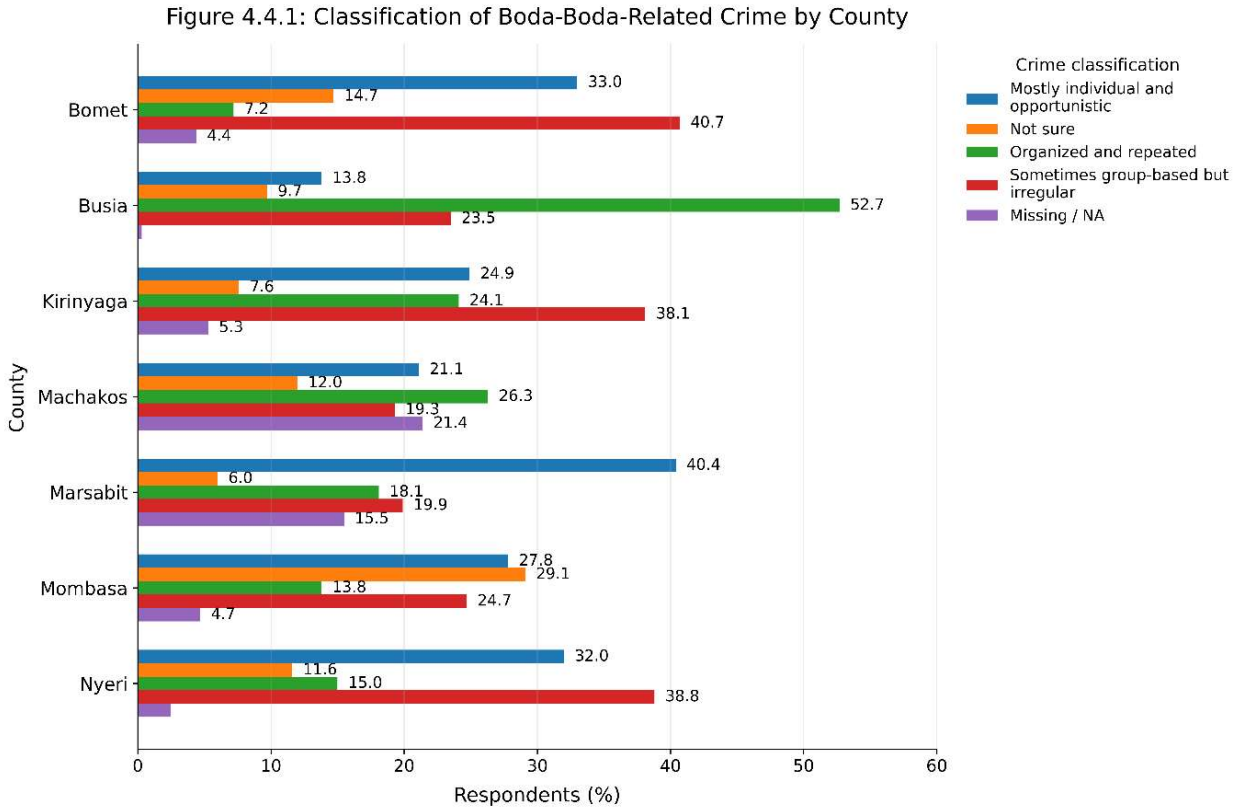


Figure 4.6: Classification of Boda-Boda-Related Crime by County
Source: Objective Two quantitative survey outputs.

This subsection therefore functions as the entry point into the objective. It establishes respondents' direct perception of crime organisation before the later index, indicator, qualitative, and statistical analyses test and explain the same issue in greater detail.

The classification used in this section captures four main response categories: mostly individual and opportunistic, not sure, organised and repeated, and sometimes group-based but irregular. A fifth category, NA, represents non-response or missing classification. These categories allow the analysis to separate isolated or situational crime from crime that shows signs of repetition, group participation, or organisation. The county-level results are therefore useful for identifying where boda-boda-related crime appears more structured and where it appears more incidental.

Busia recorded the strongest perception of organised and repeated boda-boda-related crime. More than half of respondents in Busia, 52.7%, described boda-boda-related crime as organised and repeated. This was the highest proportion among all the study counties. The finding indicates that

respondents in Busia were more likely to view boda-boda-related crime as recurring, patterned, and possibly coordinated rather than as isolated misconduct by individual riders. This suggests that in Busia, criminal incidents involving boda-boda may be associated with repeated methods, known routes, offender familiarity with local movement patterns, and possible links to wider illicit activities.

The Busia result is especially important because the county also recorded a relatively low proportion of respondents who described boda-boda-related crime as mostly individual and opportunistic, at 13.8%. This means that respondents were less inclined to see the problem as random or purely personal wrongdoing. Instead, the dominant perception was that crime had a repeated and organised character. In addition, 23.5% of respondents in Busia described the crime as sometimes group-based but irregular. When this transitional category is considered together with the organised and repeated category, it shows that a large share of respondents associated boda-boda-related crime in Busia with some level of collective action or repeated criminal behaviour.

This pattern may be linked to Busia's strategic position as a border county. Border environments often generate complex mobility patterns involving trade, informal transport, cross-border movement, and illicit exchange. Boda-boda motorcycles are highly mobile and can move through spaces that are not always easily monitored by formal security agencies. Where such movement intersects with smuggling, theft, robbery, or informal cross-border transport, crime may become more repetitive and structured. This interpretation is consistent with research that links the historical emergence of boda-boda transport to border mobility and with Kenyan evidence on boda-boda-related security challenges (National Crime Research Centre, 2018; Nyachieo, 2015).

Machakos recorded the second-highest proportion of respondents who classified boda-boda-related crime as organised and repeated, at 26.3%. This shows that organised elements were also visible in Machakos, although not at the same level as Busia. However, the Machakos pattern is more mixed because 21.1% of respondents described the crime as mostly individual and opportunistic, while 19.3% described it as sometimes group-based but irregular. This means that perceptions in Machakos were more evenly distributed across the three main crime-classification categories.

The Machakos results suggest that boda-boda-related crime in the county may not be dominated by a single pattern. Some incidents may involve individual offenders acting alone, while others may involve small groups, repeated targeting, or loosely coordinated actors. The presence of a relatively high organised and repeated category indicates that organised elements should not be ignored. However, the substantial levels of opportunistic and irregular group-based classifications suggest that the county may be experiencing a mixed crime environment rather than a fully organised criminal structure.

An important issue in interpreting Machakos is the high NA or missing-response category, which stood at 21.4%. This was the highest missing-response proportion among all the counties. The high NA value means that caution is needed when drawing conclusions from the Machakos classification results. Missing responses may reflect uncertainty, unwillingness to classify the crime, lack of direct knowledge, fear of giving sensitive information, or problems in response completion. Nevertheless, among those who provided a classification, organised and repeated crime formed an important component of the county's boda-boda crime profile.

Kirinyaga also recorded a notable level of organised and repeated boda-boda-related crime, at 24.1%. However, the largest category in Kirinyaga was sometimes group-based but irregular, at 38.1%. This suggests that the dominant pattern in Kirinyaga was not fully organised crime but rather irregular collective offending. In other words, respondents were more likely to see boda-boda-related crime as involving some degree of group participation without necessarily being controlled by stable criminal networks or formal leadership structures.

The Kirinyaga pattern points to a transitional form of criminality. Crimes may involve temporary collaboration, peer influence, shared opportunities, or small groups of riders acting together, but without the clear continuity and structure associated with organised criminal activity. The 24.9% who described the crime as mostly individual and opportunistic further confirms that Kirinyaga has a mixed crime pattern. Some offences appear individual, some appear irregularly group-based, and some appear organised and repeated. This supports the wider finding that boda-boda-related crime should be analysed as a layered phenomenon rather than as a single crime type.

Bomet showed a strong concentration in the sometimes group-based but irregular category. In Bomet, 40.7% of respondents classified boda-boda-related crime as sometimes group-based but irregular. This was the largest category in the county. A further 33.0% described the crime as mostly

individual and opportunistic, while only 7.2% described it as organised and repeated. This suggests that, based on respondents' perceptions, boda-boda-related crime in Bomet is more likely to involve informal or temporary group action than fully organised criminal activity.

The Bomet findings are significant because they show that group involvement does not automatically mean organised crime. Crime can be group-based without being stable, hierarchical, or repeated in a systematic way. For example, riders or offenders may come together temporarily to commit theft, intimidate victims, evade arrest, protect one another, or exploit immediate opportunities. Such activity may be collective but still irregular. Therefore, Bomet's classification suggests the presence of group-based risk, but not necessarily a dominant pattern of organised criminal networks according to this specific perception measure.

Nyeri presented a similar pattern to Bomet. The largest category in Nyeri was sometimes group-based but irregular, at 38.8%, followed by mostly individual and opportunistic at 32.0%. Only 15.0% of respondents classified the crime as organised and repeated. This suggests that boda-boda-related crime in Nyeri is widely perceived as involving irregular collective behaviour and individual opportunism rather than fully organised criminal activity. However, the 15.0% organised and repeated category still indicates that structured forms of offending exist and should not be dismissed.

The Nyeri results show that crime classification may differ depending on the level of organisation being measured. While respondents may observe repeated or coordinated actions in some cases, they may still perceive most offences as irregular or opportunistic. This means that Nyeri may have a semi-organised crime environment in which some incidents are repeated and group-based, but not all are linked to stable criminal structures. The findings therefore suggest a need for interventions that address both individual offender behaviour and informal group dynamics within the boda-boda sector.

Marsabit presented a different pattern from Busia, Machakos, Kirinyaga, Bomet, and Nyeri. The largest proportion of respondents in Marsabit, 40.4%, classified boda-boda-related crime as mostly individual and opportunistic. This was the highest proportion for the opportunistic category among all counties. Only 18.1% described the crime as organised and repeated, while 19.9% described it as sometimes group-based but irregular. This indicates that although boda-boda-related crime may

be visible in Marsabit, respondents were more likely to interpret it as individual or situational rather than as formally organised.

The Marsabit finding is important when compared with the results from Objective One, which showed that some counties may record high exposure to boda-boda-related crime. High exposure does not automatically mean that crime is organised. In Marsabit, crimes may occur frequently or be highly visible because of spatial vulnerability, long-distance movement, sparse policing, frontier conditions, or routine opportunities. However, the classification results suggest that many respondents did not interpret these incidents as being controlled by organised groups. This distinction is important for policy because the response to opportunistic crime may differ from the response to organised criminal networks.

The Marsabit results may also reflect the county's geography and settlement patterns. In areas where distances are long, policing is limited, and transport options are fewer, motorcycles may be used in crimes because they are practical tools of mobility rather than because they are embedded in organised criminal structures. Therefore, the high opportunistic classification suggests that crime prevention in Marsabit may need to focus on improving surveillance, strengthening patrol coverage, enhancing rider identification, and reducing opportunities for individual offenders.

Mombasa had the highest level of uncertainty among the counties. In Mombasa, 29.1% of respondents indicated that they were not sure how to classify boda-boda-related crime. This was higher than the proportion who classified the crime as mostly individual and opportunistic, at 27.8%, and higher than the proportion who classified it as sometimes group-based but irregular, at 24.7%. Only 13.8% classified it as organised and repeated. This pattern suggests a more ambiguous crime environment in Mombasa.

The high uncertainty in Mombasa may have several possible explanations. First, crime in urban coastal settings may be more spatially concentrated, occurring around particular neighbourhoods, nightlife areas, transport nodes, markets, informal settlements, or tourist-related spaces. Respondents outside these areas may have limited direct knowledge of how the crimes are organised. Second, some organised elements may be hidden from ordinary public view, especially where crimes involve protection networks, fake registration, illicit market links, or actors who are not easily identifiable as regular boda-boda riders. Third, the boda-boda sector in Mombasa may

be more diverse and fluid, making it difficult for respondents to distinguish between legitimate riders, occasional offenders, and organised criminal actors.

The Mombasa finding therefore requires careful interpretation. A low organised and repeated classification does not necessarily mean that organised elements are absent. Instead, it may indicate that such elements are less visible to ordinary respondents or operate in specific spaces. The high "not sure" category suggests that public knowledge of boda-boda-related crime organisation in Mombasa is uncertain and possibly fragmented. This points to the need for more targeted local intelligence, stage-level assessment, and spatial analysis of crime hotspots.

Across all counties, the results show that the most common classifications differ by local context. Busia stands out as the clearest case where respondents perceived boda-boda-related crime as organised and repeated. Bomet, Nyeri, and Kirinyaga are more strongly associated with irregular group-based offending. Marsabit is more strongly associated with individual and opportunistic offending. Mombasa is characterised by uncertainty and mixed perceptions. Machakos shows a mixed pattern but is affected by a high level of missing responses.

The NA or missing-response category is also important. Machakos recorded the highest NA value at 21.4%, followed by Marsabit at 15.5%. Kirinyaga recorded 5.3%, Mombasa 4.7%, Bomet 4.4%, Nyeri 2.5%, and Busia 0.3%. These missing responses affect the strength of interpretation, especially in Machakos and Marsabit. In counties with high missing values, the observed classification percentages should be treated as indicative rather than definitive. Missing responses may point to limited knowledge, sensitivity of the topic, fear of victimization, lack of confidence in classification, or respondent fatigue.

Overall, Figure 4.6 demonstrates that boda-boda-related crime should not be treated as a single uniform phenomenon. The results show a continuum from individual opportunism to irregular group offending and organised repeated crime. This continuum avoids two misleading extremes: criminalizing the entire boda-boda sector by assuming that all rider-related crime is organised, and underestimating the problem by treating all incidents as isolated individual misconduct. The evidence suggests that both interpretations are incomplete, a point that aligns with broader organised-crime literature that emphasizes variation in structure, hierarchy, and market embeddedness (Paoli & Vander Beken, 2014; von Lampe, 2016).

The findings instead show that boda-boda-related crime takes different forms in different counties. In Busia, the evidence points strongly toward organised and repeated patterns. In Kirinyaga, Bomet, and Nyeri, irregular group-based offending is more prominent. In Marsabit, individual opportunistic crime is more visible. In Mombasa, uncertainty suggests hidden, spatially concentrated, or less publicly understood crime dynamics. In Machakos, the findings suggest mixed patterns but require cautious interpretation because of the high missing-response rate.

These results have important implications for security policy and regulation of the boda-boda sector. Counties where organised and repeated crime is prominent require intelligence-led policing, stronger monitoring of stages and routes, disruption of criminal networks, and closer attention to links between boda-boda operations and wider illicit markets. Counties where irregular group-based crime is prominent require interventions focused on rider associations, stage discipline, peer-group behaviour, registration, and conflict prevention. Counties where crime appears mostly opportunistic require opportunity-reduction strategies, public awareness, victim protection, and improved rider identification.

Therefore, the classification results provide a foundation for understanding the degree of organisation in boda-boda-related crime. They show that the problem is not simply whether boda-boda crime is organised or incidental, but where, how, and to what extent different forms of organisation appear. This county-level variation is central to Objective Two because it demonstrates that boda-boda-related crime is shaped by local social, economic, spatial, and governance conditions. The next subsection strengthens this interpretation by using an organised-criminality index to move from direct perception to a more structured measure of criminal organisation.

Level of Organised Criminality by County. The second level of analysis used an organised-criminality index to classify respondents into three categories: incidental or weakly organised crime, transitional or semi-organised crime, and organised criminal activity. This classification provides a more structured assessment than the general perception question because it is based on multiple indicators of organisation rather than a single response category. It therefore tests whether the perceived patterns in Figure 4.4.1 are supported by a more systematic indicator-based measure.

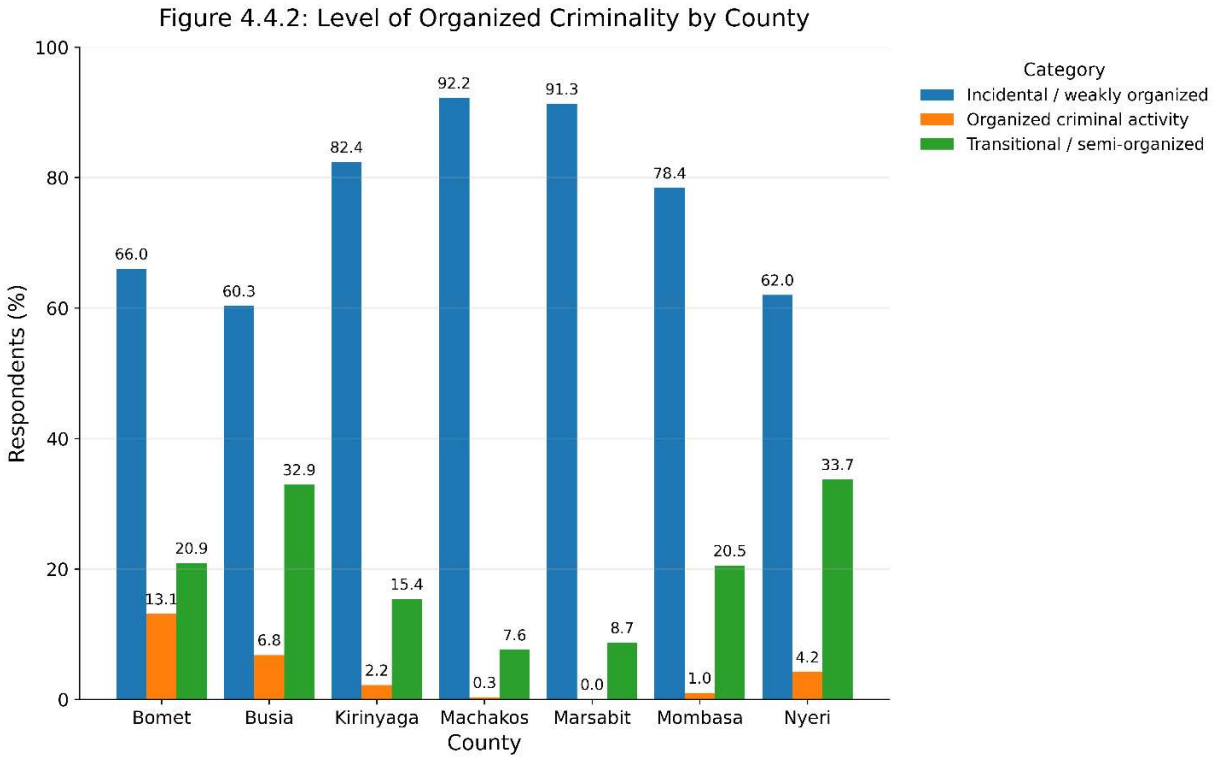


Figure 4.7: Level of Organised Criminality by County
Source: Objective Two quantitative survey outputs.

Across all counties, the largest share of respondents fell under the incidental or weakly organised category. This means that, overall, boda-boda-related crime in the study counties cannot be described as predominantly organised criminal activity. However, the presence of transitional and organised categories shows that organised elements do exist and vary significantly by county.

Machakos and Marsabit recorded the highest levels of incidental or weakly organised crime, at 92.2% and 91.3% respectively. This implies that most boda-boda-related crime in these counties appears to be weakly structured, opportunistic, or only minimally coordinated. In Marsabit, this is important because Objective One showed high crime exposure, but Objective Two suggests that high exposure does not automatically mean high organisation. Crime may be frequent or visible without necessarily being controlled by organised groups.

Kirinyaga also recorded a high incidental or weakly organised category at 82.4%, followed by Mombasa at 78.4%. This suggests that in these counties, most boda-boda-related crime remains weakly organised, even though some indicators of organisation are present.

The highest proportions of transitional or semi-organised crime were recorded in Nyeri at 33.7% and Busia at 32.9%. This is one of the most important findings under Objective Two. It shows that Nyeri and Busia occupy a middle position between opportunistic offending and organised criminal activity. In these counties, boda-boda-related crime may involve repeated methods, coordination, and role sharing, but may not always reach the level of stable criminal organisation.

Bomet recorded the highest percentage of organised criminal activity at 13.1%, followed by Busia at 6.8% and Nyeri at 4.2%. Although these percentages are lower than the incidental category, they are analytically important because organised criminal activity often represents a smaller but more serious segment of the crime environment. In Bomet, the relatively higher organised-crime classification suggests that some boda-boda-related offences may be embedded in more structured arrangements involving leaders, territorial influence, role specialization, and protection systems.

The county-level organised-criminality index further supports this interpretation. Bomet had the highest mean organised-criminality index at 2.52, followed by Busia at 2.44 and Nyeri at 2.32. Mombasa, Kirinyaga, Marsabit, and Machakos recorded lower mean scores of 1.72, 1.64, 1.41, and 1.08 respectively. This confirms that Bomet, Busia, and Nyeri showed stronger evidence of organised or semi-organised crime characteristics than the other counties. The next subsection explains which specific indicators produced these patterns.

The contrast between high incidental categories and smaller but important organised categories is analytically important. It shows that the sector should not be generalized as organised crime, while also demonstrating that a smaller organised segment may produce serious security consequences. The following indicator analysis therefore asks what forms of organisation are visible beneath these county categories.

4.4.2 **Indicators of Organised Criminal Activities**

Figure 4.8 presents the specific indicators used to assess whether boda-boda-related crime had characteristics of organised criminal activity. These indicators were important because classifying crime as organised cannot rely only on general public perception. A crime may appear ordinary or isolated on the surface but still be connected to repeated planning, coordination, role sharing, concealment, protection, or illicit market networks. For this reason, the study examined several observable signs of organisation within boda-boda-related crime, consistent with literature that

treats organised crime as a combination of illegal activities, criminal structures, and extra-legal governance arrangements (United Nations, 2000; von Lampe, 2016).

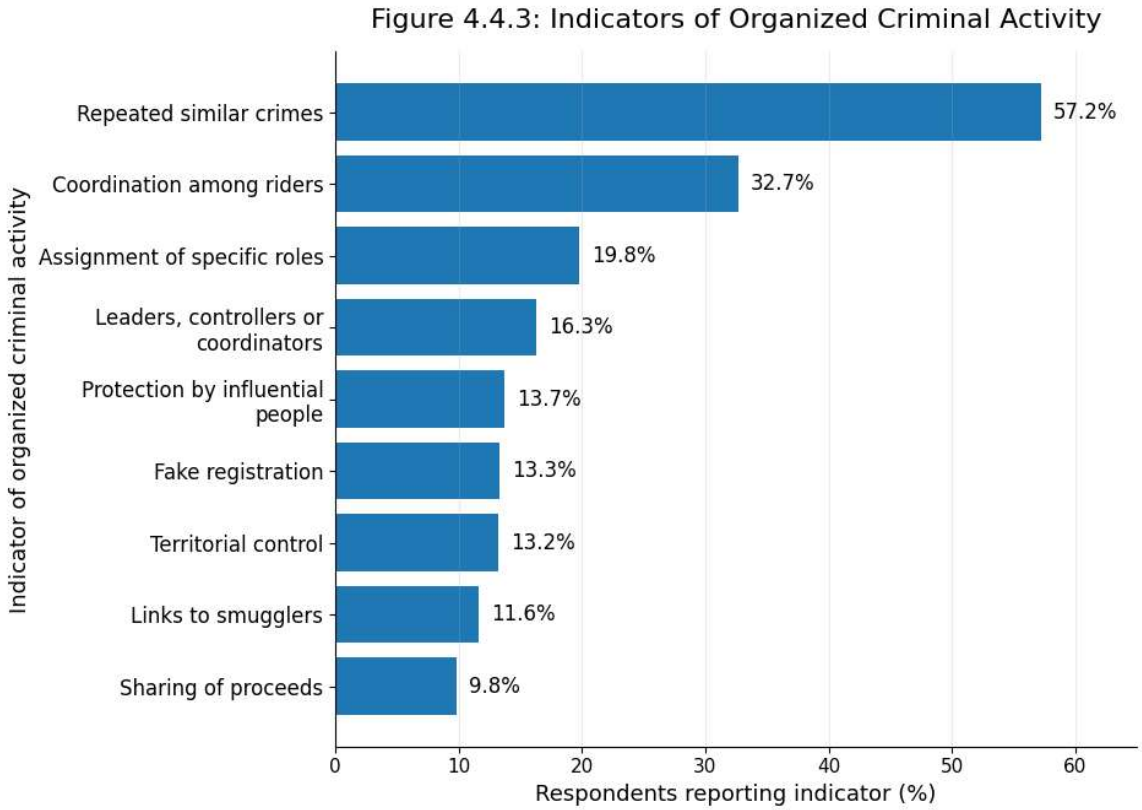


Figure 4.8: Indicators of Organised Criminal Activity
Source: Objective Two quantitative survey outputs.

The indicators measured in Figure 4.8 included repeated similar crimes, coordination among riders, assignment of specific roles, presence of leaders or controllers, protection by influential people, fake registration, territorial control, links to smugglers, and sharing of proceeds. These indicators represent different levels of criminal organisation. Some indicators, such as repeated similar crimes and coordination among riders, show basic or emerging organisation. Others, such as leadership control, territorial control, proceeds sharing, protection by influential people, and links to smugglers, suggest more advanced and structured criminal activity. The findings therefore help to distinguish between weakly organised, semi-organised, and more organised forms of boda-boda-related crime.

4.4.2.1 ***Repeated Similar Crime:*** The strongest indicator was repeated similar crimes, reported by 57.2% of respondents. This means that more than half of the respondents observed that boda-boda-related crimes often occurred in similar ways or followed repeated patterns. This was the most dominant indicator of organised criminal activity. The finding suggests that the most visible sign of organisation in boda-boda-related crime was not necessarily formal leadership or permanent criminal gangs, but the recurrence of similar offences using similar methods. Repetition is important because it shows that offenders may be learning from previous crimes, selecting familiar targets, using known escape routes, or relying on established routines.

Repeated similar crimes may also indicate that offenders understand the local transport environment. Boda-boda riders and offenders using motorcycles often know roads, footpaths, markets, estates, bus stops, border routes, isolated areas, and police patrol patterns. This local knowledge can make it easier to repeat similar offences successfully. For example, repeated theft from passengers, repeated motorcycle theft, repeated robbery using motorcycles, or repeated use of boda-boda for drug transport may suggest that offenders are using known opportunities and established routines. This interpretation is consistent with crime pattern theory, which emphasizes how offences cluster around nodes, paths, edges, and routine movement patterns (Brantingham & Brantingham, 1993).

However, repeated similar crimes should not automatically be interpreted as proof of fully organised criminal networks. Some crimes may be repeated because opportunities are common, policing is weak, victims are vulnerable, or offenders imitate one another. Therefore, repetition is best understood as a strong indicator of patterned criminal behaviour, but not necessarily a complete proof of hierarchical organisation. Its significance increases when it appears together with other indicators such as coordination, role specialization, protection, territorial control, or sharing of proceeds.

4.4.2.2 ***Coordination Among Riders:*** The second strongest indicator was coordination among riders, reported by 32.7% of respondents. This indicates that nearly one-third of respondents associated boda-boda-related crime with communication, joint movement, cooperation, or collective action among riders or motorcycle users. Coordination is an important sign of semi-organised offending because it suggests that crimes may involve more than one actor working together. Social learning and differential association perspectives further suggest that such

behaviour may be learned, normalized, and reinforced through repeated interaction within peer networks (Akers, 1998; Sutherland, 1947).

Coordination among riders does not always mean that there is a permanent criminal group. In some cases, coordination may be temporary, informal, and opportunity-driven. Offenders may cooperate only when a specific opportunity arises. In other cases, coordination may be more regular and may involve known criminal associates. The importance of this finding is that boda-boda-related crime cannot be reduced only to individual misconduct. The presence of coordination shows that some offences involve social networks, communication channels, peer influence, or informal group arrangements.

The gap between repeated similar crimes at 57.2% and coordination at 32.7% is also analytically important. It suggests that repetition is more common than visible coordination. In other words, many crimes may appear repeated even where respondents do not clearly observe cooperation among offenders. This may mean that offenders are copying similar methods without necessarily working together, or that coordination exists but is hidden from public view. It may also mean that organised aspects of crime are more visible through outcomes, such as repeated incidents, than through direct observation of offender networks.

Assignment of specific roles was reported by 19.8% of respondents. This indicator points to a more developed form of organisation because role allocation implies that different actors perform different functions within a criminal event or network. In boda-boda-related crime, role specialization may include riders who transport offenders, lookouts who monitor victims or police, informants who provide information about targets, receivers who handle stolen goods, brokers who connect offenders to buyers, and coordinators who organize movement or escape. Such role differentiation indicates that crime may be planned and executed through division of labour.

The presence of role assignment, even at a lower level than repetition and coordination, is significant because organised crime often depends on differentiated functions. A single offender acting alone may commit opportunistic theft, but a more organised group may require transporters, spotters, handlers, protectors, financiers, and receivers. In the boda-boda sector, motorcycles can support several of these roles because they enable rapid movement, surveillance, delivery, and escape. Therefore, the 19.8% reporting role assignment suggests that a meaningful minority of

boda-boda-related crimes may involve structured cooperation rather than simple individual offending.

4.4.2.3 ***Leaders, Controllers or Coordinators:*** Leaders, controllers, or coordinators were reported by 16.3% of respondents. This indicator reflects a higher level of organisation because it suggests the presence of people who direct, influence, manage, or coordinate criminal activity. Such leaders may not always be formal gang leaders. They may include stage leaders, informal controllers, brokers, criminal financiers, political actors, or individuals who influence rider groups and criminal networks. The presence of leaders or controllers implies that some criminal activity may be guided by authority, planning, or control rather than occurring spontaneously.

The lower percentage for leaders or controllers compared to repeated crimes and coordination suggests that formal hierarchy is less visible than repeated or cooperative offending. This is an important finding. It indicates that boda-boda-related crime may often operate through loose, flexible, and informal networks rather than through rigid criminal structures. Such networks may not have a clear command structure, but they may still produce organised outcomes through repeated cooperation, shared interests, or informal influence. Therefore, the absence of visible leaders in many cases does not necessarily mean the absence of organisation.

4.4.2.4 ***Protection by influential people:*** Protection by influential people was reported by 13.7% of respondents. Although this percentage appears relatively low, it is one of the most serious indicators of organised criminal activity. Protection by influential actors may include shielding offenders from arrest, warning offenders about police operations, interfering with investigations, influencing local enforcement, or using political and social power to protect criminal activity. Where such protection exists, criminal actors may operate repeatedly because they believe they are unlikely to face punishment. This reflects a common organised-crime pathway in which corruption, protection, and impunity allow illegal activity to persist (United Nations, 2000; von Lampe, 2016).

Protection systems are important because they connect street-level crime with broader governance weaknesses. Boda-boda-related crime becomes more difficult to control when offenders are protected by influential people or corrupt networks. Even a small percentage of respondents reporting this indicator is important because protection can enable a small number of organised

actors to have a large security impact. It may also discourage victims and witnesses from reporting crime, especially where they believe that offenders are connected to powerful individuals.

4.4.2.5 ***Fake Registration:*** Fake registration was reported by 13.3% of respondents. This indicator points to identity concealment and regulatory evasion. In the boda-boda sector, fake or unclear registration can make it difficult to identify riders, trace motorcycles, investigate offences, or distinguish legitimate operators from impostors. Fake registration may involve unregistered motorcycles, altered number plates, borrowed motorcycles, false rider identities, or the use of motorcycles that cannot easily be linked to a specific owner or stage. The National Crime Research Centre similarly identifies weak regulation, poor rider identification, and anonymity as major security challenges in Kenya's boda-boda sub-sector (National Crime Research Centre, 2018).

The significance of fake registration is that organised crime often depends on concealment. If riders, motorcycles, and stages are properly registered, it becomes easier to track movement and assign responsibility. Where registration is weak or false, offenders can use the boda-boda sector as a cover for crime. The finding therefore highlights the importance of registration, identification, and verification systems in reducing criminal misuse of motorcycles. It also shows that regulatory weaknesses can create opportunities for both opportunistic and organised offenders.

4.4.2.6 ***Territorial Control:*** Territorial control was reported by 13.2% of respondents. This indicator refers to control over stages, routes, operating areas, markets, streets, or specific spaces where boda-boda riders operate. Territorial control is a major feature of organised criminal activity because control over space allows offenders to regulate movement, identify victims, exclude outsiders, intimidate legitimate riders, and protect criminal operations. In the boda-boda context, stages and routes are not only transport spaces; they are also nodes and paths where legitimate routines and criminal opportunities may overlap (Brantingham & Brantingham, 1993).

The relatively modest percentage for territorial control does not reduce its importance. Territorial control may be less visible to ordinary respondents because it can be exercised indirectly through fear, informal rules, threats, or selective enforcement by powerful actors. Where territorial control exists, it may affect who is allowed to operate, who pays informal fees, who provides information, and who is protected from punishment. Therefore, territorial control is a key indicator of organised criminality even when it is reported by a smaller proportion of respondents.

4.4.2.7 ***Links to Smugglers:*** Links to smugglers were reported by 11.6% of respondents. This indicator points to the possible integration of boda-boda operations into wider illicit markets. Motorcycles are useful for smuggling because they are fast, flexible, relatively inexpensive, and able to use narrow roads, informal routes, footpaths, and border paths. Links to smugglers may involve the movement of drugs, stolen goods, contraband, weapons, livestock products, or other illicit items. This indicator is especially relevant in counties with border, transport-corridor, or market-related vulnerabilities (National Crime Research Centre, 2018; Nyachieo, 2015; Okumu, 2022).

The presence of links to smugglers suggests that some boda-boda-related crime goes beyond direct street-level offences. In such cases, motorcycles may serve as logistical tools within broader criminal economies. Riders may transport goods, monitor police movement, move information, or provide quick delivery services for illicit networks. Even where only a minority of respondents reported this indicator, its implications are serious because links to smugglers can connect local transport crime to larger organised criminal systems.

4.4.2.8 ***Sharing of Proceeds:*** Sharing of proceeds was reported by 9.8% of respondents. This was the least commonly reported indicator, but it remains important because it is one of the clearest signs of organised criminal activity. Sharing of proceeds implies that crime involves more than one participant and that benefits are distributed among those involved. This may include sharing money from robbery, sale of stolen motorcycles, proceeds from theft, payments for transport of illicit goods, or rewards given to informants and protectors.

The low percentage for proceeds sharing may indicate that this aspect of crime is hidden from public view. Ordinary respondents may observe the crime itself but may not know how benefits are distributed after the offence. Therefore, proceeds sharing may be underreported. Its presence, even at 9.8%, suggests that some boda-boda-related crimes involve planned collaboration and economic organisation. Where proceeds are shared, the crime is less likely to be purely individual and more likely to involve networks of participants.

Taken together, the indicators show that boda-boda-related crime is most commonly organised through repetition and coordination rather than through highly formalized criminal structures. Repeated similar crimes and coordination among riders were the most visible indicators, while more advanced indicators such as leadership, territorial control, protection, links to smugglers,

fake registration, and sharing of proceeds were less common. This pattern suggests that much of the organised dimension of boda-boda-related crime is transitional or semi-organised. It is more structured than isolated individual offending, but it does not always resemble a fully developed criminal enterprise.

The findings also show that organised criminality within the boda-boda sector is layered. The first layer is behavioural repetition, where similar offences occur repeatedly. The second layer is operational coordination, where offenders cooperate or communicate. The third layer is structural organisation, where roles, leaders, routes, protection systems, illicit market links, and proceeds sharing become visible. The majority of respondents identified the first and second layers more strongly than the third. This indicates that organised criminal activity exists, but in many cases it may be loose, informal, and adaptive rather than formal, centralized, and hierarchical.

4.4.2.9 ***Interpretation Imperative:*** This interpretation is important for security policy. If boda-boda-related crime is mainly organised through repetition and coordination, then prevention should focus on identifying repeated crime patterns, mapping hotspots, improving stage-level intelligence, strengthening rider identification, and disrupting communication or cooperation among offenders. If advanced indicators such as protection, territorial control, fake registration, and links to smugglers are present, then responses must go beyond ordinary patrols. They should include intelligence-led investigations, anti-corruption measures, regulation of stages and routes, monitoring of motorcycle registration, and disruption of illicit supply chains.

Therefore, Figure 4.8 confirms that boda-boda-related crime cannot be understood only as random individual misconduct. While many offences may still be opportunistic, the presence of repeated crimes, rider coordination, role specialization, leadership, protection, territorial control, fake registration, smuggling links, and proceeds sharing shows that some forms of boda-boda-related crime have organised or semi-organised characteristics. The overall evidence supports the conclusion that the sector is vulnerable to criminal misuse through both loose networks and more structured arrangements. Because these indicators are not evenly distributed, the next subsection disaggregates them by county.

The indicator results also create a bridge to the county-level analysis. Overall percentages are useful, but they can hide different local configurations. A county may show strong repetition

without strong protection systems, or strong fake registration without open coordination. For that reason, the next subsection disaggregates the indicators by county.

4.4.2.10 ***County Variation in Organised-Crime Indicators:*** The county-level indicator results show that organised criminality within the boda-boda sector does not appear in the same way across all counties. Although the overall indicator analysis showed that repeated similar crimes and coordination among riders were the most common signs of organisation, the county-level results reveal important local differences. Some counties showed stronger evidence of structured arrangements such as role specialization, leadership, territorial control, protection systems, links to smugglers, fake registration, and sharing of proceeds. Other counties showed high levels of repeated crime and coordination but weak evidence of advanced criminal organisation. This means that boda-boda-related crime should not be interpreted as a uniform phenomenon. Instead, each county appears to have a distinct crime-organisation profile.

For purposes of interpretation, the indicators can be grouped into two broad categories. The first category consists of basic or emerging indicators of organisation, especially repeated similar crimes and coordination among riders. These show that crime may be patterned, learned, or carried out through cooperation. The second category consists of advanced indicators of organisation, including assignment of specific roles, leadership or controllers, territorial control, protection by influential people, links to smugglers, sharing of proceeds, and fake registration. These advanced indicators suggest deeper organisation because they point to structure, concealment, control, protection, and connection to wider illicit markets. The county variation discussed below shows how these indicators combine differently in each county.

Bomet recorded high scores on several advanced indicators of organised criminal activity. Repeated similar crimes were reported by 61.3% of respondents, while coordination among riders was reported by 38.1%. These two indicators show that boda-boda-related crime in Bomet had a strong repeated and cooperative character. However, what makes Bomet particularly significant is that it also recorded high scores on more advanced indicators. Assignment of specific roles was reported by 34.3%, leaders or controllers by 32.2%, and territorial control by 29.1%. These are among the strongest county-level scores for structural organisation.

The Bomet pattern suggests that boda-boda-related crime in the county may involve more than repeated opportunistic behaviour. The high level of role specialization implies that different actors

may perform different functions in the commission of crime. Some may identify targets, others may provide transport, others may act as lookouts, while others may receive stolen goods or coordinate escape. The presence of leaders or controllers also suggests that some criminal activities may be directed or influenced by specific individuals. Territorial control further indicates that certain stages, routes, or operational spaces may be influenced by actors who control access, movement, or protection.

These results help explain why Bomet recorded the highest level of organised criminal activity in the organised-criminality classification. The combination of repeated crimes, coordination, role specialization, leadership, and territorial control points to a relatively structured crime environment. Although not all boda-boda-related crime in Bomet can be described as organised, the county shows stronger signs of organisation than most other counties. The findings suggest that crime prevention in Bomet should focus on stage-level governance, route monitoring, identification of local controllers, and disruption of criminal roles and networks.

Busia showed a different but equally important pattern. Repeated similar crimes were reported by 41.8%, which was lower than in Bomet, Marsabit, Mombasa, Kirinyaga, Machakos, and Nyeri. However, Busia recorded high levels of several advanced indicators. Assignment of specific roles was reported by 38.1%, coordination among riders by 37.6%, links to smugglers by 26.6%, sharing of proceeds by 24.5%, fake registration by 21.4%, protection by influential people by 19.1%, leaders or controllers by 18.0%, and territorial control by 16.7%. This pattern suggests that Busia's boda-boda-related crime may be less defined by visible repetition alone and more defined by networked criminal activity.

The high score for role specialization in Busia is particularly important. It suggests that some crimes may involve division of labour among actors. The presence of links to smugglers and sharing of proceeds further indicates that boda-boda-related crime in Busia may be connected to wider illicit market activity. This is consistent with the county's border context, where motorcycles may be used to move goods, people, information, stolen property, or contraband through formal and informal routes. The high level of fake registration also suggests that identity concealment may be important in Busia's crime environment. Criminal actors may use unregistered motorcycles, false identities, altered number plates, or riders who are not easily traceable.

Busia's profile therefore points to a logistical and illicit-market form of organisation. Unlike Bomet, where leadership, territorial control, and local structure appear more prominent, Busia appears to show stronger links between boda-boda mobility and broader illegal economic activity. The relatively high percentage of respondents reporting sharing of proceeds also suggests that some crimes may involve economic distribution among several participants. This is an important sign of organised or semi-organised crime because it indicates that the benefits of crime are not always kept by one offender but may be shared across a network.

Nyeri recorded the highest level of repeated similar crimes, at 79.3%, and the highest level of coordination among riders, at 52.4%. These two findings make Nyeri stand out as the clearest case of highly repetitive and coordinated boda-boda-related crime. The results suggest that respondents in Nyeri frequently observed similar crime patterns and also perceived cooperation among riders or motorcycle users. This explains why Nyeri recorded the highest proportion of transitional or semi-organised criminality in the organised-criminality classification.

Nyeri also recorded notable levels of leaders or controllers at 23.8% and fake registration at 23.5%. These findings suggest that although Nyeri's crime pattern is strongly based on repetition and coordination, some structural and concealment elements are also present. However, other advanced indicators were lower. Territorial control stood at 7.9%, protection by influential people at 7.6%, links to smugglers at 13.0%, and sharing of proceeds at 9.1%. This means that Nyeri's organised-crime profile appears to be semi-organised rather than fully organised. It has strong repeated and coordinated behaviour, but weaker evidence of territorial domination, protection systems, or deep illicit-market integration.

The Nyeri pattern may reflect a crime environment where offenders repeatedly use similar methods and cooperate informally, but without a highly formal criminal hierarchy. For example, crimes may involve groups of riders or motorcycle users who know each other, share information, or coordinate movement, but who do not necessarily operate under stable command structures. This form of criminality is still serious because repeated and coordinated offending can produce insecurity even where advanced organisation is limited. In Nyeri, interventions should therefore focus on identifying repeated crime patterns, monitoring rider networks, improving registration, and strengthening intelligence around coordinated offending.

Mombasa presented a distinctive pattern. Repeated similar crimes were reported by 51.7%, showing that crime in the county had a visible repetitive element. However, coordination among riders was relatively low at 9.4%. This means that respondents did not strongly associate boda-boda-related crime in Mombasa with open cooperation among riders. At the same time, Mombasa recorded the highest level of protection by influential people at 35.3%, and fake registration stood at 22.1%. These two indicators are highly significant because they suggest that the organised dimension of crime in Mombasa may be less about visible group coordination and more about protection, concealment, and selective facilitation.

The Mombasa pattern may reflect the complexity of urban coastal crime environments. In such settings, organised activity may not always be visible as rider-to-rider coordination. Instead, it may operate through hidden arrangements, informal protection, corrupt facilitation, or selective use of motorcycles by actors connected to wider criminal networks. The high level of protection by influential people suggests that some offenders may benefit from shielding, interference, or tolerance by powerful actors. This can weaken enforcement and make it difficult for victims or witnesses to report crime. Fake registration also increases anonymity and reduces the ability of authorities to trace offenders.

Mombasa presented a distinctive pattern. Repeated similar crimes were reported by 51.7%, showing that crime in the county had a visible repetitive element. However, coordination among riders was relatively low at 9.4%. This means that respondents did not strongly associate boda-boda-related crime in Mombasa with open cooperation among riders. At the same time, Mombasa recorded the highest level of protection by influential people at 35.3%, and fake registration stood at 22.1%. These two indicators are highly significant because they suggest that the organised dimension of crime in Mombasa may be less about visible group coordination and more about protection, concealment, and selective facilitation. This interpretation is consistent with studies showing that informal transport sectors can become embedded in political, regulatory, and protection networks (Goodfellow, 2015; Goodfellow & Titeca, 2012).

Marsabit recorded high levels of repeated similar crimes at 64.6% and coordination among riders at 44.6%. These are strong indicators of patterned and cooperative offending. However, Marsabit recorded very low levels of advanced organisation indicators. Protection by influential people and fake registration were both reported at 0.0%. Links to smugglers and sharing of proceeds were

each reported at only 0.8%. Leaders or controllers were reported by 7.3%, territorial control by 7.1%, and assignment of specific roles by 16.0%. This indicates that while boda-boda-related crime in Marsabit may be repetitive and sometimes coordinated, it does not show strong evidence of formalized criminal structure.

The Marsabit findings are important because they show that repeated crime and coordination do not automatically amount to organised criminal activity. In Marsabit, repetition may be driven by routine opportunity, geography, long distances, weak surveillance, or repeated use of motorcycles in similar offences. Coordination may occur because riders operate in close social and spatial networks, but this does not necessarily mean that there are stable criminal organisations. The absence of protection systems, fake registration, proceeds sharing, and strong smuggling links suggests that advanced organisation is limited.

This distinction is important for interpreting Marsabit's security environment. The county may experience visible or repeated boda-boda-related crime, but the underlying structure appears weaker than in Bomet, Busia, or Mombasa. Crime prevention in Marsabit may therefore require opportunity reduction, improved patrol coverage, better route surveillance, community policing, and strengthening of local reporting systems rather than only focusing on dismantling organised criminal networks. However, the high levels of repetition and coordination should still be treated seriously because they may provide a foundation for future organisation if left unchecked.

Machakos showed moderate levels of repeated similar crimes but low levels of advanced organisation. Repeated similar crimes were reported by 51.3%, while coordination among riders was reported by 20.1%. These results indicate that boda-boda-related crime in Machakos had some patterned elements, but coordination was much lower than in Nyeri, Marsabit, Bomet, and Busia. Advanced indicators were generally weak. Assignment of specific roles stood at 8.3%, leaders or controllers at 8.6%, territorial control at 7.6%, protection by influential people at 3.9%, links to smugglers at 4.2%, sharing of proceeds at 2.6%, and fake registration at 1.8%.

The Machakos profile suggests weak or emerging organisation rather than established organised criminal activity. The presence of repeated similar crimes shows that some methods may be recurring, but the low levels of role specialization, protection, smuggling links, proceeds sharing, and fake registration suggest that these crimes are not strongly embedded in advanced criminal networks. This supports the interpretation that much of the boda-boda-related crime in Machakos

may be opportunistic or weakly coordinated. However, because repeated crime was still above 50%, the county should not ignore the possibility of emerging patterns.

In Machakos, the main concern appears to be repeated offending rather than deep criminal organisation. This means interventions should focus on detecting repeat patterns, identifying hotspots, improving rider registration, strengthening stage discipline, and preventing repeated targeting of passengers, riders, or motorcycles. If repeated incidents are not addressed early, they may create conditions for stronger coordination and more structured criminal activity over time.

Kirinyaga also showed moderate levels of repeated crimes but lower levels of advanced organisation. Repeated similar crimes were reported by 52.1%, while coordination among riders was reported by 28.0%. These figures suggest that boda-boda-related crime in Kirinyaga may involve repeated methods and some cooperation. However, most advanced indicators remained relatively low. Leaders or controllers were reported by 14.8%, links to smugglers by 14.3%, fake registration by 12.9%, assignment of specific roles by 12.9%, territorial control by 10.4%, sharing of proceeds by 10.1%, and protection by influential people by 9.0%.

Kirinyaga's profile is therefore stronger than Machakos in some advanced indicators, but still does not show the same level of structure as Bomet or Busia. The county appears to occupy an intermediate position. It has repeated crimes and some coordination, but advanced organisation remains limited and dispersed across several indicators. This suggests weak or emerging organisation rather than fully established organised criminal activity. The presence of moderate smuggling links, fake registration, and leadership indicators should, however, be monitored because they may indicate early signs of deeper organisation.

The comparison between Machakos and Kirinyaga is useful. Both counties recorded repeated similar crimes above 50%, but Kirinyaga had higher levels of coordination and slightly stronger advanced indicators than Machakos. This means that Kirinyaga may have a more developed semi-organised pattern, while Machakos appears much weakly organised. However, neither county showed the strong structural organisation seen in Bomet or the illicit-market orientation seen in Busia.

Overall, the county-level indicator results reveal several distinct organised-crime profiles. Bomet reflects a structural and territorial organisation profile, with high levels of role specialization,

leadership, coordination, and territorial control. Busia reflects an illicit-market and logistical organisation profile, with high role specialization, coordination, links to smugglers, sharing of proceeds, and fake registration. Nyeri reflects a repetitive and coordinated semi-organised profile, with very high repeated crimes and coordination but weaker evidence of advanced protection and territorial control. Mombasa reflects a concealed and protected organisation profile, with high protection by influential people and fake registration but low visible coordination. Marsabit reflects a routine and coordinated but weakly structured profile, with high repetition and coordination but very low advanced organisation. Machakos and Kirinyaga reflect weak or emerging organisation, where repeated crime is present but advanced indicators remain relatively limited.

These patterns show that organised criminality in the boda-boda sector is not one-dimensional. In some counties, it appears through leadership and territorial control. In others, it appears through smuggling links and sharing of proceeds. Elsewhere, it appears through repeated methods and rider coordination without strong evidence of hierarchy. In urban or coastal settings, it may appear through protection and concealment rather than visible group action. This confirms that the organisation of boda-boda-related crime is shaped by local conditions, including geography, border location, urban structure, stage governance, enforcement capacity, and links to informal or illicit economies.

The findings also have important implications for policy and policing. A uniform intervention would be inadequate because the form of organisation differs by county. In Bomet, interventions should prioritize stage and route governance, identification of controllers, and disruption of territorial influence. In Busia, attention should focus on cross-border movement, smuggling networks, fake registration, and proceeds-sharing arrangements. In Nyeri, the priority should be monitoring repeated crime patterns and coordinated rider networks. In Mombasa, the focus should be on protection systems, fake registration, and hidden facilitation by influential actors. In Marsabit, interventions should emphasise opportunity reduction, route surveillance, and prevention of repetitive crime. In Machakos and Kirinyaga, early prevention is needed to stop weakly organised patterns from becoming more structured.

Therefore, the county-level indicator analysis strengthens the conclusion that boda-boda-related crime exists along a continuum. Some counties show mostly repeated and opportunistic patterns,

others show semi-organised coordination, and others show signs of more advanced organised criminal activity. The key policy lesson is that boda-boda-related crime should be addressed through differentiated, county-specific strategies rather than generalized assumptions about the sector. The following qualitative subsection deepens this interpretation by showing how respondents described the mechanisms behind these indicator patterns.

4.4.4 **Qualitative Organised-Crime Themes**

Figure 4.9 presents the qualitative organised-crime themes identified from the Objective Two qualitative data. The qualitative findings provide an important interpretive layer to the quantitative results because they show how organised or semi-organised boda-boda-related crime is experienced, described, and understood in county contexts. While the quantitative indicators measured the presence of specific signs of organisation, the qualitative themes explain the social, spatial, and operational meanings behind those indicators. This linkage is important because mixed-method interpretation allows numerical patterns to be explained through respondent narratives and local context.

Figure 4.4.4: Objective Two Qualitative Organized-Crime Themes by County

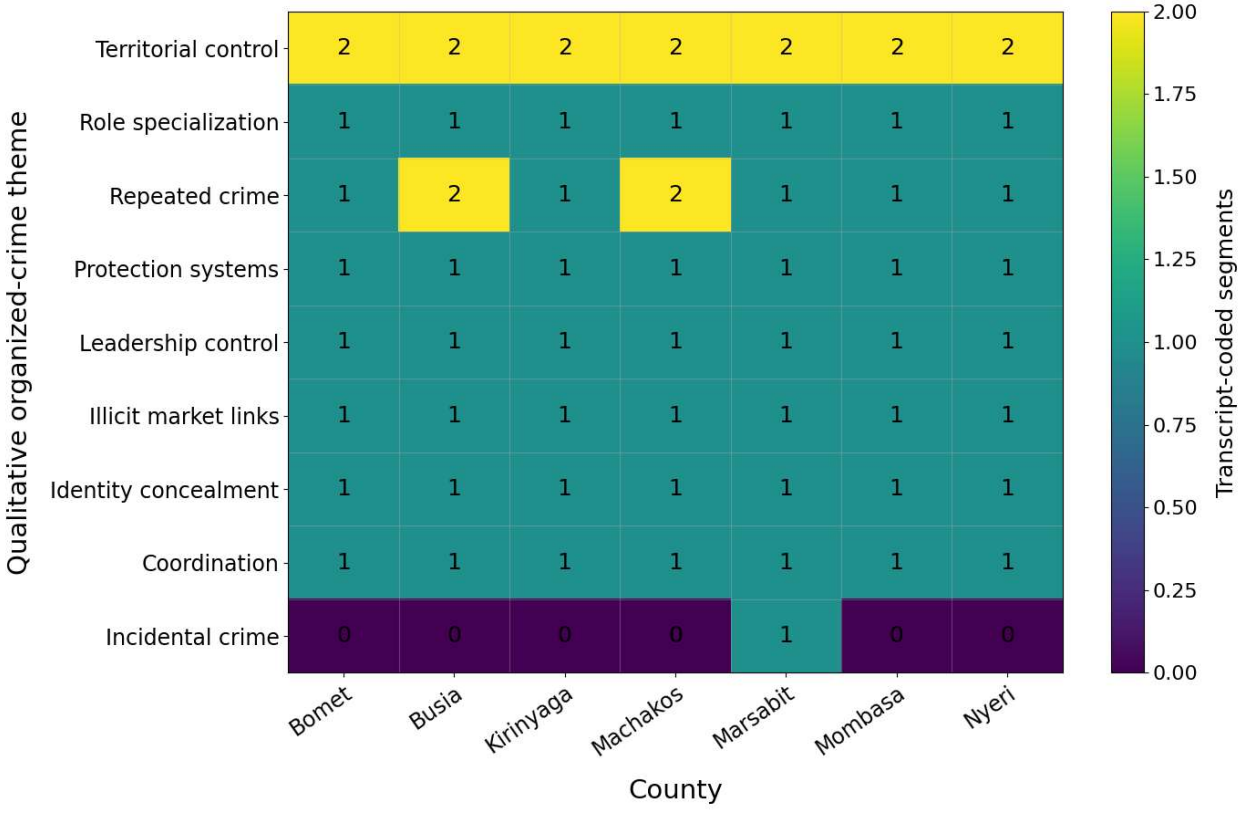


Figure 4.9: Objective Two Qualitative Organised-Crime Themes by County
Source: *Objective Two qualitative transcript coding outputs.*

The themes identified across the counties included repeated crime, coordination, leadership control, role specialization, territorial control, protection systems, illicit market links, identity concealment, and incidental crime. These themes correspond closely with the quantitative indicators discussed in the preceding sections. This convergence strengthens the interpretation that boda-boda-related crime is not always random or isolated. In some counties, it shows signs of repetition, cooperation, informal control, protection, concealment, and connection to wider illicit activities. At the same time, the qualitative findings also confirm that not all boda-boda-related crime is organised. Some incidents remain individual, opportunistic, and situational.

The most consistent qualitative theme was territorial control. Across the counties, the qualitative material referred to control over stages, routes, operating spaces, market areas, terminals, streets, and other locations where boda-boda riders gather or operate. This theme is important because the boda-boda sector is spatially organised. Riders do not operate in an abstract space; they work from stages, routes, road junctions, bus stops, markets, estates, informal settlements, border points, nightlife spaces, and other transport nodes. These spaces can become important points of control, surveillance, recruitment, intimidation, protection, and criminal opportunity.

Territorial control is therefore a key indicator of organised or semi-organised crime. Where criminal actors influence a stage or route, they may control who operates there, who is protected, who is excluded, who pays informal fees, and who can move safely. Such control may also allow offenders to identify victims, monitor police presence, hide stolen motorcycles, facilitate escape, or intimidate legitimate riders and witnesses. In this sense, territorial control transforms ordinary transport spaces into security-sensitive spaces. The qualitative evidence therefore supports the quantitative finding that stages and routes are central to understanding the organisation of boda-boda-related crime.

The territorial-control theme also shows that organised criminality in the boda-boda sector may be local and informal rather than highly formalized. Control may not always be exercised by a visible gang or official leader. It may operate through informal authority, fear, familiarity, peer pressure, stage politics, or influence by actors who are locally known but difficult to prosecute. This is especially important because formal policing may overlook such informal structures if attention is

focused only on individual offenders. The qualitative findings therefore suggest that understanding boda-boda-related crime requires close attention to the governance of stages and routes.

A second important qualitative theme was repeated crime. Respondents' accounts pointed to the recurrence of similar offences, similar methods, or similar patterns of victimization. This supports the quantitative finding that repeated similar crimes were the strongest overall indicator of organised criminal activity. Repetition suggests that offenders may be learning from previous incidents, copying successful methods, exploiting known vulnerabilities, or using familiar escape routes. It may also indicate that certain areas, times, victims, or routes are repeatedly targeted.

Repeated crime does not automatically mean that a formal criminal organisation exists. However, it is an important warning sign because repetition can create routine criminal opportunities. Where offenders repeatedly commit similar offences without effective disruption, crime may become normalized, predictable, and eventually more coordinated. Repeated offences may also strengthen offender confidence and weaken public trust in security agencies. The qualitative theme of repeated crime therefore helps explain why respondents perceived some boda-boda-related crimes as organised and repeated, especially in counties where similar patterns appeared frequently.

A third theme was coordination. Qualitative accounts suggested that some boda-boda-related crimes involve cooperation among riders, offenders, or other actors. Coordination may take different forms. It may involve riders moving together, warning one another about police presence, identifying targets, transporting offenders, blocking victims, assisting escape, or sharing information about routes and opportunities. In some cases, coordination may be temporary and opportunity-driven. In other cases, it may be more regular and embedded in known groups or local networks.

The coordination theme is important because it distinguishes semi-organised crime from purely individual offending. A single rider acting alone may commit an opportunistic offence, but coordinated offending involves interaction among several actors. Even when such coordination is informal, it can increase the effectiveness of crime. It can make robbery easier, improve escape, reduce the risk of arrest, and make intimidation more effective. The qualitative evidence therefore supports the quantitative finding that coordination among riders was the second strongest overall indicator of organised criminal activity.

Another major qualitative theme was role specialization. Respondents' accounts suggested that different actors may play different roles in boda-boda-related crime. These roles may include lookout, transporter, receiver, seller, broker, organizer, coordinator, informant, or protector. Role specialization is an important sign of organisation because it indicates division of labour. Rather than one person planning and executing the entire offence, different participants may perform different functions before, during, and after the crime.

In the boda-boda context, role specialization can occur in subtle ways. One person may identify a victim, another may provide transport, another may follow or monitor the victim, another may hide the motorcycle, and another may sell stolen goods. In smuggling-related offences, one actor may move goods, another may provide information about police movement, while another may connect the rider to buyers or handlers. Such arrangements do not always appear as formal organisations, but they show that crime may be structured through practical cooperation. This supports the quantitative finding that assignment of specific roles was present in several counties, although less common than repeated crime and coordination.

Leadership control was also identified as a qualitative theme. Respondents' accounts suggested that some criminal activities may be influenced or directed by leaders, controllers, coordinators, stage officials, informal power brokers, criminal financiers, or politically connected actors. Leadership control is significant because it suggests that some crimes may not be purely spontaneous. Instead, certain individuals may organize, direct, protect, or benefit from criminal activity. Such leaders may not always be visible to the public, and their influence may be indirect rather than openly declared.

The leadership-control theme helps explain why some counties showed higher levels of organised criminality. Where leaders or controllers exist, they can coordinate offenders, assign roles, control routes, protect members, distribute proceeds, or intimidate witnesses. However, the qualitative findings also suggest that leadership in boda-boda-related crime may be fluid and informal. It may not always resemble a formal criminal hierarchy. This is important because organised criminality in informal transport sectors often operates through loose networks, personal influence, and local authority rather than formal command structures.

Protection systems formed another important qualitative theme. The findings suggest that organised or semi-organised boda-boda-related crime may sometimes be protected by influential

people, politicians, corrupt actors, informal power brokers, or individuals with social or economic influence. Protection systems are significant because they reduce the risk of detection, arrest, punishment, or public exposure. Where offenders believe they are protected, they may be more willing to repeat crimes, intimidate victims, or continue operating within known spaces.

Protection systems also connect boda-boda-related crime to broader governance challenges. If offenders are shielded by influential actors, victims may fear reporting crime, witnesses may remain silent, and enforcement agencies may face pressure or interference. This makes crime more difficult to address through ordinary policing alone. The qualitative evidence therefore suggests that organised boda-boda-related crime may be sustained not only by offenders themselves but also by enabling environments that weaken accountability.

Illicit market links were also identified in the qualitative data. References to smugglers, drug dealers, gangs, contraband, stolen goods, and informal markets suggest that some boda-boda-related crime extends beyond direct street-level offending. In such cases, motorcycles may serve as tools of mobility within wider illegal economies. Boda-boda motorcycles may be used to transport drugs, stolen items, contraband goods, information, or people involved in criminal activity. They may also provide quick delivery, escape, surveillance, or access to areas not easily reached by larger vehicles.

This theme is particularly important because it shows that boda-boda-related crime may be part of wider criminal systems. A rider may not be the main organizer of the crime but may provide mobility, logistics, or local knowledge. This means that boda-boda operations may be exploited by actors outside the sector, including smugglers, handlers of stolen goods, drug networks, or criminal gangs. The qualitative findings therefore support the quantitative indicators on links to smugglers and sharing of proceeds, especially in counties where mobility, border movement, or informal markets create opportunities for illicit activity.

Identity concealment was another important qualitative theme. Respondents referred to fake registration, false identity, unknown riders, unfamiliar operators, and motorcycles that are difficult to trace. Identity concealment is a major security concern because it weakens accountability. If a rider, motorcycle, stage, or owner cannot be easily identified, it becomes difficult to investigate crime, recover stolen property, trace suspects, or separate legitimate riders from impostors.

In the boda-boda sector, identity concealment may occur through unregistered motorcycles, altered number plates, borrowed motorcycles, lack of rider uniforms, absence of stage records, or riders operating outside recognized stages. Such concealment creates anonymity, which can be exploited by offenders. It also harms legitimate riders because the public may begin to distrust the sector as a whole. The qualitative theme therefore reinforces the importance of registration, rider identification, stage records, and traceability as crime-prevention measures.

At the same time, the qualitative findings also included the theme of incidental crime. This theme is important because it prevents overgeneralization. Not all boda-boda-related crime is organised, repeated, protected, or linked to illicit markets. Some incidents are individual, spontaneous, opportunistic, or situational. For example, a rider may exploit a passenger, participate in a theft, or act violently without belonging to any organised group. Similarly, a person may use a motorcycle to commit crime without being part of the regular boda-boda sector.

The incidental-crime theme was especially important in interpreting counties where advanced indicators of organisation were weak. It confirms that boda-boda-related crime exists along a continuum. At one end are individual and opportunistic incidents. At the middle are irregular group-based or semi-organised offences. At the other end are organised criminal activities involving repeated methods, roles, leadership, protection, territorial control, concealment, and links to illicit markets. This continuum helps avoid the mistake of treating all riders as criminals while still recognizing that organised criminal misuse of the sector exists.

The qualitative findings also show that county contexts matter. In some counties, territorial control and repeated crime were more visible. In others, protection systems, identity concealment, or illicit market links were more important. This means that organised criminality is shaped by local conditions such as border location, urban density, stage governance, transport routes, informal markets, policing capacity, and political or social influence. Therefore, the same boda-boda sector may produce different crime patterns in different counties.

The integration of qualitative and quantitative findings strengthens the overall interpretation of Objective Two. The quantitative findings showed the measurable prevalence of organised-crime indicators, while the qualitative findings explained how these indicators operate in real settings. Repeated crime is not only a number; it reflects recurring methods and routine opportunities. Coordination is not only an indicator; it reflects cooperation, communication, and collective

movement. Territorial control is not only a variable; it reflects control over stages, routes, and transport spaces. Protection systems are not only reported percentages; they reflect governance weaknesses and the shielding of offenders. Identity concealment is not only fake registration; it reflects the difficulty of tracing riders and motorcycles.

Therefore, Figure 4.9 confirms that organised boda-boda-related crime should be understood as a locally embedded and multi-layered phenomenon. It may involve physical spaces, social networks, informal authority, economic incentives, protection, concealment, and links to illicit markets. However, it also coexists with legitimate livelihood activity and incidental crime. This finding is central to the study because it shows that the boda-boda sector should not be criminalized as a whole. Instead, interventions should focus on identifying and disrupting the specific organised, semi-organised, and protected criminal elements that misuse boda-boda operations.

The policy implication is that responses must be differentiated. Where territorial control is prominent, authorities should strengthen stage and route governance. Where role specialization and coordination are visible, intelligence-led policing should identify networks and repeated patterns. Where protection systems are reported, anti-corruption and accountability mechanisms are required. Where illicit market links exist, security responses should connect boda-boda regulation with broader efforts against smuggling, drug trafficking, and stolen-property markets. Where identity concealment is common, rider registration, motorcycle traceability, and stage-level records should be strengthened. Where crime is mainly incidental, prevention should focus on opportunity reduction, public awareness, and protection of both passengers and legitimate riders.

In summary, the qualitative findings deepen the interpretation of organised criminal activity within the boda-boda sector. They show that organised crime indicators were not limited to statistical responses but were also visible in respondents' narratives about stages, routes, roles, protection, concealment, repeated offences, and illicit market connections. The findings confirm that boda-boda-related crime is neither wholly incidental nor uniformly organised. Instead, it takes different forms across counties, ranging from individual opportunism to semi-organised coordination and more structured criminal misuse of transport spaces. The next subsection tests whether these observed patterns are statistically meaningful.

The qualitative themes are therefore not separate from the quantitative results. They explain the same phenomenon from the perspective of lived experience. The statistical analysis that follows

tests whether these patterns are strong enough to support the broader interpretation of county-specific organised criminality.

Statistical Test Results. The statistical tests were conducted to determine whether the observed differences in organised criminality across counties were meaningful and not merely descriptive variations. The tests examined three main issues: whether the organised-criminality index differed significantly by county; whether county was associated with the classification of boda-boda-related crime into incidental, transitional, and organised categories; and whether specific predictors, especially criminal control of stages and routes, increased the likelihood that boda-boda-related crime would be classified as organised criminal activity. The interpretation of these tests followed standard guidance for applied social-science statistics and scale reliability (Field, 2018; Tavakol & Dennick, 2011).

The Kruskal-Wallis test was used to compare the organised-criminality index across the seven counties. This test was appropriate because the organised-criminality index was based on a count or summed score of organised-crime indicators, and the distribution of such index scores may not meet the strict assumptions required for parametric analysis. The test produced a statistically significant result, $\chi^2 = 265.76$, $df = 6$, $p < 0.001$. This means that the organised-criminality index differed significantly across counties.

The significance of the Kruskal-Wallis result is important for the interpretation of Objective Two. It confirms that the county differences observed in the descriptive results were not random or accidental. Instead, they reflected real variation in the extent to which boda-boda-related crime displayed indicators of organisation. In practical terms, some counties had stronger evidence of repeated offences, coordination, leadership, role specialization, territorial control, protection systems, illicit market links, proceeds sharing, and fake registration than others. Therefore, organised criminality within the boda-boda sector is shaped by local county conditions rather than appearing uniformly across the study sites.

The Kruskal-Wallis result also supports the argument that boda-boda-related crime should be analysed geographically. If there were no significant county differences, it would be reasonable to interpret the problem as broadly similar across the study area. However, the statistically significant result shows that county context matters. Counties such as Bomet, Busia, and Nyeri showed stronger organised or semi-organised patterns, while Machakos, Marsabit, Kirinyaga, and

Mombasa showed weaker or more selective forms of organisation. This reinforces the need for county-specific security and regulatory responses.

The second test was the Pearson chi-square test of association between county and organised-criminality category. The organised-criminality category classified respondents into three groups: incidental or weakly organised crime, transitional or semi-organised crime, and organised criminal activity. The chi-square test showed a statistically significant association between county and organised-criminality category, $\chi^2 = 306.66$, $df = 12$, $p < 0.001$. This confirms that the distribution of organised-criminality categories varied significantly by county.

This finding means that the likelihood of boda-boda-related crime being classified as incidental, transitional, or organised was not the same across counties. For example, some counties had a larger proportion of respondents in the incidental or weakly organised category, while others had higher proportions in the transitional or organised categories. This confirms the descriptive interpretation presented earlier, where Bomet had the highest percentage of organised criminal activity, while Busia and Nyeri had strong transitional or semi-organised patterns. It also supports the finding that Marsabit and Machakos were more strongly associated with weakly organised or incidental patterns.

The strength of the association was assessed using Cramer's V. The value of Cramer's V was 0.241. This indicates a moderate association between county and organised-criminality category. The association was not weak enough to be ignored, but it was also not so strong as to suggest that county alone completely determines the form of boda-boda-related crime. This is an important finding because it shows that county context matters, but it is not the only factor shaping organised criminality. Other factors may include local policing capacity, stage governance, rider registration systems, border dynamics, informal markets, youth unemployment, political protection, settlement patterns, transport demand, and the presence of illicit networks.

The moderate value of Cramer's V therefore supports a balanced interpretation. It would be inaccurate to say that organised boda-boda-related crime is purely a county effect. However, it would also be inaccurate to treat all counties as experiencing the same crime structure. County context influences the degree and form of criminal organisation, but it interacts with other social, economic, spatial, and institutional conditions. This interpretation is consistent with the mixed-method findings, which showed that different counties displayed different combinations of

repeated crime, coordination, territorial control, protection, smuggling links, identity concealment, and incidental offending.

The study also assessed the reliability of the organised-crime indicators used to construct the organised-criminality index. The reliability analysis produced a raw Cronbach's alpha of 0.572 and a standardised alpha of 0.605. These values indicate moderate internal consistency. The standardised alpha above 0.60 suggests that the indicators were sufficiently related to be used as a combined measure of organised criminality, although the reliability was not high enough to suggest that all items measured a single narrow construct. This interpretation is consistent with guidance that Cronbach's alpha should be evaluated in relation to the number of items, the dimensionality of the construct, and the purpose of the scale rather than by a rigid cut-off alone (Tavakol & Dennick, 2011).

This result should be interpreted carefully. The organised-crime indicators were deliberately broad because organised criminality in the boda-boda sector can appear in different forms. Repeated similar crimes, coordination among riders, role specialization, leaders or controllers, territorial control, protection by influential people, links to smugglers, sharing of proceeds, and fake registration are related, but they do not all measure the same exact dimension of crime. Some indicators capture behavioural repetition. Others capture operational coordination. Others capture hierarchy, territorial influence, concealment, illicit-market connection, or protection systems. Therefore, a moderate reliability coefficient is acceptable because the index was designed to capture a multi-dimensional phenomenon rather than a single simple trait.

The reliability results suggest that the indicators were connected enough to justify their use in constructing an organised-criminality index, but diverse enough to show that organised crime in the boda-boda sector is complex and layered. A very high alpha would have suggested that all indicators were measuring nearly the same thing. In this study, however, organised criminality was expected to involve different but related features. For example, a county may have high repeated crimes and coordination but low protection systems, as seen in Marsabit. Another county may have lower visible coordination but high protection and fake registration, as seen in Mombasa. This diversity explains why the reliability was moderate rather than very high.

The logistic regression model was used to examine predictors of organised criminal activity. The dependent variable was organised criminality coded in binary form, while the independent

variables included perceptions of criminal control of stages and routes, support for larger criminal activities, political use of boda-boda groups, and county. The model showed that criminal control over stages and routes was a statistically significant predictor of organised criminal activity. The coefficient for criminal-controlled stages and routes was positive and significant, $\beta = 0.8315$, $p = 0.000906$. Because logistic regression estimates changes in log-odds, the coefficient was also interpreted through its odds ratio (Field, 2018).

The positive coefficient means that respondents who reported criminal control over stages and routes were more likely to fall into the organised-crime category than those who did not report such control. When converted into an odds ratio, the coefficient corresponds to approximately 2.30. This means that the odds of organised criminal activity were more than twice as high where criminal control over stages and routes was reported. This is one of the most important statistical findings under Objective Two because it provides empirical support for the importance of territorial control.

The logistic regression result confirms that stages and routes are not merely transport spaces. They can also become spaces of criminal influence, surveillance, recruitment, intimidation, concealment, and protection. In the boda-boda sector, stages are central nodes of operation. Riders gather there, passengers identify transport services there, local leaders or stage officials may exercise influence there, and informal rules may regulate who operates in the area. If criminal actors gain control over such spaces, they can influence movement, protect offenders, identify victims, monitor security activity, and exclude outsiders. This makes stage and route control a critical pathway through which boda-boda-related crime can become organised.

This finding is also consistent with the qualitative theme of territorial control. The qualitative results showed that respondents referred to stage control, route control, and control over operating spaces as part of the organisation of crime. The regression result strengthens this interpretation by showing that territorial control is not only a descriptive theme, but also a statistically significant predictor of organised criminal activity. Therefore, territorial control should be treated as a central factor in understanding organised criminality within the boda-boda sector.

The model also included other predictors, including whether boda-boda supported larger criminal activities and whether political actors used boda-boda groups. These variables are important because they point to possible wider networks and external influences. However, the strongest and

clearest statistically significant predictor identified in the model was criminal control over stages and routes. This suggests that localised control of transport spaces may be more directly associated with organised criminality than general perceptions of broader criminal or political linkages.

The regression model further controlled for county, which was important because county differences were already shown to be significant in the Kruskal-Wallis and chi-square tests. Controlling for county helped to determine whether stage and route control still mattered after accounting for county-level variation. The significant result for criminal-controlled stages and routes shows that this factor remained important even when county differences were considered. This strengthens the conclusion that territorial control is a key mechanism through which boda-boda-related crime becomes organised.

The logistic regression model was estimated using 2,329 observations, with 302 observations deleted due to missingness. This should be considered when interpreting the results. Missing data may reduce the effective sample size and may affect the precision of estimates. However, the model still used a large number of observations, and the significance of the stage and route control variable indicates a robust relationship within the available data. The model results therefore provide useful evidence for explaining organised criminality, while still requiring cautious interpretation due to missing responses.

Taken together, the statistical tests provide strong support for the findings of Objective Two. The Kruskal-Wallis test confirmed that the organised-criminality index varied significantly by county. The chi-square test confirmed that county was significantly associated with organised-criminality category. Cramer's V showed that this association was moderate, meaning that county context matters but does not fully explain organised criminality. The reliability analysis showed that the organised-crime indicators had moderate internal consistency, which is appropriate for a multi-dimensional construct. The logistic regression showed that criminal control over stages and routes significantly increased the odds of organised criminal activity.

The statistical findings therefore support the broader interpretation that boda-boda-related crime exists along a continuum. Some crimes are incidental and weakly organised, some are transitional or semi-organised, and some show clearer signs of organised criminal activity. The tests also show that this continuum varies across counties and is strongly influenced by control over stages and routes. The results therefore reinforce the need for differentiated policy responses. Counties with

stronger organised-crime indicators require intelligence-led policing, stage and route regulation, disruption of criminal networks, and action against protection systems. Counties with weaker organisation require preventive interventions focused on registration, opportunity reduction, rider discipline, and protection of legitimate riders.

In conclusion, the statistical results confirm that organised criminality in the boda-boda sector is not random, uniform, or purely anecdotal. It varies significantly by county, is moderately associated with county context, and is strongly linked to criminal control over stages and routes. These findings provide empirical support for treating stage governance, route control, rider identification, and local security intelligence as central components of any strategy aimed at reducing organised boda-boda-related crime. Having established the statistical significance of the patterns, the next section situates the findings within previous research and criminological theory.

The statistical evidence is consequently used not as a stand-alone result, but as confirmation of the earlier descriptive, indicator-based, and qualitative findings. The discussion now connects this evidence to criminological theory and previous empirical work on boda-boda transport, informality, mobility, and organised crime.

Discussion in Relation to Previous Research. The findings for Objective Two show that boda-boda-related crime should be understood as a continuum rather than as a single fixed category. At one end of this continuum are individual and opportunistic crimes committed by riders, passengers, or offenders posing as riders. These may include theft from passengers, opportunistic robbery, assault, snatching of valuables, or use of a motorcycle for quick escape. At the middle of the continuum are transitional or semi-organised crimes involving repeated methods, temporary cooperation, rider coordination, and irregular group activity. At the most serious end are organised criminal activities involving role specialization, territorial control, protection systems, illicit market links, fake registration, sharing of proceeds, and leadership or coordination by specific actors.

This continuum-based interpretation is consistent with broader criminological thinking on organised crime. The United Nations Convention against Transnational Organised Crime defines an organised criminal group broadly as a structured group acting together to commit serious crime for material benefit, while also recognizing that such groups need not have formal roles, continuous membership, or a developed structure. This is important for the boda-boda context

because criminal organisation may be loose, informal, flexible, and locally embedded rather than highly formalized. Therefore, the absence of visible gangs or permanent criminal structures does not necessarily mean the absence of organised criminality. In the boda-boda sector, organisation may appear through repeated cooperation, territorial control over stages, informal protection, shared proceeds, or links to illicit markets (Paoli & Vander Beken, 2014; United Nations, 2000; von Lampe, 2016).

The findings also support routine activity theory, which argues that crime occurs when a motivated offender, a suitable target, and absence of capable guardianship converge in time and space (Cohen & Felson, 1979). Boda-boda operations create many such convergence points. Riders operate in markets, transport stages, urban estates, nightlife zones, border corridors, isolated roads, informal settlements, and rural access routes. These places bring together mobile offenders, vulnerable passengers, goods, motorcycles, cash, and sometimes weak guardianship. This helps explain why some boda-boda-related crimes remain opportunistic while others become repeated or semi-organised.

Crime pattern theory is also useful in interpreting these findings. Brantingham and Brantingham (1993) argue that crime is shaped by nodes, paths, edges, and routine movement patterns. Boda-boda stages, routes, markets, terminals, road junctions, and settlement entry points function as crime-relevant nodes and paths. The findings on territorial control, route control, and repeated crimes fit this theory well. Where offenders repeatedly use the same routes, identify targets around the same nodes, or control particular stages, boda-boda-related crime becomes spatially patterned rather than random. This explains why stage and route governance emerged as a central issue in the present study.

The dominant pattern across the study counties was incidental or weakly organised crime. However, this does not mean that organised criminal activity is absent. Rather, organised activity appears to be concentrated in particular counties and in specific indicators. Bomet, Busia, and Nyeri showed the strongest organised or semi-organised patterns, while Machakos, Marsabit, Kirinyaga, and Mombasa showed weaker, selective, or more ambiguous forms of organisation. This means that boda-boda-related crime should not be generalized across all counties. Instead, county context matters in shaping whether crime appears opportunistic, semi-organised, or organised.

The findings align with the National Crime Research Centre's work on boda-boda motorcycle transport and security challenges in Kenya. The NCRC identified boda-boda-related crime as a multidimensional security problem involving robbery, theft, drug and substance abuse, smuggling of contraband and illegal goods, mob justice, weak law enforcement, weak regulation, corruption, and inadequate rider identification. The NCRC also emphasised measures such as police patrols, roadblocks, community policing, regulation by SACCOs and associations, limiting night operations, inspections, and county-level regulation. The current findings support that position but add a more specific contribution: they show that the organisation of boda-boda-related crime differs by county and by type of indicator (National Crime Research Centre, 2018).

Busia stands out because many respondents directly classified boda-boda-related crime as organised and repeated. The county also showed strong transitional criminality, role specialization, links to smugglers, sharing of proceeds, and fake registration. This suggests that Busia may have a crime environment where boda-boda mobility interacts with illicit market opportunities. The finding is consistent with scholarship on the historical and spatial meaning of boda-boda transport in East Africa. Nyachieo (2015) notes that boda-boda transport emerged around border movement and cross-border business, including smuggling, especially around the Kenya-Uganda border. This historical association is important for interpreting Busia because the county's border position creates mobility opportunities that may be used for both legitimate trade and illicit movement.

Busia's profile suggests that the organised dimension of boda-boda-related crime may be logistical. Motorcycles can move quickly across short distances, use informal routes, avoid congested roads, and access border-adjacent spaces that larger vehicles may not reach easily. This makes them useful for both lawful transport and illicit mobility. Where role specialization, fake registration, smuggling links, and proceeds sharing are present, the boda-boda may function not only as a transport service but also as a logistical tool within wider illicit economies. This interpretation is also consistent with Okumu's analysis of motorcycles as versatile assets for organised criminal actors and economically vulnerable youth (Okumu, 2022).

Bomet stands out because it recorded the highest organised-criminality index and the highest percentage of organised criminal activity. The presence of leadership, role specialization, territorial control, and coordination suggests more structured criminal arrangements. Unlike Busia, where the organised pattern appears strongly connected to mobility and illicit market links, Bomet's

profile appears more territorial and structural. The high indicators for leaders or controllers, assignment of roles, and territorial control suggest that crime may be organised around stages, routes, local authority structures, and operational spaces. This supports the idea that organised crime does not always need to be transnational or border-based; it can also be locally embedded in control over territory and transport spaces.

The Bomet pattern also supports the importance of informal governance within the boda-boda sector. Stages are not only places where riders wait for passengers. They are also social and economic spaces with internal rules, leaders, peer networks, informal enforcement, and competition over customers. Where these spaces are captured by criminal actors, they may support extortion, protection, recruitment, concealment, or intimidation of legitimate riders. This explains why territorial control emerged as both a qualitative theme and a significant predictor of organised criminality in the statistical analysis.

Nyeri presents a more transitional pattern. It recorded very high repeated-crime and coordination indicators, but lower evidence of advanced protection and illicit-market structures. This suggests that boda-boda-related crime in Nyeri may be highly repetitive and coordinated without necessarily being fully organised. The Nyeri pattern illustrates the middle point of the continuum: crime may be more structured than individual opportunism but not fully developed into organised criminal enterprise. This type of criminality may involve repeated cooperation, informal peer networks, shared information, or temporary group action.

The Nyeri findings are consistent with Kiplagat, Ngetich, and Auya's study of motorcycle-related crimes in Nakuru East Sub-County. Their study found that motorcycle-related crime in an urban Kenyan setting involved robbery with violence, robbery, assault, theft, and group-based operations. They also anchored their analysis in routine activity theory and crime pattern theory, which fits the present study's finding that motorcycle-related crime is shaped by opportunity, movement, and spatial patterns. The similarity between the Nakuru study and the present Nyeri findings suggests that repeated and coordinated motorcycle-related crime may be an important feature in some urban and peri-urban Kenyan settings (Kiplagat et al., 2024).

Mombasa presents a more complex pattern. Although the overall organised-crime category was low, protection by influential people and fake registration were relatively high. This suggests that organised criminality in Mombasa may be less visible to ordinary respondents and may operate

through protection, concealment, and specific urban spaces rather than open rider coordination. In such a context, low visible coordination should not be interpreted as absence of organisation. Organised elements may be hidden, selective, or embedded in networks that ordinary respondents cannot easily observe.

This finding is important because urban crime often operates through concealed relationships rather than visible group activity. Mombasa's coastal urban setting includes transport nodes, port-related movement, tourism areas, informal settlements, markets, nightlife spaces, and mixed formal-informal economies. In such environments, motorcycles may be used selectively for surveillance, delivery, quick escape, transport of illicit goods, or concealment of offenders. The relatively high fake-registration indicator suggests that traceability is a key issue. When motorcycles or riders cannot be easily identified, criminal actors can exploit anonymity while legitimate riders suffer reputational damage.

Marsabit also presents an important distinction. Although repeated crimes and coordination were high, advanced indicators such as protection, fake registration, sharing of proceeds, and links to smugglers were very low. This suggests that repetitive crime does not automatically amount to organised criminal activity. Repetition may occur because of routine opportunities, weak policing, spatial isolation, long-distance movement, limited guardianship, or repeated targeting patterns without a stable criminal structure. This interpretation is consistent with Felson and Clarke's argument that opportunity plays a major role in crime. If opportunities remain open, crimes may repeat even without a formal criminal organisation.

The Marsabit finding is useful because it prevents over-classification. Not every repeated crime pattern should be labelled organised crime. In some frontier or sparsely policed areas, crime may recur because of environmental opportunity rather than structured criminal control. Long distances, limited patrol coverage, isolated routes, and weak surveillance may allow offenders to repeat similar offences. Therefore, Marsabit requires a different policy response from Busia or Bomet. The priority may be improving guardianship, route surveillance, rider identification, and community reporting rather than assuming the existence of entrenched organised networks.

Machakos and Kirinyaga showed moderate levels of repeated crimes but lower levels of advanced indicators. These patterns suggest weak or emerging organisation rather than established organised criminal activity. In both counties, repeated crime should still be treated seriously because

repetition may become the foundation for stronger organisation if not disrupted. However, the evidence does not suggest the same level of structured criminality seen in Bomet, the same illicit-market orientation seen in Busia, or the same concealed protection pattern seen in Mombasa. This again confirms that boda-boda-related crime must be interpreted through local context.

The discussion also needs to recognize that boda-boda riders are not only perpetrators or facilitators of crime. Previous studies show that riders are also victims of theft, robbery, kidnapping, murder, harassment, and motorcycle theft. Munishi's study of motorcycle-taxi riding and crime in Tanzania notes that riders may be involved in crime in some cases, but it also emphasizes that riders themselves face motorcycle theft, kidnapping, violence, and murder. The NCRC similarly found that boda-boda riders, owners, passengers, and members of the public can all be victims of boda-boda-related crime. This is important because an undifferentiated security response may punish legitimate riders while failing to identify the smaller group of organised criminal actors (Munishi, 2023; National Crime Research Centre, 2018).

The findings therefore support a differentiated interpretation. Boda-boda-related crime is not purely incidental, but neither is it uniformly organised. The sector is vulnerable to criminal misuse because motorcycles provide speed, flexibility, anonymity, affordability, and access to spaces that may be difficult for formal security agencies to monitor. However, the degree of organisation depends on local conditions, including stage control, route governance, informal leadership, protection networks, regulatory weaknesses, youth unemployment, border movement, and links to illicit economies.

This interpretation has important implications for policy. A blanket criminalization of the boda-boda sector would be inappropriate because many riders are legitimate workers and many are victims of crime. At the same time, treating all offences as isolated acts of individual misconduct would underestimate the organised and semi-organised patterns identified in the study. The appropriate response is therefore targeted regulation and intelligence-led intervention. Counties such as Busia require attention to cross-border movement, smuggling links, fake registration, and proceeds-sharing networks. Bomet requires closer regulation of stages, routes, leadership structures, and territorial control. Nyeri requires monitoring of repeated and coordinated offending. Mombasa requires investigation of protection systems, identity concealment, and hidden

facilitation. Marsabit requires opportunity reduction, route surveillance, and stronger guardianship.

The findings also support situational crime prevention. Felson and Clarke (1998) argue that crime can be reduced by increasing the effort required to offend, increasing the risks of detection, reducing rewards, and removing excuses. In the boda-boda sector, this could include mandatory rider and motorcycle registration, visible identification, stage records, route monitoring, night-operation controls in high-risk areas, stronger rider associations, community policing, surveillance at hotspots, and rapid reporting mechanisms. Such measures would not eliminate the livelihood function of boda-boda transport but would reduce opportunities for criminal misuse.

Overall, Objective Two contributes to the study by showing that boda-boda-related crime should be classified through degrees of organisation. The evidence indicates that organised criminality is uneven, locally embedded, and indicator-specific. Repeated crimes and coordination are the most visible forms of organisation, while advanced indicators such as territorial control, protection systems, smuggling links, fake registration, and proceeds sharing are less common but highly significant where they occur. This supports the conclusion that boda-boda-related crime exists along a continuum from opportunistic offending to semi-organised and organised criminal activity.

In conclusion, the findings confirm that the boda-boda sector is both a livelihood system and a security space. Its mobility, informality, and accessibility make it essential for transport and income generation, but the same features can be exploited by criminal actors. The policy challenge is therefore not to suppress the sector, but to protect legitimate riders and passengers while identifying and disrupting the specific criminal networks, territorial controls, protection systems, and illicit market linkages that misuse boda-boda operations. The final subsection summarizes these connected findings and draws out their contribution to the overall study.

Summary of Objective Two Findings. Objective Two examined whether boda-boda-related crime in the selected counties should be understood mainly as incidental and opportunistic offending, transitional or semi-organised crime, or organised criminal activity. The findings show that boda-boda-related crime cannot be placed into one simple category. Instead, it varies along a continuum. At one end are individual and opportunistic offences committed by riders, passengers, or offenders using motorcycles for quick movement and escape. At the middle are semi-organised crimes involving repeated methods, coordination, informal group action, and temporary cooperation. At

the most serious end are organised criminal activities involving role specialization, territorial control, leadership, protection systems, fake registration, links to smugglers, and sharing of proceeds.

The first major finding is that Busia recorded the strongest direct perception of organised and repeated boda-boda-related crime. More than half of respondents in Busia, 52.7%, classified boda-boda-related crime as organised and repeated. This was the highest proportion among all the counties. The finding suggests that in Busia, respondents were more likely to view boda-boda-related crime as recurring, structured, and possibly connected to wider illicit activities rather than as isolated misconduct by individual riders. Busia's pattern is particularly important because the county also showed strong indicators of role specialization, links to smugglers, sharing of proceeds, and fake registration. This suggests that boda-boda mobility in Busia may interact with border movement, informal trade routes, smuggling opportunities, and other illicit market dynamics.

The second major finding is that the organised-criminality index identified Bomet, Busia, and Nyeri as the counties with the strongest organised or semi-organised crime patterns. Bomet recorded the highest mean organised-criminality index and the highest percentage of respondents falling into the organised criminal activity category. This indicates that Bomet had stronger evidence of structured criminal arrangements involving leadership, role specialization, coordination, and territorial control. Busia showed a strong transitional and illicit-market pattern, while Nyeri showed a highly repetitive and coordinated pattern. These findings demonstrate that organised criminality appears differently across counties. In some places it is territorial and leadership-based; in others it is linked to smuggling, proceeds sharing, and concealment; and elsewhere it appears as repeated and coordinated semi-organised offending.

The third finding is that repeated similar crimes and coordination among riders were the most common indicators of organised criminal activity. Repeated similar crimes were reported by 57.2% of respondents, making this the strongest overall indicator. Coordination among riders was reported by 32.7% of respondents, making it the second strongest indicator. These findings show that the most visible signs of organisation were not necessarily formal gangs, permanent leadership structures, or highly developed criminal syndicates. Instead, organised criminality was most

commonly seen through repeated methods and cooperative behaviour. This suggests that much of the organised dimension of boda-boda-related crime is semi-organised, informal, and adaptive.

The fourth finding is that advanced indicators of organised criminal activity were less common but highly significant. These included assignment of specific roles, leaders or controllers, territorial control, protection by influential people, links to smugglers, fake registration, and sharing of proceeds. Although these indicators were reported by smaller proportions of respondents, they are important because they point to more serious forms of organisation. Role specialization suggests division of labour. Leadership indicates possible control or direction. Territorial control points to influence over stages, routes, or operating spaces. Protection by influential people suggests shielding from detection or punishment. Links to smugglers and sharing of proceeds show possible integration into wider illicit economies. Fake registration points to concealment and weak traceability.

The fifth finding is that territorial control emerged as one of the most important explanatory factors. It appeared strongly in the qualitative themes and was also statistically significant in the logistic regression model. Respondents who reported criminal control of stages and routes were more likely to fall into the organised-crime category. The regression coefficient was positive and statistically significant, and the odds ratio showed that the odds of organised criminal activity were more than twice as high where criminal control over stages and routes was reported. This confirms that stages and routes are not only transport spaces. They may also become spaces of surveillance, recruitment, intimidation, concealment, extortion, and criminal protection where governance is weak.

The sixth finding is that county differences were statistically significant. The Kruskal-Wallis test confirmed that the organised-criminality index varied significantly across counties, while the chi-square test confirmed a significant association between county and organised-criminality category. Cramer's V indicated a moderate association, meaning that county context matters in shaping whether boda-boda-related crime appears incidental, transitional, or organised. However, county alone does not fully explain organised criminality. Other factors such as stage governance, route control, rider registration, border location, policing capacity, urban density, informal markets, youth unemployment, and protection networks also influence the organisation of crime.

The seventh finding is that qualitative evidence supported and deepened the quantitative results. Qualitative themes included territorial control, role specialization, repeated crime, protection systems, leadership control, illicit market links, identity concealment, coordination, and incidental crime. These themes showed how organised crime indicators operate in real county contexts. For example, territorial control referred to control over stages, routes, and operating areas. Role specialization referred to different actors performing different criminal functions. Protection systems referred to possible shielding by influential people or corrupt actors. Illicit market links pointed to smuggling, stolen goods, drugs, or contraband. Identity concealment involved fake registration, false identities, or unknown riders.

The eighth finding is that not all boda-boda-related crime is organised. The presence of incidental and weakly organised crime across all counties shows that some offences remain individual, spontaneous, situational, or opportunistic. This is important because it prevents overgeneralization. The boda-boda sector is not criminal in itself. Many riders depend on it for livelihood, and some riders are victims of crime. Therefore, policy responses should avoid treating all boda-boda riders as criminals. Instead, interventions should distinguish between legitimate riders, opportunistic offenders, semi-organised groups, and organised criminal actors who misuse boda-boda operations.

The ninth finding is that different counties require different responses. In Busia, interventions should focus on border mobility, fake registration, links to smugglers, proceeds sharing, and illicit market networks. In Bomet, the priority should be stage and route governance, leadership structures, territorial control, and role specialization. In Nyeri, responses should focus on repeated crimes, coordinated offending, and rider-network monitoring. In Mombasa, attention should be given to protection systems, fake registration, hidden facilitation, and spatially concentrated urban crime. In Marsabit, where repetition and coordination were high but advanced organisation was weak, interventions should focus on route surveillance, opportunity reduction, and improved guardianship. In Machakos and Kirinyaga, early prevention is needed to stop weak or emerging patterns from developing into more structured criminality.

Overall, Objective Two established that boda-boda-related crime is neither purely incidental nor uniformly organised. It exists along a continuum from opportunistic offending to semi-organised and organised criminal activity. The dominant pattern across the study counties was incidental or

weakly organised crime, but organised and semi-organised patterns were clearly present in specific counties and indicators. The most important signs of organisation were repeated similar crimes, coordination among riders, territorial control, role specialization, protection systems, illicit market links, fake registration, and sharing of proceeds.

The findings therefore support a targeted security and governance approach. Counties with high transitional or organised indicators require stronger regulation of stages and routes, effective rider identification, improved motorcycle registration, intelligence-led policing, protection of legitimate riders, and disruption of criminal networks using boda-boda operations for illicit purposes. At the same time, counties where crime is mostly opportunistic require public awareness, opportunity reduction, victim protection, community policing, and stronger reporting systems. A uniform response would be inadequate because the organisation of boda-boda-related crime differs across county contexts.

In conclusion, Objective Two contributes to the study by showing that the structure of boda-boda-related crime matters. Understanding whether crime is opportunistic, semi-organised, or organised is essential for designing effective interventions. The findings show that boda-boda-related crime should be addressed through differentiated strategies that protect the livelihood role of the sector while identifying and disrupting the specific criminal elements that exploit motorcycles, stages, routes, and informal transport networks for crime.

4.5 Socio-Economic Drivers of Boda-Boda-Related Crime

This section presents and discusses findings for Objective Three, which sought to examine the socio-economic factors influencing boda-boda-related crime in the selected counties. The analysis focused on eight socio-economic indicators: youth unemployment, poverty or low income, debt pressure, lack of alternative livelihoods, substance abuse, peer influence, low education, and family financial pressure. These indicators were combined into a socio-economic vulnerability index and further examined alongside crime-frequency scores and qualitative themes from the study counties.

The findings show that socio-economic vulnerability is widespread across the boda-boda sector but varies in intensity by county. The results also indicate that socio-economic pressure is associated with boda-boda-related crime, although the relationship is weak and mediated by local

conditions such as border dynamics, urban informality, weak regulation, policing patterns, rider organisation, and the availability of alternative livelihoods. This interpretation is consistent with Kenyan evidence linking boda-boda-related insecurity to unemployment, poverty, drug and substance abuse, peer pressure, weak regulation, rider anonymity, and weak enforcement (National Crime Research Centre [NCRC], 2018), and with policy analysis that identifies weak regulation, training gaps, and coordination challenges as core governance concerns in the subsector (Kenya Institute for Public Policy Research and Analysis [KIPPRA], 2022). This section therefore treats socio-economic vulnerability as an enabling condition rather than as a deterministic cause of crime.

4.5.1 **Reliability of the Socio-Economic Vulnerability Index**

Before interpreting the socio-economic results, the internal consistency of the socio-economic vulnerability index was assessed. Reliability testing was necessary because the index combined several related but distinct indicators: youth unemployment, poverty or low income, debt pressure, lack of alternative livelihoods, substance abuse, peer influence, low education, and family financial pressure. Since these indicators do not measure exactly the same issue, it was important to establish whether they were sufficiently related to justify their combination into a single socio-economic vulnerability index.

The reliability test produced a Cronbach's alpha coefficient of 0.788, with a standardised alpha of 0.790. This indicates acceptable internal consistency for the eight-item scale. Cronbach's alpha is widely used to assess whether multiple items coherently measure an underlying construct, and values above 0.70 are generally considered acceptable in applied social research when interpreted alongside the content and purpose of the scale (Cronbach, 1951; Tavakol & Dennick, 2011). In this study, the alpha value suggests that the eight indicators were sufficiently interrelated to measure a common underlying condition of socio-economic vulnerability among boda-boda riders and boda-boda operating environments.

The reliability result is important because socio-economic vulnerability is a multidimensional condition. It is not adequately captured by one indicator alone. A rider may be unemployed before entering the sector, earn low daily income after joining it, carry household responsibilities, depend on informal credit, face pressure to repay motorcycle loans, lack alternative employment, interact

with risky peer groups, and operate in an environment where substance abuse is normalized. These conditions may overlap and reinforce one another. The index therefore captures cumulative vulnerability rather than a single isolated cause of crime.

4.5.2 **The item statistics further support the construction of the index**

Youth unemployment had the highest overall mean score at 3.995, followed by poverty or low income at 3.826, substance abuse at 3.663, family financial pressure at 3.410, debt pressure at 3.395, lack of alternative livelihoods at 3.334, peer influence at 3.177, and low education at 3.083. This pattern indicates that respondents viewed unemployment and poverty as the most prominent socio-economic pressures in the boda-boda sector, while substance abuse, household pressure, debt, and lack of alternative livelihoods also remained important. Low education and peer influence recorded relatively lower mean scores, but they still contributed to the overall vulnerability structure.

The alpha-if-item-deleted results also supported retention of all eight indicators. None of the indicators, if removed, improved the overall reliability beyond the total alpha value of 0.788. This means that each indicator contributed meaningfully to the scale and that deleting any one of them would not improve the measurement quality of the index. This finding justified keeping all eight indicators in the socio-economic vulnerability index. It also confirmed that the index was not dominated by a single variable, but reflected a broader set of socio-economic and behavioural pressures.

The response distribution further strengthens the interpretation of the index. A high proportion of respondents gave high scores to youth unemployment and poverty or low income, showing that economic hardship was widely perceived as a major driver of vulnerability. Approximately three-quarters of responses to youth unemployment fell in the higher agreement categories, while poverty or low income also recorded high agreement levels. Substance abuse, debt pressure, family financial pressure, and lack of alternative livelihoods also recorded substantial levels of agreement. This suggests that respondents did not see boda-boda crime only as a matter of individual deviance; they linked it to economic survival, social pressure, debt, and weak livelihood alternatives.

The acceptable reliability of the index therefore provides a strong basis for the subsequent analysis. It allows the study to compare socio-economic vulnerability across counties, examine its association with crime frequency, and test its relationship with crime exposure. However, the reliability result should not be interpreted to mean that all socio-economic factors affect crime in the same way. Rather, the index shows that these factors are related enough to form a composite measure, while later analysis identifies how specific counties and specific indicators vary in strength.

Theoretically, the reliability result supports a cumulative-strain interpretation of boda-boda-related crime. Merton's (1938) strain theory emphasizes that crime may occur when individuals face pressure to achieve socially valued economic goals but lack legitimate means of doing so. Agnew's (1992) General Strain Theory extends this argument by showing that strain becomes criminogenic when individuals experience blocked opportunities, financial pressure, negative emotions, and limited lawful coping mechanisms. In the present study, unemployment, poverty, debt pressure, and family financial obligations represent forms of economic strain, while peer influence and substance abuse operate as social and behavioural pathways through which strain may be translated into risky or criminal behaviour.

However, the reliability result also points to an important caution. Socio-economic vulnerability should not be treated as proof that poor or unemployed riders are criminals. The index measures pressure, not guilt. It identifies structural conditions that may increase crime risk, especially where combined with weak regulation, inadequate policing, lack of rider registration, poor stage leadership, and criminal infiltration. Therefore, the findings should be interpreted in a balanced way. They show that crime-prevention strategies should address socio-economic vulnerability, but they should avoid stigmatizing the boda-boda sector as inherently criminal.

In summary, the socio-economic vulnerability index demonstrated acceptable internal consistency and was therefore suitable for further analysis. The reliability results confirm that youth unemployment, poverty or low income, debt pressure, lack of alternative livelihoods, substance abuse, peer influence, low education, and family financial pressure form a coherent set of vulnerability indicators. This index provides the empirical foundation for examining county-level differences and assessing how socio-economic conditions relate to boda-boda-related crime.

4.5.2 **County-Level Patterns of Socio-Economic Vulnerability**

The county-level results show clear variation in socio-economic vulnerability across the seven study counties. The socio-economic vulnerability index was computed from eight indicators: youth unemployment, poverty or low income, debt pressure, lack of alternative livelihoods, substance abuse, peer influence, low education, and family financial pressure. The results show that Marsabit recorded the highest mean socio-economic vulnerability index at 3.95, followed by Busia at 3.60, Machakos at 3.45, Nyeri at 3.44, Mombasa at 3.35, Kirinyaga at 3.33, and Bomet at 3.18. This pattern indicates that socio-economic pressure was present in all counties, but its intensity differed considerably across locations.

The results further show that all counties fell within a moderate-to-high vulnerability range. This means that socio-economic hardship was not limited to one geographical area or one type of boda-boda operating environment. Instead, it appeared as a general structural feature of the boda-boda sector. However, Marsabit and Busia stood out as the most vulnerable contexts. Their high index scores suggest that boda-boda operations in these counties are shaped by stronger pressures of unemployment, poverty, weak livelihood alternatives, substance abuse, debt obligations, and household financial stress. These pressures may increase the likelihood that some individuals in or around the sector become exposed to criminal opportunity structures.

The statistical evidence confirms that the county differences were not random. The Kruskal-Wallis test showed a statistically significant difference in socio-economic vulnerability across counties, $\chi^2 = 204.54$, $df = 6$, $p < 0.001$. This result means that the counties differed meaningfully in their socio-economic vulnerability profiles. Therefore, Objective Three should not be interpreted as showing a uniform socio-economic pattern across all study sites. Rather, the findings show that boda-boda-related crime is shaped by county-specific socio-economic conditions, spatial settings, and institutional environments.

Marsabit recorded the highest mean socio-economic vulnerability index at 3.95. This was driven by particularly high scores for youth unemployment, poverty or low income, substance abuse, low education, and family financial pressure. Marsabit had the highest youth unemployment score at 4.76, the highest poverty or low-income score at 4.18, the highest substance-abuse score at 4.28, the highest low-education score at 3.99, and the highest family-financial-pressure score at 3.84.

These results suggest that Marsabit represents the most socio-economically pressured boda-boda operating environment among the counties studied.

Marsabit also recorded the highest mean crime-frequency score at 3.51. This suggests that socio-economic hardship in Marsabit coincides with higher reported frequency of boda-boda-related crime. The finding is important because Marsabit combines economic vulnerability with frontier, mobility, and security challenges. In such contexts, motorcycles serve important livelihood and transport functions because they connect settlements, markets, grazing areas, border zones, and remote communities. At the same time, the same mobility advantages can be misused by offenders for theft, robbery, movement of illicit goods, smuggling, surveillance, escape after crime, or support to wider criminal networks.

The Marsabit pattern therefore supports the argument that boda-boda-related crime should be understood as both a livelihood problem and a security problem. Where poverty, unemployment, low education, and substance abuse converge with weak policing and difficult terrain, motorcycles can become attractive tools for both legitimate survival and criminal activity. This does not mean that boda-boda riders in Marsabit are inherently criminal. Rather, the findings suggest that the operating environment creates higher vulnerability to criminal infiltration, opportunistic offending, and use of motorcycles in insecurity-related activities.

Busia ranked second in socio-economic vulnerability, with a mean index of 3.60 and a mean crime-frequency score of 3.19. The county scored highly on youth unemployment, poverty or low income, debt pressure, lack of alternative livelihoods, substance abuse, and peer influence. Busia recorded a youth unemployment score of 4.00, poverty or low-income score of 3.93, debt-pressure score of 3.57, lack-of-alternative-livelihood score of 3.56, substance-abuse score of 3.74, and peer-influence score of 3.42. These results show that Busia's vulnerability is broad-based and not limited to one factor.

The Busia findings can be interpreted in relation to the county's border economy and cross-border mobility. Border counties often experience high levels of informal trade, population movement, motorcycle transport demand, and opportunities for both licit and illicit exchange. In such environments, boda-boda motorcycles may support trade, commuting, passenger movement, and

small-scale business. However, they may also be misused for smuggling, quick cross-border movement, transporting stolen goods, ferrying offenders, or avoiding formal checkpoints. This helps explain why socio-economic vulnerability appears strongly connected to crime in Busia.

The Busia pattern also reflects the interaction between economic strain and opportunity. Youth unemployment and poverty may push some individuals into the boda-boda sector as a survival strategy. However, limited alternative livelihoods and debt obligations may keep riders under pressure to earn daily income. Where this pressure occurs in a border environment with high mobility and uneven regulation, the temptation or opportunity to participate in illicit activities may increase. This interpretation is consistent with previous research on boda-boda security challenges in Kenya, which identifies unemployment, poverty, drug abuse, weak regulation, poor enforcement, and inadequate rider identification as factors contributing to crime risks in the sector.

Machakos ranked third, with a mean socio-economic vulnerability index of 3.45 and a mean crime-frequency score of 2.88. The county recorded relatively high scores for poverty or low income at 3.79, youth unemployment at 3.65, debt pressure at 3.57, lack of alternative livelihoods at 3.55, substance abuse at 3.59, and family financial pressure at 3.39. These results suggest that socio-economic pressure in Machakos is substantial, although it does not translate into crime frequency at the same level as Marsabit or Busia.

The Machakos result is important because it shows that moderate-to-high socio-economic vulnerability does not automatically produce high crime frequency. Machakos may have a relatively strong boda-boda presence due to peri-urban growth, commuting patterns, market transport, and links to Nairobi and surrounding towns. However, its lower crime-frequency score compared with Marsabit and Busia suggests that other factors may moderate the relationship between vulnerability and crime. These may include better road connectivity, stronger local administration, more active community surveillance, stronger market integration, or differences in the types of crime experienced.

Nyeri ranked fourth, with a mean socio-economic vulnerability index of 3.44 and a mean crime-frequency score of 2.72. Nyeri recorded a high youth unemployment score at 4.40 and a high poverty or low-income score at 3.99. However, its low-education score was relatively low at 2.43,

the lowest among the counties. This suggests that respondents in Nyeri perceived unemployment and poverty as important socio-economic pressures, but did not strongly associate crime risk with low education.

The Nyeri pattern is significant because it shows that even counties with relatively strong social organisation or higher education indicators may still experience youth-related economic pressure. In this case, unemployment and poverty appear to be more important than low education. This means that educated or semi-educated youth may still enter the boda-boda sector because of limited formal employment opportunities. Therefore, the socio-economic driver is not simply lack of schooling, but the mismatch between education, employment opportunities, income expectations, and available livelihoods.

Mombasa ranked fifth, with a mean socio-economic vulnerability index of 3.35 and the lowest mean crime-frequency score at 2.65. The county recorded high scores for youth unemployment at 3.88, poverty or low income at 3.69, and substance abuse at 3.81. However, it recorded lower scores for debt pressure at 3.00, lack of alternative livelihoods at 3.09, and peer influence at 2.82. This pattern suggests that Mombasa's vulnerability is shaped strongly by unemployment, poverty, and substance abuse, but less by debt and peer influence compared with some other counties.

The Mombasa finding is particularly important because it shows that moderate socio-economic vulnerability does not necessarily produce high reported crime frequency. Mombasa is an urban and coastal county with a complex informal economy, tourism-related activity, port-linked mobility, dense policing, and spatially concentrated crime opportunities. The lower mean crime-frequency score may indicate that boda-boda-related crime is more concentrated in specific spaces rather than evenly distributed across the county. Such spaces may include nightlife areas, informal settlements, transport terminals, beach zones, ferry routes, or market corridors.

This suggests that socio-economic vulnerability in Mombasa may be mediated by urban regulation, policing visibility, tourism surveillance, route concentration, and the presence of alternative informal livelihoods. Although unemployment and substance abuse are visible, crime may be controlled or displaced by stronger surveillance in some areas. Alternatively, some forms of crime may be underreported because they are normalized within urban informality or hidden within

broader coastal security dynamics. Therefore, Mombasa illustrates the importance of interpreting socio-economic vulnerability through local spatial and institutional contexts.

Kirinyaga ranked sixth, with a mean socio-economic vulnerability index of 3.33 and a mean crime-frequency score of 2.71. The county recorded moderate-to-high scores for youth unemployment at 3.80, poverty or low income at 3.50, substance abuse at 3.49, family financial pressure at 3.33, and peer influence at 3.30. However, low education was relatively low at 2.70, and debt pressure was moderate at 3.21. These results suggest that Kirinyaga's boda-boda vulnerability is influenced mainly by youth unemployment, low income, substance abuse, and social influence, rather than by low education alone.

The Kirinyaga pattern suggests that boda-boda-related crime risks may be connected to rural-market mobility, youth income insecurity, and social group dynamics around stages. In counties with strong agricultural economies, boda-boda riders often provide essential transport between farms, markets, schools, trading centres, and households. However, where agricultural income is seasonal or unstable, boda-boda work may become both an income supplement and a fallback livelihood for youth. This may create pressure when daily income is inconsistent, especially among riders supporting households or repaying motorcycle-related debts.

Bomet recorded the lowest mean socio-economic vulnerability index at 3.18, although this still represents moderate vulnerability. The county recorded lower scores than most other counties on youth unemployment at 3.35, substance abuse at 3.14, peer influence at 2.75, and debt pressure at 3.15. However, poverty or low income remained relatively high at 3.60, and family financial pressure was 3.32. This shows that Bomet was not free from socio-economic pressure, but the overall intensity was lower than in Marsabit, Busia, Machakos, and Nyeri.

The Bomet result may indicate a comparatively less intense boda-boda crime-risk environment. Lower vulnerability may be associated with stronger rural social control, more stable community networks, lower anonymity, lower exposure to border-related illicit mobility, or more predictable rider identification within local communities. In rural and semi-rural settings where riders are personally known to passengers, chiefs, elders, stage leaders, and local residents, informal

accountability may reduce criminal opportunity. However, the continued presence of poverty and family financial pressure means that boda-boda riders in Bomet still face livelihood vulnerability.

The county-level pattern therefore shows that socio-economic vulnerability is not evenly distributed. Marsabit and Busia represent high-vulnerability and higher-crime-frequency contexts. Machakos and Nyeri show substantial vulnerability but lower crime-frequency scores, suggesting the presence of moderating factors. Mombasa shows moderate vulnerability but the lowest crime-frequency score, suggesting that urban regulation, surveillance, spatial concentration, or reporting dynamics may shape the relationship between vulnerability and crime. Kirinyaga and Bomet show moderate vulnerability, with crime frequency remaining lower than in Marsabit and Busia.

These differences support the conclusion that socio-economic pressure alone does not fully explain boda-boda-related crime. If socio-economic vulnerability were the only determinant, counties with similar vulnerability scores would have similar crime-frequency scores. However, the findings show variation. For example, Machakos and Nyeri had relatively high socio-economic vulnerability but lower crime-frequency scores than Busia and Marsabit. Similarly, Mombasa had moderate vulnerability but the lowest crime-frequency score. This implies that socio-economic vulnerability interacts with county-specific conditions such as border location, urban density, informal trade, policing intensity, road networks, rider organisation, political interference, and community surveillance.

The findings are consistent with Goodfellow's (2015) argument that informal motorcycle-transport sectors are shaped by local political and regulatory arrangements. Where regulation is weak, fragmented, or politicized, motorcycle-taxi sectors may become difficult to control and vulnerable to disorder. Where regulation is stronger or more consistently enforced, the same sector may remain more organised and less associated with crime. This helps explain why socio-economic vulnerability does not produce identical crime outcomes across counties.

The findings also support Bryceson, Mbara, and Maunder's (2003) argument that mobility and livelihoods are closely connected in sub-Saharan Africa. Boda-boda transport provides access to income, markets, employment, and services, especially where formal transport systems are limited. Porter (2014) similarly shows that transport services matter for poverty reduction and growth

because they shape access to work, markets, education, health care, and other opportunities. In the present study, this explains why counties with high livelihood pressure also reported stronger boda-boda crime concerns.

Overall, the county-level results show that boda-boda-related crime must be addressed through county-specific interventions. Marsabit requires responses that address frontier insecurity, youth unemployment, substance abuse, low education, and household vulnerability. Busia requires border-sensitive interventions that combine rider registration, cross-border security coordination, youth livelihood support, and control of illicit mobility. Machakos and Nyeri require livelihood and employment interventions that reduce the economic pressure on youth while strengthening rider-stage governance. Mombasa requires spatially targeted interventions around high-risk urban and coastal zones, especially where substance abuse and youth unemployment intersect. Kirinyaga and Bomet require preventive interventions that preserve community accountability while addressing poverty, family financial pressure, and rider income insecurity.

In summary, Objective Three shows that socio-economic vulnerability varies significantly across counties. Marsabit and Busia emerged as the most vulnerable counties and also recorded higher crime-frequency scores. Bomet recorded the lowest vulnerability index, while Mombasa recorded the lowest crime-frequency score despite moderate socio-economic vulnerability. These findings show that socio-economic pressure is an important driver of boda-boda-related crime, but it operates through local contexts. Crime is more likely where economic hardship intersects with weak regulation, border mobility, informal trade, substance abuse, peer influence, and limited alternative livelihoods. Therefore, effective policy responses must combine security measures with socio-economic interventions tailored to the specific conditions of each county.

Table 4.17: County-Level Socio-Economic Vulnerability and Crime-Frequency Scores

County	**Mean Vulnerability Index**	**Mean Crime-Frequency Score**	**Main Interpretation**
Marsabit	3.95	3.51	Highest vulnerability and highest crime frequency; frontier and mobility-related risks are important.
Busia	3.60	3.19	High vulnerability and high crime frequency; border mobility and informal trade shape risk.
Machakos	3.45	2.88	Moderate-to-high vulnerability but lower crime frequency than Marsabit and Busia.

Nyeri	3.44	2.72	High youth unemployment and poverty, but lower crime frequency, suggesting moderating local controls.
Mombasa	3.35	2.65	Moderate vulnerability but lowest crime frequency; crime may be spatially concentrated.
Kirinyaga	3.33	2.71	Moderate vulnerability linked to unemployment, low income, and peer influence.
Bomet	3.18	2.83	Lowest vulnerability index, but poverty and family pressure remain present.

Source: Objective Three quantitative survey outputs.

Building from this county-level profile, the next subsection disaggregates the two most consistently reported economic drivers: youth unemployment and poverty or low income.

Youth unemployment and poverty or low income emerged as the most prominent socio-economic drivers of boda-boda-related crime across the study counties. These two factors were consistently ranked highly in the quantitative results and were also strongly reflected in the qualitative narratives. This indicates that many respondents interpreted boda-boda-related crime through an economic survival lens. In other words, crime was not viewed only as a matter of individual moral failure or weak law enforcement, but also as a product of economic hardship, blocked opportunities, unstable income, and the pressure to survive in contexts where formal employment opportunities are limited.

The county-level results show that youth unemployment was the strongest socio-economic factor across most counties. Marsabit recorded the highest youth unemployment score at 4.76, followed by Nyeri at 4.40, Busia at 4.00, Mombasa at 3.88, Kirinyaga at 3.80, Machakos at 3.65, and Bomet at 3.35. These scores show that youth unemployment was not confined to one county; rather, it was a widespread structural concern across the boda-boda sector. However, Marsabit and Nyeri stood out because their youth unemployment scores were especially high. This suggests that in these counties, the boda-boda sector is strongly linked to the limited availability of formal or stable employment opportunities for young people.

4.5.3 **Poverty or low income also recorded high scores in all counties**

Marsabit again recorded the highest poverty or low-income score at 4.18, followed by Nyeri at 3.99, Busia at 3.93, Machakos at 3.79, Mombasa at 3.69, Bomet at 3.60, and Kirinyaga at 3.50. The high scores across all counties indicate that low income is a common feature of the boda-boda

operating environment. Although the sector provides employment, it does not always provide stable or sufficient income. Riders may earn daily income, but this income is often uncertain, seasonal, affected by competition, reduced by fuel costs, police encounters, motorcycle maintenance, loan repayments, stage fees, family obligations, and fluctuations in passenger demand.

The combined pattern of youth unemployment and poverty suggests that the boda-boda sector functions as a livelihood safety net for many young people. Many riders may enter the sector not because it is their preferred occupation, but because it is one of the few available income-generating opportunities. This is particularly important in counties where formal employment is limited, rural economies are weak, or youth lack access to capital, skills, or networks required for other types of work. In such circumstances, boda-boda riding becomes a survival strategy. It provides daily cash, mobility, social identity, and a form of self-employment. However, because entry into the sector is often informal and weakly regulated, it may also expose riders to insecurity, exploitation, debt, peer pressure, substance abuse, and criminal networks.

The findings therefore show that boda-boda-related crime should not be interpreted only as a policing issue. It is also connected to the broader political economy of youth livelihoods. Where youth unemployment is high, the boda-boda sector absorbs young people who have few other options. Where poverty and low income persist, some individuals may become more vulnerable to risky behaviour, illegal opportunities, or recruitment by criminal actors. This does not mean that unemployment or poverty automatically causes crime. Most unemployed or poor young people do not engage in crime, and most boda-boda riders are legitimate workers. However, unemployment and poverty can increase vulnerability by creating economic frustration, reducing lawful alternatives, and making illegal opportunities appear more attractive to a small minority.

This interpretation is consistent with Merton's (1938) strain theory, which argues that crime may emerge when individuals are encouraged to pursue socially valued goals such as income, status, and material success but lack legitimate means to achieve them. In the context of boda-boda operations, many young people face pressure to earn income, support families, repay loans, meet daily needs, and maintain social expectations. Agnew's (1992) General Strain Theory further explains that such pressure can become criminogenic when individuals experience frustration,

blocked opportunities, negative emotions, and limited lawful coping mechanisms. Youth unemployment and poverty therefore represent important forms of economic strain in this study.

The qualitative findings reinforced this interpretation. Across the counties, respondents repeatedly associated boda-boda-related crime with unemployment, jobless youth, idleness, lack of jobs, poor income, poverty, low earnings, and lack of money. These explanations suggest that many community members see crime as partly rooted in economic desperation. For example, where young people lack jobs and spend long hours around stages or informal gathering points, they may become vulnerable to peer influence, substance use, and opportunistic crime. Similarly, where riders earn insufficient income, they may be tempted to carry suspicious passengers, work late at night, participate in illegal transport, or ignore regulations in order to increase earnings.

Marsabit provides the clearest example of the connection between unemployment, poverty, and crime frequency. The county recorded the highest youth unemployment score, the highest poverty or low-income score, and the highest mean crime-frequency score. This suggests that socio-economic hardship in Marsabit coincides with higher reported frequency of boda-boda-related crime. The county's frontier characteristics, long distances, mobility challenges, and security vulnerabilities may intensify the effects of unemployment and poverty. In such contexts, motorcycles are essential for legitimate transport, trade, and access to services. However, the same motorcycles may also be exploited for theft, smuggling, movement of illicit goods, and quick escape after crime.

Busia also demonstrates the relationship between economic vulnerability and crime risk. The county recorded high scores for youth unemployment and poverty or low income, and it also had a relatively high crime-frequency score. Busia's border location creates a distinctive economic and security environment. Boda-boda riders support cross-border movement, trade, passenger transport, and informal economic activity. However, border mobility may also create opportunities for smuggling, movement of stolen goods, and evasion of law enforcement. In such a setting, unemployment and low income may increase the likelihood that some individuals become involved in illicit activities, especially where regulation and rider identification are weak.

Nyeri presents a slightly different pattern. The county recorded the second-highest youth unemployment score and the second-highest poverty or low-income score, yet its mean crime-frequency score was lower than those of Marsabit and Busia. This suggests that unemployment and poverty alone do not fully explain crime frequency. Other factors such as community surveillance, stronger local social control, more effective policing, stronger rider associations, better education levels, or different livelihood alternatives may reduce the likelihood that socio-economic pressure translates into crime. Nyeri therefore shows that economic vulnerability may be present without producing the same level of crime frequency as in more vulnerable or less regulated environments.

Mombasa also recorded high youth unemployment and poverty scores but had the lowest mean crime-frequency score among the counties. This finding is important because it suggests that the relationship between socio-economic hardship and crime may be shaped by urban regulation, tourism-related surveillance, policing visibility, and spatial concentration of crime. In Mombasa, boda-boda-related crime may occur in specific urban spaces such as nightlife zones, transport corridors, informal settlements, beach areas, ferry routes, or market centres rather than being evenly distributed across the county. The county therefore illustrates that poverty and unemployment may create risk, but the visibility and frequency of crime depend on local opportunity structures and enforcement patterns.

Machakos, Kirinyaga, and Bomet also recorded moderate-to-high youth unemployment and poverty scores. These counties show that economic pressure is a general feature of the boda-boda sector even in areas where crime frequency is not as high as in Marsabit or Busia. In Machakos, the boda-boda sector is linked to peri-urban mobility, market access, commuting, and connections to nearby urban centres. In Kirinyaga and Bomet, boda-boda transport supports rural movement, agricultural marketing, school transport, and access to trading centres. However, in all these counties, low income and limited youth employment opportunities create pressure on riders and increase vulnerability to risky practices.

The findings agree with the National Crime Research Centre (2018), which identified unemployment and poverty among the key root causes of boda-boda-related crimes in Kenya. The NCRC report recommended that responses to boda-boda insecurity should address unemployment

and poverty, especially among young people, because many enter the sector due to lack of alternative livelihoods. This study supports that position but adds county-level detail by showing where unemployment and poverty are most intense and how they relate differently to crime frequency across counties.

The findings also agree with transport-livelihood studies in sub-Saharan Africa. Bryceson et al. (2003) argue that transport and mobility are closely linked to livelihoods, especially in contexts where poor households depend on movement to access markets, work, services, and social networks. Porter (2014) similarly observes that transport services influence poverty and development outcomes because they determine people's ability to reach opportunities. In the present study, boda-boda transport plays a similar role. It enables youth to earn daily income and helps communities access markets and services. However, because the sector is informal and income is unstable, it may also reproduce vulnerability.

Goodfellow's (2015) work on informal motorcycle transport further helps explain the findings. He argues that motorcycle-taxi sectors often expand rapidly in African cities and towns because they meet real transport and employment needs, but they may become associated with disorder when regulation is weak or politically compromised. This is relevant to the present study because youth unemployment and poverty push people into the sector, while weak regulation determines whether the sector remains a legitimate livelihood space or becomes vulnerable to criminal misuse.

The findings also support social disorganization theory. Sampson and Groves (1989) argue that socio-economic disadvantage is more likely to produce crime where it weakens informal social control. Applied to the boda-boda sector, unemployment and poverty may increase crime risk where rider stages lack effective leadership, communities have limited control over riders, police enforcement is inconsistent, and offenders can easily hide within the wider population of legitimate riders. In contrast, where community surveillance is stronger and riders are known locally, poverty may not translate into the same level of crime frequency.

An important implication of these findings is that crime-prevention interventions should not focus only on enforcement. Arrests, crackdowns, and motorcycle impoundment may reduce some immediate offences, but they do not address the underlying economic pressures that push

vulnerable youth into risky situations. A more effective response would combine security measures with livelihood interventions. These may include youth vocational training, affordable credit, business development support, rider cooperatives, formalization of stages, subsidized rider training, savings schemes, and alternative employment pathways.

The findings also suggest that county governments should treat the boda-boda sector as part of local economic planning. Since many young people depend on boda-boda work, policies should not only regulate the sector but also improve its economic stability. This may include creating formal rider databases, supporting SACCOs, improving stage infrastructure, providing financial literacy training, linking riders to insurance schemes, and ensuring that motorcycle financing arrangements do not trap riders in exploitative debt. Such measures would reduce economic pressure and make the sector less vulnerable to criminal infiltration.

At the same time, interventions must avoid stigmatizing poor or unemployed youth as criminals. The data show that youth unemployment and poverty are risk factors, not direct proof of criminality. Many riders operate honestly under difficult conditions. Therefore, policy should distinguish between legitimate riders, economically vulnerable riders, opportunistic offenders, and organised criminal actors who use motorcycles for illegal purposes. This distinction is important because blanket criminalization may alienate riders, weaken cooperation with security agencies, and make crime prevention more difficult.

Overall, the findings show that youth unemployment and poverty or low income are core economic drivers of boda-boda-related crime. They create a pressure environment in which some individuals may become vulnerable to criminal involvement, especially where weak regulation, peer influence, substance abuse, debt pressure, and limited livelihood alternatives are present. However, the relationship is not automatic. County context matters. Marsabit and Busia show stronger links between economic vulnerability and crime frequency, while Nyeri and Mombasa show that local social control, policing, regulation, and spatial factors may moderate this relationship. Therefore, effective responses must combine economic empowerment, rider regulation, community policing, and county-specific crime-prevention strategies.

Table 4.18: Youth Unemployment and Poverty Scores by County

County	Youth Unemployment Score	Poverty or Low-Income Score	Interpretation
Marsabit	4.76	4.18	Highest economic vulnerability; unemployment and poverty strongly coincide with high crime frequency.
Nyeri	4.40	3.99	Very high youth unemployment and poverty, but lower crime frequency suggests moderating local controls.
Busia	4.00	3.93	High economic pressure combined with border mobility and informal trade risks.
Mombasa	3.88	3.69	High urban youth unemployment and poverty, but crime may be spatially concentrated.
Kirinyaga	3.80	3.50	Moderate-to-high economic pressure linked to rural-market livelihood insecurity.
Machakos	3.65	3.79	Economic vulnerability shaped by peri-urban growth, commuting, and informal work.
Bomet	3.35	3.60	Lowest youth unemployment score, but poverty remains a relevant pressure.

Source: Objective Three quantitative survey outputs.

Having established unemployment and poverty as the core economic drivers, the analysis next examines the financial pressures that continue after riders enter the sector: debt, household obligations, and limited livelihood alternatives.

4.5.4 **Debt pressure, family financial pressure and lack of alternative**

Debt pressure, family financial pressure, and lack of alternative livelihoods formed another important cluster of socio-economic drivers influencing boda-boda-related crime. While youth unemployment and poverty explain why many young people enter the boda-boda sector, debt pressure, family responsibility, and lack of livelihood alternatives explain why many remain under continuous economic strain after entering the sector. These factors show that boda-boda-related vulnerability is not only caused by lack of work, but also by the unstable, pressured, and financially demanding nature of informal motorcycle transport work.

Debt pressure was an important socio-economic theme across the counties. The county scores were highest in Marsabit at 3.64, followed by Nyeri at 3.59, Busia and Machakos at 3.57, Kirinyaga at 3.21, Bomet at 3.15, and Mombasa at 3.00. These scores indicate that debt pressure was present in all counties, although it was more pronounced in Marsabit, Nyeri, Busia, and Machakos. The qualitative findings showed that debt pressure appeared through motorcycle loans, hire-purchase arrangements, daily repayments, SACCO dues, rental obligations, owner-rider arrangements, fuel costs, repair expenses, and other financial obligations linked to motorcycle ownership or operation.

As shown in Figure 4.10, the three factors of debt pressure, family financial pressure, and lack of alternative livelihoods were not evenly distributed across the counties. Marsabit recorded the highest family financial pressure, while Busia and Machakos recorded some of the highest scores for lack of alternative livelihoods. Debt pressure was especially visible in Marsabit, Nyeri, Busia, and Machakos. This pattern suggests that financial strain within the boda-boda sector is county-specific and is shaped by local livelihood structures, motorcycle ownership arrangements, household dependency, and the availability of alternative income opportunities.

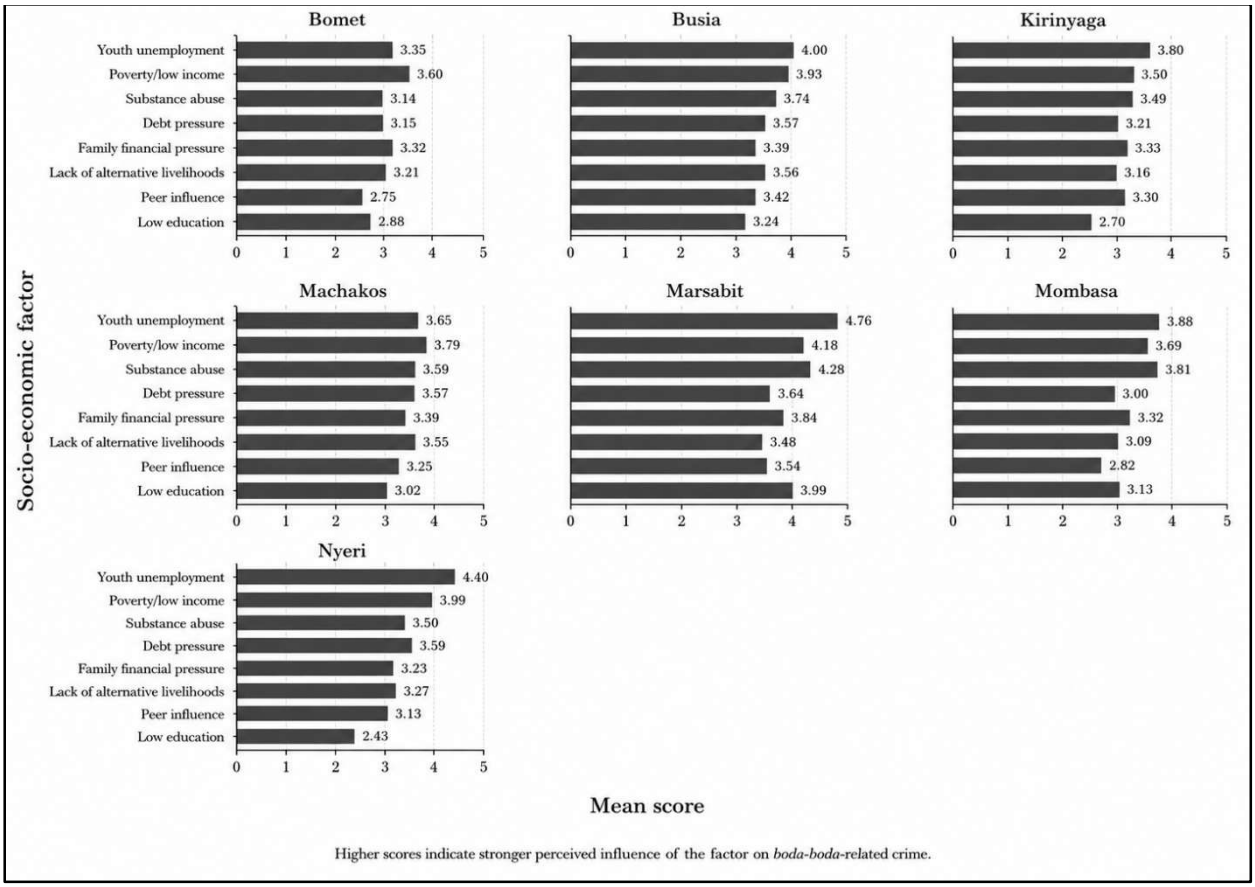


Figure 4.10: Socio-Economic Drivers of Boda-Boda-Related Crime by County
Source: Objective Three quantitative survey outputs.

The figure presents county-level mean scores for the main socio-economic drivers, including youth unemployment, poverty or low income, debt pressure, lack of alternative livelihoods, substance abuse, peer influence, low education, and family financial pressure. Higher scores indicate stronger perceived influence of the factor on boda-boda-related crime. The pattern shows that Marsabit and

Busia recorded some of the strongest socio-economic pressures, while Bomet and Mombasa generally recorded comparatively lower scores on selected indicators.

This finding is important because many boda-boda riders do not operate from a position of full asset ownership. Some riders own their motorcycles, but others ride motorcycles owned by employers, relatives, financiers, SACCOs, or private owners. Others operate under lease, rental, commission, or hire-purchase arrangements. Such arrangements may create daily or weekly repayment pressure. A rider may be required to submit a fixed amount to the motorcycle owner or financier regardless of whether the day was profitable. This means that economic pressure continues even when passenger demand is low, when fuel prices rise, when the motorcycle breaks down, when the rider is sick, when police crackdowns occur, or when insecurity reduces night travel.

Under such conditions, debt pressure can influence rider behaviour in several ways. First, it may push riders to extend working hours into late evening or night periods, when crime risks are higher. Second, it may encourage riders to operate in unsafe locations or carry passengers they would otherwise avoid. Third, it may lead riders to ignore safety regulations, over-speed, overload, or compete aggressively for passengers. Fourth, it may make some riders vulnerable to illegal opportunities, including transporting stolen goods, ferrying criminals, participating in smuggling, or accepting suspicious assignments for quick money. Therefore, debt pressure does not directly cause crime, but it may reduce the ability of riders to reject risky or illegal opportunities.

Marsabit's high debt-pressure score of 3.64 is particularly significant because it occurs alongside the county's high socio-economic vulnerability and high crime-frequency score. In Marsabit, debt pressure may be intensified by long distances, fuel costs, poor road conditions, insecurity, and irregular passenger demand. Where motorcycles are used to connect dispersed settlements, markets, grazing zones, border spaces, and remote communities, operating costs may be high and earnings unpredictable. Riders who are under debt obligations may therefore face stronger pressure to take risks in order to meet repayment targets.

Nyeri also recorded a high debt-pressure score of 3.59. This is notable because Nyeri also had high youth unemployment and poverty scores, but lower crime frequency than Marsabit and Busia. The

Nyeri pattern suggests that debt pressure is present, but its effect on crime may be moderated by other local factors such as stronger community surveillance, better rider identification, more organised stages, stronger local administration, or greater social accountability. This shows that debt pressure should be understood as a risk factor whose effect depends on local regulatory and social-control conditions.

Busia and Machakos each recorded debt-pressure scores of 3.57. In Busia, debt pressure must be interpreted in relation to the county's border economy and informal trade. Riders under repayment pressure may be tempted to participate in cross-border movement of goods, including goods that may not pass through formal customs channels. In such contexts, the boda-boda motorcycle may become both an income tool and a mobility instrument for informal or illegal exchange. In Machakos, debt pressure may be linked to peri-urban expansion, competition for passengers, commuting routes, and motorcycle financing arrangements. Riders may operate in competitive environments where daily income is uncertain, but repayment expectations remain fixed.

Family financial pressure also recorded consistently moderate-to-high scores across counties. Marsabit had the highest score at 3.84, followed by Busia and Machakos at 3.39, Kirinyaga at 3.33, Bomet and Mombasa at 3.32, and Nyeri at 3.23. These scores show that boda-boda income is often not merely personal income. It is tied to wider household survival. Riders may be expected to provide food, pay rent, meet school fees, support spouses, children, parents, or siblings, pay medical bills, contribute to funerals or social obligations, and respond to emergencies. Therefore, the pressure on riders is both individual and household based.

This finding broadens the interpretation of boda-boda-related crime beyond individual greed. Some respondents may explain crime as a result of "quick money," but the deeper finding is that many riders operate under pressure to meet family needs. In such contexts, crime risk may arise where household survival pressures combine with unstable daily income and weak regulation. A rider who fails to meet daily family obligations may experience stress, shame, frustration, or pressure to find income by any available means. This does not mean that family responsibility causes crime. Rather, it means that family pressure forms part of the broader strain environment that may increase vulnerability to risky behaviour.

The lack of alternative livelihoods also scored highly across the counties. Busia recorded the highest score at 3.56, followed closely by Machakos at 3.55, Marsabit at 3.48, Nyeri at 3.27, Bomet at 3.21, Kirinyaga at 3.16, and Mombasa at 3.09. These findings indicate that many riders remain in the boda-boda sector not because the sector is always profitable or secure, but because they lack viable alternatives. In this sense, boda-boda work becomes a survival occupation. Riders may continue operating even when income is unstable, risks are high, or debt obligations are heavy because there are few other accessible livelihood options.

Taken together, debt pressure, family financial pressure, and lack of alternative livelihoods show that boda-boda-related crime must be understood within a wider livelihood system. Riders are not only transport workers; they are also borrowers, household providers, young job seekers, informal entrepreneurs, and members of peer-based stage networks. Their decisions are shaped by multiple pressures at the same time. A rider may need to repay a motorcycle loan, provide for children, buy fuel, repair the motorcycle, pay stage fees, and compete for passengers in the same day. When legitimate earnings are insufficient, some riders may become more vulnerable to risky or illegal opportunities.

This finding agrees with previous research on transport and poverty in sub-Saharan Africa. Bryceson et al. (2003) show that mobility services are closely connected to livelihoods because transport enables access to work, markets, services, and social networks. Porter (2014) similarly demonstrates that transport services can support poverty reduction by expanding access to livelihood opportunities. However, the findings of this study show the other side of that relationship: where transport work itself is informal, unstable, and weakly regulated, it may become a survival sector marked by income insecurity, debt, and exposure to risk.

The findings also agree with the National Crime Research Centre (2018), which identified unemployment, poverty, weak regulation, drug and substance abuse, peer pressure, and high cost of living as root causes of boda-boda-related crime in Kenya. The NCRC also noted that some perpetrators and victims of boda-boda-related crime include riders hired on commission, riders who hire motorcycles from owners, motorcycle owners, passengers, and members of the public. This supports the present study's finding that ownership and employment arrangements matter. Riders operating hired or owner-controlled motorcycles may face greater financial pressure

because they must satisfy the owner's income expectations while also meeting their own household needs.

Goodfellow's (2015) work on informal transport politics is also useful in interpreting these findings. He argues that motorcycle-taxi sectors in African cities and towns are not merely transport systems; they are also political and economic spaces shaped by regulation, informality, and state capacity. Where regulation is weak or inconsistent, informal transport workers may become difficult to govern, and criminal actors may exploit the sector. In the present study, debt pressure and lack of alternative livelihoods may make riders economically vulnerable, while weak regulation determines whether such vulnerability is contained or converted into insecurity.

Theoretically, the findings are consistent with strain theory. Merton (1938) explains that when individuals face pressure to achieve economic goals but lack legitimate means, some may turn to illegitimate strategies. Agnew (1992) further shows that financial stress, blocked opportunities, and inability to meet responsibilities can create negative emotions that increase the risk of criminal coping. In the context of boda-boda work, debt repayment, household obligations, and lack of alternative livelihoods represent forms of strain. However, these pressures do not affect all riders in the same way; their effect depends on social control, peer networks, policing, stage leadership, and individual choices.

Overall, debt pressure, family financial pressure, and lack of alternative livelihoods deepen the socio-economic vulnerability of boda-boda riders. These factors explain why some riders continue operating under risky conditions and why some may become exposed to criminal opportunities. The findings do not suggest that indebted or poor riders are criminals. Rather, they show that financial pressure creates a vulnerability environment. Crime becomes more likely where this pressure intersects with weak regulation, poor rider identification, peer influence, substance abuse, border mobility, and limited policing. Therefore, effective responses must combine security enforcement with livelihood support, fair financing, rider organisation, and county-specific economic interventions.

Table 4.19: Debt Pressure, Family Financial Pressure, and Lack of Alternative Livelihoods by County

County	Debt Pressure Score	Family Financial Pressure Score	Lack of Alternative Livelihood Score	Interpretation
Marsabit	3.64	3.84	3.48	Highest household pressure; debt and limited alternatives combine with frontier insecurity.
Busia	3.57	3.39	3.56	High pressure linked to border mobility, informal trade, and limited livelihood alternatives.
Machakos	3.57	3.39	3.55	Strong debt and livelihood pressure in a peri-urban and competitive transport economy.
Nyeri	3.59	3.23	3.27	High debt pressure, but lower crime frequency suggests moderating local controls.
Kirinyaga	3.21	3.33	3.16	Moderate pressure linked to rural-market livelihoods and household needs.
Bomet	3.15	3.32	3.21	Moderate pressure; poverty and family responsibility remain relevant.
Mombasa	3.00	3.32	3.09	Lower debt and alternatives pressure, but urban living costs and informal work remain important.

Source: Objective Three quantitative survey outputs.

The preceding subsection explained the financial strain that surrounds boda-boda work. The analysis now turns to behavioural and social mechanisms that may convert economic vulnerability into risky or criminal conduct: substance abuse and peer influence.

4.5.5 **Substance Abuse and Peer Influence**

Substance abuse and peer influence emerged as important socio-economic and behavioural drivers of boda-boda-related crime. While the preceding sections showed that economic hardship, debt pressure, family obligations, and lack of alternative livelihoods create a vulnerability environment, the findings in this subsection show that vulnerability is also reinforced through social networks, group behaviour, and risky lifestyles. Substance abuse and peer influence are therefore important because they help explain how economic pressure may be translated into unsafe, disorderly, or criminal behaviour within some boda-boda operating spaces.

Substance abuse was a strong factor in several counties. Marsabit recorded the highest substance-abuse score at 4.28, followed by Mombasa at 3.81, Busia at 3.74, Machakos at 3.59, Nyeri at 3.50, Kirinyaga at 3.49, and Bomet at 3.14. These scores show that substance abuse was present across

all study counties, although its intensity varied. Marsabit stood out as the county where respondents most strongly associated substance abuse with boda-boda-related crime. Mombasa, Busia, and Machakos also recorded relatively high scores, suggesting that substance abuse is not restricted to frontier or rural contexts but also appears in coastal, border, urban, and peri-urban environments.

As shown in Figure 4.5.1, substance abuse was among the highest-rated socio-economic drivers in Marsabit, Mombasa, and Busia. The figure also shows that although Bomet recorded the lowest substance-abuse score, the score remained above the midpoint, indicating that substance abuse was still perceived as a relevant issue. This pattern suggests that substance use is not an isolated county-specific problem but a cross-cutting behavioural risk within the boda-boda sector.

The qualitative findings reinforced the quantitative pattern. Respondents repeatedly referred to alcohol, drugs, bhang, drinking, narcotics, intoxication, and drug peddling as issues affecting some boda-boda riders or motorcycle users. These themes suggest that substance abuse may influence boda-boda-related crime in several ways. First, intoxication may impair judgement and increase aggressive or reckless behaviour. Second, substance abuse may reduce riders' ability to comply with traffic rules, safety regulations, and passenger-care obligations. Third, drug use may increase the need for quick money to sustain consumption habits. Fourth, some stages or operating spaces may become points of drug sale, distribution, or consumption, creating opportunities for criminal networks to interact with riders.

Marsabit's high substance-abuse score is particularly significant because the county also recorded the highest socio-economic vulnerability index and the highest mean crime-frequency score. This suggests that substance abuse in Marsabit may be interacting with other forms of vulnerability, including youth unemployment, poverty, low education, family financial pressure, and frontier insecurity. In such an environment, substance abuse may not simply be an individual habit; it may become part of a wider risk environment where economic frustration, weak regulation, difficult policing, and limited livelihood alternatives increase the likelihood of criminal involvement.

Mombasa recorded the second-highest substance-abuse score at 3.81, despite having the lowest mean crime-frequency score among the counties. This finding is important because it suggests that

substance abuse may be present without producing uniformly high crime frequency across the county. In Mombasa, substance abuse may be concentrated in particular urban spaces such as nightlife zones, informal settlements, beaches, ferry routes, transport terminals, and market areas. The county's urban and coastal economy may provide multiple sites where youth unemployment, informal transport, nightlife activity, and drug availability intersect. Therefore, the lower overall crime-frequency score should not be interpreted to mean that substance abuse is insignificant. Rather, it may indicate that substance-related boda-boda crime is spatially concentrated or unevenly reported.

Busia also recorded a high substance-abuse score at 3.74. This is important because Busia combines border mobility, informal trade, youth unemployment, and high socio-economic vulnerability. In such a setting, substance abuse may reinforce cross-border crime risks by weakening self-control, increasing association with risky peer groups, or connecting riders to informal and illicit networks. The border environment may also increase exposure to smuggling, drug circulation, and unregulated transport movement. Therefore, in Busia, substance abuse should be interpreted not only as a personal behaviour but also as a factor linked to mobility, informal trade, and weak control of some transport spaces.

Machakos, Nyeri, and Kirinyaga recorded moderate-to-high substance-abuse scores of 3.59, 3.50, and 3.49 respectively. These scores show that substance abuse is also relevant in peri-urban and agriculturally linked counties. In Machakos, substance abuse may be associated with expanding towns, transport corridors, youth unemployment, and competition among riders. In Nyeri and Kirinyaga, the issue may be linked to rural-market centres, youth idleness, low income, and informal social networks around stages. These findings show that substance abuse is not only an urban or coastal issue. It also appears in rural and semi-rural boda-boda environments where youth gather around stages and trading centres.

Bomet recorded the lowest substance-abuse score at 3.14. However, this score still indicates moderate concern. The relatively lower score may suggest stronger community surveillance, more stable social networks, lower anonymity, or lower visibility of substance-related crime compared with counties such as Marsabit, Mombasa, and Busia. In rural settings where riders are known by residents, chiefs, elders, stage leaders, and passengers, substance abuse may be more easily noticed

and informally controlled. Nevertheless, the score shows that Bomet should not be excluded from substance-abuse prevention interventions.

Peer influence was also present across the counties. Marsabit recorded the highest peer-influence score at 3.54, followed by Busia at 3.42, Kirinyaga at 3.30, Machakos at 3.25, Nyeri at 3.13, Mombasa at 2.82, and Bomet at 2.75. These scores show that peer influence was perceived as a relevant driver, although generally lower than youth unemployment, poverty, and substance abuse. This means that respondents considered peer influence important, but not as dominant as economic hardship or drug-related factors.

Peer influence is important because boda-boda work is highly social. Riders commonly operate from stages, wait for passengers together, share information about routes and customers, borrow money from one another, assist each other during emergencies, and develop group norms around work, safety, competition, and relations with police. These networks can provide positive support, including mutual assistance, security alerts, savings groups, and collective bargaining. However, the same networks can also normalize risky behaviour where stage leadership is weak or where deviant practices become accepted among some members.

The findings suggest that peer influence may shape boda-boda-related crime in several ways. First, riders may be encouraged by peers to participate in risky or illegal activities for quick income. Second, new or younger riders may learn behaviour from older riders, including how to evade police, ignore traffic rules, carry suspicious clients, or operate in restricted areas. Third, group loyalty may lead some riders to protect offenders, resist arrest, hide stolen motorcycles, or obstruct law enforcement. Fourth, peer pressure may encourage substance use, especially where drinking, bhang use, or other drug use becomes part of stage culture. Fifth, peer networks may be exploited by criminal actors seeking riders who can provide transport, surveillance, escape, or access to particular routes.

Marsabit's high peer-influence score is consistent with its high scores on other vulnerability indicators. Where unemployment, poverty, substance abuse, and insecurity are already high, peer networks can become powerful channels through which risky behaviour spreads. In Marsabit, peer

influence may interact with frontier mobility and weak enforcement in remote areas, making it easier for criminal practices to be shared, tolerated, or concealed within some rider networks.

Busia's peer-influence score of 3.42 is also important because of the county's border setting. Peer networks may influence how riders participate in cross-border movement, informal trade, and transport of goods. Where some riders benefit from illicit cross-border activity, others may be encouraged to join. Peer influence may therefore contribute to the normalization of informal or illegal transport practices, especially where enforcement is inconsistent or where illegal earnings are perceived as attractive.

Kirinyaga and Machakos recorded peer-influence scores of 3.30 and 3.25 respectively. These counties show that peer influence is also relevant outside high-border or frontier contexts. In agricultural and peri-urban counties, rider stages are important social spaces. Young riders may spend long hours together while waiting for passengers, especially during low-demand periods. Such spaces may create opportunities for group bonding, but also for the spread of substance use, gambling, political mobilization, and risky behaviour.

Nyeri recorded a peer-influence score of 3.13. This suggests that peer influence is present but may be moderated by local social controls. Nyeri's relatively lower crime-frequency score despite high youth unemployment and poverty may indicate that community surveillance, better education levels, more effective local administration, or stronger rider accountability reduce the extent to which peer influence translates into crime. This finding supports the broader argument that socio-economic pressure becomes more criminogenic where informal social controls are weak.

Mombasa and Bomet recorded the lowest peer-influence scores at 2.82 and 2.75 respectively. In Mombasa, this may mean that substance abuse and unemployment are more visible drivers than peer pressure. It may also reflect the more fluid and anonymous nature of urban transport work, where riders may not depend on stable peer groups in the same way as riders in smaller towns or rural stages. In Bomet, the lower peer-influence score may suggest stronger community-level monitoring or more stable stage organisation. However, the scores do not mean peer influence is absent; rather, it is less dominant compared with other socio-economic drivers.

The findings agree with social learning and differential association perspectives in criminology. Sutherland's (1947) differential association theory argues that criminal behaviour is learned through interaction with others, especially where individuals are exposed to definitions favourable to law violation. Akers' (1998) social learning theory further explains that behaviour is reinforced through imitation, peer approval, rewards, and group norms. In the boda-boda sector, this means that riders who regularly interact with peers involved in substance use, theft, smuggling, violence, or police evasion may become more likely to view such behaviour as acceptable or profitable.

The findings also support social disorganization theory. Sampson and Groves argue that crime is more likely where communities have weak informal social control. Applied to the boda-boda sector, peer influence becomes riskier where rider stages lack effective leadership, where community members do not know riders, where police-rider relations are poor, and where criminal actors can hide among legitimate operators. In contrast, where riders are registered, stage leaders are accountable, and communities can identify riders, peer networks may become sources of discipline rather than disorder.

The National Council for Population and Development (2017) identifies poverty, peer pressure, easy access to drugs and alcohol, family breakdown, and unemployment as causes of alcohol and drug abuse among young people in Kenya. It also links alcohol and drug abuse to violence, crime, low productivity, school dropouts, and other social harms. This supports the present study's finding that substance abuse and peer influence are not isolated behavioural problems. They are embedded within wider socio-economic and social-control conditions.

The National Crime Research Centre (2018) also identifies drug and substance abuse and peer pressure among the root causes of boda-boda-related crime in Kenya. The present study strengthens that finding by showing county-level variation. Substance abuse was highest in Marsabit, Mombasa, and Busia, while peer influence was highest in Marsabit, Busia, and Kirinyaga. This means that policy interventions should not treat all counties in the same way. Counties with high substance-abuse scores may require stronger prevention, treatment, enforcement, and rehabilitation measures. Counties with high peer-influence scores may require stronger stage leadership, rider mentorship, association-based discipline, and community policing.

The implication is that boda-boda crime prevention must address both behaviour and structure. Substance abuse cannot be reduced only through arrests or crackdowns. It requires prevention education, counselling, referral services, treatment support, youth programmes, and control of drug supply networks. Peer influence cannot be managed only by punishing individual riders. It requires organised stages, accountable rider leadership, mentorship for young riders, clear codes of conduct, disciplinary mechanisms within rider associations, and cooperation between riders, police, chiefs, county officials, and community members.

Substance-abuse interventions should be especially prioritized in Marsabit, Mombasa, Busia, and Machakos because these counties recorded relatively high scores. In Marsabit, interventions should address the link between substance abuse, youth unemployment, frontier insecurity, and low education. In Mombasa, interventions should focus on high-risk urban spaces where youth unemployment, nightlife, informal transport, and drug availability intersect. In Busia, interventions should link drug-control measures with border security, rider registration, and control of illicit mobility. In Machakos, interventions should target peri-urban stages, transport corridors, and youth groups.

Peer-influence interventions should be especially prioritized in Marsabit, Busia, Kirinyaga, and Machakos. These interventions should strengthen positive group norms among riders. Rider associations and SACCOs can be used to promote peer accountability, reporting of suspicious riders, discouragement of substance use at stages, and cooperation with local security structures. Stage leaders should be trained to identify risky behaviour, support conflict resolution, and report criminal infiltration without exposing legitimate riders to harassment.

Overall, substance abuse and peer influence deepen socio-economic vulnerability within the boda-boda sector. They show that boda-boda-related crime is not driven only by poverty or unemployment, but also by group norms, drug availability, social learning, weak stage governance, and ineffective regulation. Substance abuse may impair judgement, increase violence, create demand for quick money, and link riders to illicit networks. Peer influence may normalize risky behaviour, encourage rule-breaking, and protect offenders. However, peer networks can also be used positively if rider associations, SACCOs, and stage leaders are strengthened. Therefore,

effective policy should transform boda-boda peer networks from sources of risk into structures of accountability, discipline, and crime prevention.

Table 4.19: Substance Abuse and Peer Influence Scores by County

County	Substance Abuse Score	Peer Influence Score	Interpretation
Marsabit	4.28	3.54	Highest scores on both indicators; substance abuse and peer networks may reinforce frontier insecurity and socio-economic vulnerability.
Mombasa	3.81	2.82	High substance-abuse score, but lower peer influence; risks may be spatially concentrated in urban and coastal activity zones.
Busia	3.74	3.42	High substance abuse and peer influence; border mobility and informal trade may increase exposure to illicit networks.
Machakos	3.59	3.25	Moderate-to-high scores; peri-urban transport corridors and youth networks may shape risk.
Nyeri	3.50	3.13	Substance abuse present, but peer influence may be moderated by local social controls.
Kirinyaga	3.49	3.30	Peer influence relatively strong; rural-market stage networks may shape behaviour.
Bomet	3.14	2.75	Lowest scores, but both factors remain relevant and require preventive attention.

Source: Objective Three quantitative survey outputs.

The discussion of substance abuse and peer influence shows how social networks and risky behaviour reinforce vulnerability. The next subsection considers education and skills constraints as background factors that shape employability, regulatory awareness, financial literacy, and rider professionalism.

4.5.6 **Low education and skills constraints**

Low education and skills constraints recorded a mixed pattern in the analysis of socio-economic drivers of boda-boda-related crime. Quantitatively, low education was present across all counties, although it was not among the highest-ranked socio-economic drivers when compared with youth unemployment, poverty or low income, substance abuse, debt pressure, and financial pressure. Marsabit recorded the highest low-education score at 3.99, followed by Busia at 3.24, Mombasa at 3.13, Machakos at 3.02, Bomet at 2.88, Kirinyaga at 2.70, and Nyeri at 2.43. This pattern shows that education-related vulnerability was strongest in Marsabit and weakest in Nyeri.

As shown in Figure 4.5.1, low education was not uniformly high across the counties. Marsabit stood out clearly, with a score close to 4.00, suggesting that respondents in the county perceived

low education as an important factor shaping boda-boda-related crime. Busia, Mombasa, and Machakos recorded moderate scores, while Nyeri and Kirinyaga recorded comparatively lower scores. This indicates that low education is not a universal driver of boda-boda-related crime in the same way as youth unemployment and poverty. Instead, its influence varies according to county-level conditions, access to schooling, rider training, employment opportunities, and the structure of local labour markets.

The qualitative findings also showed that low education was not as strongly represented as other socio-economic themes. In the qualitative coding summarized in Table 4.5.6, themes such as youth unemployment, poverty or low income, debt pressure, lack of alternative livelihoods, substance abuse, peer influence, and family financial pressure appeared more prominently in respondents' explanations. This suggests that respondents were more likely to explain boda-boda-related crime through immediate economic and behavioural pressures than through education alone. In other words, unemployment, low income, substance abuse, and debt were more visible to respondents as direct explanations of crime than schooling level.

However, the lower qualitative visibility of low education does not mean that education is unimportant. Rather, it suggests that low education operates indirectly. It may not always appear as the immediate cause of crime, but it can shape the conditions under which riders become vulnerable to crime. Education influences employability, understanding of legal obligations, capacity to interpret regulations, ability to manage finances, access to alternative livelihoods, and awareness of the long-term consequences of criminal involvement. Therefore, low education should be interpreted as a background vulnerability factor rather than a direct and independent cause of boda-boda-related crime.

Marsabit's high low-education score is particularly important because the county also recorded high levels of youth unemployment, poverty or low income, substance abuse, family financial pressure, and crime frequency. This suggests that low education in Marsabit may be part of a broader pattern of structural disadvantage. Where educational opportunities are limited, formal employment opportunities are scarce, and household poverty is high, young people may enter the boda-boda sector with limited skills and few alternatives. In such contexts, low education may

reduce their ability to transition into more stable occupations or to participate effectively in regulated transport structures.

Busia recorded a moderate low-education score of 3.24. This finding is significant because Busia also recorded high scores for youth unemployment, poverty, lack of alternative livelihoods, substance abuse, and peer influence. In a border county such as Busia, low education may affect riders' ability to distinguish between legitimate and illegal cross-border activities, understand regulatory requirements, manage risk, and resist involvement in informal or illicit transport networks. However, the stronger drivers in Busia were economic pressure and border mobility, meaning that low education should be understood as one factor reinforcing vulnerability rather than the main explanation.

Mombasa recorded a low-education score of 3.13. This indicates a moderate perception that education and skills constraints contribute to boda-boda-related crime. In an urban and coastal setting, low education may limit access to formal employment and push some young people into informal transport work. However, Mombasa also has a wider informal economy, including tourism-related activities, port-linked work, casual labour, petty trade, and service-sector opportunities. Therefore, the relationship between low education and crime may be mediated by the availability of other informal livelihood options. The county's high substance-abuse and youth-unemployment scores suggest that behavioural and economic factors may be more visible than education alone.

Machakos recorded a low-education score of 3.02. This suggests that education-related vulnerability exists but is moderate. In a peri-urban county, boda-boda work may attract young people who have some schooling but lack formal employment. Therefore, the issue may not be lack of basic education alone, but lack of employable skills, vocational training, business skills, financial literacy, and access to capital. This distinction is important because a rider may have attended school but still lack practical skills needed to enter other occupations. Therefore, skills constraints may be more important than schooling level alone.

Bomet recorded a low-education score of 2.88, while Kirinyaga recorded 2.70. These relatively lower scores suggest that low education was not perceived as a major driver compared with

poverty, family financial pressure, youth unemployment, and lack of livelihood alternatives. In rural and agricultural counties, some riders may have basic education but still face limited employment opportunities. This means that the main problem may be the absence of viable economic pathways after schooling rather than education level itself. Therefore, interventions should not focus only on formal schooling but also on practical training, agricultural value-chain skills, enterprise development, and financial literacy.

Nyeri recorded the lowest low-education score at 2.43. This is notable because Nyeri recorded high scores for youth unemployment and poverty or low income. The finding suggests that respondents in Nyeri did not strongly associate boda-boda-related crime with low education. Instead, the county's challenge appears to be more related to unemployment and income insecurity among youth who may already have some level of education. This pattern is important because it shows that education alone does not guarantee employment or prevent entry into precarious informal work. Educated or semi-educated youth may still enter the boda-boda sector when the formal economy cannot absorb them.

The findings therefore caution against treating low education as a direct cause of crime. The data show that low education was part of the socio-economic vulnerability structure, but it was not the strongest driver in most counties. This means that crime-prevention policies should avoid simplistic claims that boda-boda-related crime is caused by lack of schooling. Such a view would ignore the stronger effects of unemployment, poverty, substance abuse, debt pressure, peer influence, and weak regulation. A more accurate interpretation is that low education deepens vulnerability when it combines with other pressures.

Low education may influence crime risk through employability. Riders with limited education or skills may find it difficult to access formal jobs, technical work, public-sector employment, or stable private-sector opportunities. As a result, boda-boda work becomes one of the few accessible livelihood options. Since entry into the sector may require less formal education than many other occupations, it absorbs young people who are excluded from other forms of employment. This makes the sector socially important but also vulnerable to overcrowding, low earnings, and weak professional standards.

Low education may also affect knowledge of laws and regulations. Riders with limited training may not fully understand traffic rules, licensing requirements, insurance obligations, passenger safety standards, road-use regulations, and the legal consequences of aiding crime. This can contribute to unlawful behaviour, not always because riders intend to commit crime, but because they may lack adequate training and awareness. In such cases, violations may arise from weak knowledge, poor enforcement, or informal norms rather than deliberate criminal intent.

Financial literacy is another important pathway. Many boda-boda riders operate under loan, hire-purchase, rental, or owner-rider arrangements. Riders with limited financial literacy may enter into exploitative agreements, misunderstand repayment obligations, fail to plan for fuel and maintenance costs, or lack savings strategies. This can increase debt pressure and economic frustration. Where financial pressure becomes severe, some riders may become more willing to accept risky passengers, work in unsafe places, operate at night, or participate in illegal transport assignments for quick money.

Low education may also reduce the ability of riders to transition into alternative livelihoods. Without vocational skills, digital skills, business training, driving qualifications, agricultural value-chain skills, mechanical skills, or entrepreneurship support, riders may remain locked into boda-boda work even when earnings are low and risks are high. This supports the argument that the boda-boda sector becomes a survival occupation for many young people. Education and skills therefore matter not only because they influence crime directly, but because they determine whether riders have realistic exit options from risky or low-income work.

4.5.6.1 ***Skills Constraints:*** Skills constraints may also affect stage governance and rider professionalism. Where riders lack training in customer care, conflict resolution, road safety, ethics, financial management, and basic legal awareness, boda-boda stages may become disorderly or poorly organised. Weak professionalism can create opportunities for criminal infiltration because legitimate riders may not have strong systems for identifying offenders, reporting suspicious activity, or enforcing stage rules. Training can therefore strengthen both livelihood capacity and crime prevention.

This interpretation aligns with KIPPRA's (2022) observation that the boda-boda sector requires stronger regulation, training, coordination, rider organisation, and institutional support. KIPPRA argues that training gaps and weak coordination between riders, regulatory agencies, and training institutions contribute to disorder in the sector. The present study supports this view by showing that low education and skills constraints are part of the vulnerability environment, especially in counties such as Marsabit, Busia, Mombasa, and Machakos.

The findings also support the National Crime Research Centre's (2018) recommendation that rider training should be subsidized. This recommendation is important because many young people who enter the boda-boda sector are poor, unemployed, or financially constrained. If formal training is expensive, riders may avoid it or enter the sector without adequate preparation. Subsidized training would improve compliance, road safety, passenger protection, financial management, and awareness of crime risks. It would also reduce the burden on poor riders who cannot afford private training but still need to work.

The relationship between low education and boda-boda-related crime can also be interpreted using strain theory. Merton's strain theory suggests that crime risk increases when individuals are expected to achieve economic success but lack legitimate means to do so. Low education may reduce access to legitimate employment opportunities, thereby increasing economic strain. Agnew's General Strain Theory further suggests that blocked opportunities, failure to achieve goals, and financial pressure can generate frustration and negative emotions. In the present study, low education may contribute to such strain by limiting employment choices and increasing dependence on informal work.

4.5.6.2 ***Social Disorganization Theory Relevance***: Where low education combines with poverty, unemployment, weak community supervision, poor stage leadership, and limited institutional support, informal social control may weaken. In such settings, riders may lack organised structures for self-regulation, and criminal actors may exploit the sector. However, where rider associations, community policing, and training systems are strong, low education may be less likely to translate into crime risk. This explains why low education has different meanings across counties.

The policy implication is that education-based interventions should go beyond formal schooling. Since many riders are already adults and active workers, the most relevant interventions are practical and skills based. These may include rider training, defensive riding, licensing support, basic legal awareness, financial literacy, customer care, first aid, conflict resolution, business management, digital payment skills, and cooperative management. Such interventions would strengthen the professional identity of riders and reduce the likelihood that the sector is viewed as informal, disorderly, or criminal.

4.5.6.3 ***Training a County Specific Imperative:*** In Marsabit, where low education was highest, training should be linked to livelihood diversification, literacy support, security awareness, and substance-abuse prevention. In Busia, training should include cross-border regulations, anti-smuggling awareness, rider identification, and cooperation with border security agencies. In Mombasa, training should address urban passenger safety, tourism-related conduct, substance-abuse risks, and crime prevention in high-risk zones. In Machakos, training should focus on peri-urban transport professionalism, financial literacy, and traffic compliance. In Nyeri, Kirinyaga, and Bomet, training should focus on entrepreneurship, agricultural transport services, savings, and alternative livelihood pathways.

Overall, low education and skills constraints are relevant but not dominant drivers of boda-boda-related crime. The findings show that respondents were more likely to explain crime through unemployment, poverty, substance abuse, debt pressure, peer influence, and lack of alternative livelihoods. However, low education remains important because it affects employability, regulatory awareness, financial literacy, rider professionalism, and ability to transition into alternative livelihoods. Therefore, low education should be understood as an indirect vulnerability factor that becomes more significant when combined with economic hardship, weak regulation, poor training, and limited livelihood opportunities.

Table 4.20: Low-Education Scores by County

County	Low-Education Score	Interpretation
Marsabit	3.99	Highest education-related vulnerability; low education may reinforce poverty, unemployment, substance abuse, and frontier insecurity.
Busia	3.24	Moderate education-related vulnerability; skills constraints may interact with border mobility and informal trade.
Mombasa	3.13	Moderate score; low education may limit access to formal employment, but substance abuse and unemployment appear more visible.
Machakos	3.02	Moderate score; practical skills, financial literacy, and vocational alternatives may be more important than schooling alone.
Bomet	2.88	Lower score, but training and financial literacy remain relevant for rider professionalism.
Kirinyaga	2.70	Low-to-moderate score; economic pressure may be more important than formal education levels.
Nyeri	2.43	Lowest score; unemployment and low income appear more influential than low education.

Source: Objective Three quantitative survey outputs.

The quantitative patterns now need to be read alongside qualitative evidence. The following subsection integrates respondents' narratives to show how livelihood pressure, behavioural risk, and skills constraints are understood at county level.

4.6 Qualitative Socio-Economic Themes by County

The qualitative theme coding summarized in Table 4.20 provides the interpretive bridge between the county-level quantitative results and respondents' explanations of boda-boda-related crime. The coding shows that youth unemployment, vulnerable riders, substance abuse, poverty or low income, peer influence, lack of alternative livelihoods, family financial pressure, debt pressure, and low education appeared across the study counties. Their recurrence indicates that socio-economic drivers are not isolated county-specific issues; they are embedded in the livelihood structure of the boda-boda sector and are expressed differently depending on county context.

The qualitative pattern is important because it confirms and deepens the quantitative results. The quantitative analysis showed that socio-economic vulnerability was moderate to high in all counties, with Marsabit and Busia emerging as particularly vulnerable contexts. The qualitative evidence explains why these scores matter. Respondents did not view boda-boda-related crime only as a law-enforcement problem. They also linked it to unemployment, low income, poverty, financial pressure, drug and alcohol abuse, peer influence, lack of other jobs, and vulnerability among riders. This means that the social meaning of boda-boda-related crime is closely connected

to livelihood insecurity. This interpretation is consistent with the National Crime Research Centre's finding that boda-boda-related security challenges in Kenya are linked to poverty, unemployment, weak regulation, drug and substance abuse, and peer pressure (National Crime Research Centre, 2018).

The presence of youth unemployment across all counties shows that respondents consistently associated the boda-boda sector with joblessness and limited formal employment opportunities. This supports the earlier quantitative finding that youth unemployment was one of the highest-scoring socio-economic indicators. In the qualitative accounts, unemployment was reflected through references to jobless youth, lack of jobs, idleness, and the entry of economically frustrated young people into boda-boda work. This suggests that many riders enter the sector not necessarily because it is a preferred long-term occupation, but because it offers immediate daily income in contexts where formal employment is scarce. This agrees with transport-livelihood studies which show that informal mobility services often become survival occupations in contexts of limited employment and weak formal transport systems (Bryceson, Mbara, & Maunder, 2003; Porter, 2014).

Poverty or low income also appeared consistently across the counties. This theme indicates that boda-boda work is often understood as a survival activity. Riders may earn daily income, but such income may be unstable, insufficient, and vulnerable to shocks such as fuel-price increases, motorcycle breakdowns, illness, police enforcement, competition, and seasonal fluctuations in passenger demand. The qualitative evidence therefore supports the interpretation that boda-boda-related crime should be examined through an economic survival lens. However, this should not be taken to mean that poverty directly causes crime. Rather, poverty creates pressure, frustration, and vulnerability that may increase exposure to risky or illegal opportunities in some circumstances. This interpretation is consistent with strain theory, which argues that blocked access to legitimate economic opportunities can create pressure toward deviant or illegal coping strategies (Merton, 1938; Agnew, 1992).

Debt pressure also appeared as a recurring theme. The qualitative findings linked debt pressure to motorcycle loans, hire-purchase arrangements, daily repayments, SACCO dues, owner-rider arrangements, and other financial obligations attached to motorcycle operation. This finding is

significant because economic vulnerability does not end when a young person enters the boda-boda sector. Instead, some riders remain under continuous repayment pressure. A rider may be required to remit money to a motorcycle owner, meet loan obligations, buy fuel, repair the motorcycle, support dependants, and still retain enough income for personal survival. Under such conditions, some riders may extend working hours, operate at night, accept risky passengers, or become vulnerable to criminal recruitment. This supports Agnew's General Strain Theory, which explains that financial pressure, blocked opportunities, and inability to meet obligations may generate stress and negative emotions that increase the likelihood of risky or unlawful coping (Agnew, 1992).

The theme of lack of alternative livelihoods also appeared across counties. This means that many respondents perceived boda-boda work as a fallback occupation for people with limited alternatives. The qualitative evidence supports the view that the boda-boda sector functions as a livelihood safety net for unemployed and underemployed youth. However, when the sector becomes overcrowded, weakly regulated, and economically unstable, it may produce vulnerability rather than security. Riders who have no alternative source of income may continue operating even when risks are high, income is low, or pressure from peers and criminal actors increases. This finding agrees with Bryceson, Mbara and Maunder's argument that mobility and poverty are closely linked in sub-Saharan Africa, because transport services can support livelihoods while also exposing workers to precarious and unstable income conditions (Bryceson et al., 2003).

Substance abuse was another widely reported theme. Respondents referred to alcohol, drugs, bhang, drinking, narcotics, and related behavioural risks. This qualitative finding is consistent with the quantitative results, where substance abuse recorded relatively high scores in Marsabit, Mombasa, Busia, Machakos, Nyeri, and Kirinyaga. The qualitative evidence suggests that substance abuse may contribute to boda-boda-related crime by impairing judgement, encouraging risky behaviour, increasing aggression, creating demand for quick money, and linking some riders to drug-distribution networks. Substance abuse therefore operates both as a behavioural risk and as a social problem embedded in wider economic insecurity. This agrees with the National Council for Population and Development, which links alcohol and drug abuse among young people in Kenya to poverty, peer pressure, easy access to drugs and alcohol, family breakdown, unemployment, violence, crime, and low productivity (NCPD, 2017).

Peer influence also appeared across the counties. This theme is important because boda-boda riders often operate from stages, spend long hours together, exchange information, and develop shared norms. Peer groups may provide positive support, including protection, savings, emergency assistance, and information-sharing. However, they may also normalize risky behaviour where stage leadership is weak. Peer influence may encourage substance use, reckless riding, concealment of offenders, resistance to law enforcement, or involvement in illegal transport activities. This interpretation is consistent with differential association and social learning perspectives, which argue that deviant behaviour can be learned through repeated interaction, imitation, reinforcement, and exposure to group norms favourable to rule-breaking (Sutherland, 1947; Akers, 1998).

The theme of vulnerable riders is also important. It shows that riders should not be viewed only as possible offenders. They may also be victims of crime, exploitation, theft, robbery, debt pressure, harassment, and unsafe working conditions. This is a critical finding because it prevents a one-sided interpretation of boda-boda-related crime. Some crimes may be committed by riders, some by criminals pretending to be riders, some by passengers targeting riders, and some by organised actors who exploit motorcycle mobility. Therefore, the qualitative findings support a balanced interpretation that distinguishes legitimate riders from opportunistic offenders and organised criminal users of motorcycles.

Although the themes were widely present, their meaning and intensity varied across counties. In Marsabit, socio-economic vulnerability appeared more severe and coincided with the highest mean crime-frequency score. This suggests that the socio-economic themes in Marsabit are not merely general background issues; they are closely connected to the county's broader vulnerability environment. Marsabit combines youth unemployment, poverty, substance abuse, family financial pressure, low education, and frontier insecurity. The county's geography, long-distance mobility, dispersed settlements, and security challenges may make motorcycles essential for legitimate transport while also creating opportunities for crime.

In Busia, socio-economic hardship interacted strongly with border-related mobility and informal trade. The qualitative themes of unemployment, poverty, peer influence, debt pressure, and lack of alternative livelihoods must therefore be interpreted within a border economy. Boda-boda

motorcycles in Busia support legitimate passenger movement, cross-border trade, and local livelihoods. However, the same mobility can be exploited for smuggling, movement of stolen goods, ferrying offenders, and evasion of formal controls. This means that socio-economic vulnerability in Busia is amplified by border opportunity structures. This interpretation is consistent with the National Crime Research Centre's observation that boda-boda security challenges in Kenya are linked to weak regulation, anonymity, poor identification, and the misuse of motorcycles in criminal activity (National Crime Research Centre, 2018).

In Machakos, the qualitative themes reflected peri-urban livelihood pressure. Youth unemployment, low income, debt obligations, and lack of alternative livelihoods may be linked to urban expansion, commuting, market access, and competition among riders. Although Machakos recorded moderate-to-high socio-economic vulnerability, its crime-frequency score was lower than Marsabit and Busia. This suggests that peri-urban pressures exist, but other local controls, transport patterns, or community-level factors may reduce the conversion of vulnerability into frequent crime.

In Mombasa, unemployment and substance abuse were visible, but the overall crime-frequency score was lower than in Marsabit and Busia. This suggests that socio-economic vulnerability in Mombasa may be spatially concentrated rather than evenly distributed. Crime risks may be stronger around specific urban areas such as nightlife zones, transport corridors, informal settlements, ferry routes, market centres, and coastal activity spaces. Urban policing, tourism-related surveillance, alternative informal livelihoods, and route concentration may also shape how socio-economic vulnerability translates into crime. Therefore, Mombasa demonstrates that the presence of socio-economic themes does not automatically produce high county-wide crime frequency.

In Nyeri, youth unemployment and poverty were high, but crime frequency was lower than might be expected from the vulnerability scores alone. This suggests that local governance, community surveillance, stronger social cohesion, better education indicators, rider identification, or more effective local administration may reduce the likelihood that socio-economic pressure becomes crime. Nyeri is therefore important because it shows that vulnerability can be moderated by local

social-control mechanisms. In other words, economic hardship may exist, but crime outcomes depend on how communities and institutions manage the boda-boda sector.

Kirinyaga and Bomet also show the importance of local context. In both counties, socio-economic themes were present, but the intensity of vulnerability was lower than in Marsabit and Busia. These counties may benefit from stronger rural community surveillance, agricultural livelihood options, lower anonymity, or more stable rider-passenger relationships. However, the presence of poverty, family pressure, unemployment, debt pressure, and substance abuse means that they still require preventive interventions. Their lower vulnerability levels should therefore not be interpreted as absence of risk.

The qualitative findings support the argument that boda-boda-related crime is a context-contingent phenomenon. This means that similar socio-economic drivers can produce different crime outcomes depending on local conditions. Youth unemployment may be present in all counties, but it may become more criminogenic where border mobility, weak regulation, substance abuse, and poor stage leadership exist. Poverty may be widespread, but its effect may be moderated where communities know riders, stages are organised, and policing is consistent. Peer influence may encourage crime in weakly governed stages, but it may support discipline in well-organised rider associations.

This interpretation agrees with Goodfellow's work on informal transport politics in Uganda and Rwanda. Goodfellow shows that motorcycle-taxi sectors may expand rapidly where they meet livelihood and mobility needs, but the level of disorder, criminalization, or control depends strongly on state effectiveness, implementation of rules, and informal political processes (Goodfellow, 2015). This is directly relevant to the present study because the boda-boda sector in Kenya also operates at the intersection of livelihood need, transport demand, informality, local politics, and regulation. Therefore, the presence of socio-economic vulnerability does not automatically lead to crime; institutional and spatial contexts determine whether vulnerability becomes criminal opportunity.

The findings also agree with social disorganization theory. Sampson and Groves argue that crime is more likely where economic disadvantage weakens informal social control (Sampson & Groves,

1989). In the boda-boda sector, social control may include stage leadership, rider associations, community recognition of riders, cooperation with chiefs and police, passenger reporting, and local disciplinary mechanisms. Where these controls are weak, socio-economic themes such as poverty, peer influence, and substance abuse may more easily translate into crime. Where they are strong, the same socio-economic pressures may be contained.

The qualitative findings further support strain theory. Merton's strain theory suggests that individuals may turn to illegitimate means when they face pressure to achieve economic goals but lack legitimate opportunities (Merton, 1938). Agnew's General Strain Theory adds that financial stress, blocked opportunities, and inability to meet obligations can generate negative emotions and increase the risk of criminal coping (Agnew, 1992). The qualitative themes of unemployment, poverty, debt pressure, family financial pressure, and lack of alternative livelihoods are all forms of strain. However, the county variation shows that strain alone is insufficient; its effect depends on peer networks, regulation, policing, community surveillance, and access to alternatives.

From a policy perspective, the qualitative findings show that a uniform national response would be insufficient. Since the themes are widespread, broad national interventions are needed, including rider registration, affordable training, financial literacy, substance-abuse prevention, employment creation, and strengthening of rider associations. However, because the meaning of the themes varies across counties, interventions must also be locally tailored. Marsabit requires interventions that address frontier insecurity, low education, substance abuse, and youth livelihood scarcity. Busia requires border-sensitive regulation, cross-border cooperation, and control of illicit mobility. Mombasa requires spatially targeted interventions around high-risk urban and coastal zones. Nyeri, Kirinyaga, and Bomet require preventive livelihood and community-based approaches that preserve local accountability.

Overall, Table 4.19 demonstrates that the socio-economic foundations of boda-boda-related crime are broad and recurring. Youth unemployment, poverty, debt pressure, lack of alternative livelihoods, substance abuse, peer influence, family financial pressure, and rider vulnerability appeared across the counties, showing that boda-boda crime is embedded in wider livelihood insecurity. However, the county differences show that socio-economic pressure becomes crime only under particular institutional and spatial conditions. Therefore, effective interventions must

combine livelihood support, rider regulation, stage governance, substance-abuse prevention, community policing, and county-specific security strategies.

Table 4.21: Interpretation of Qualitative Socio-Economic Themes by County

County	Dominant Qualitative Interpretation	Implication
Marsabit	Severe socio-economic vulnerability combined with frontier mobility, substance abuse, poverty, low education, and high crime frequency.	Requires integrated livelihood, security, education, and substance-abuse interventions.
Busia	Socio-economic hardship interacts with border mobility, informal trade, peer influence, and illicit opportunity structures.	Requires border-sensitive rider regulation, cross-border security coordination, and livelihood support.
Machakos	Peri-urban livelihood pressure, debt, unemployment, and lack of alternatives shape rider vulnerability.	Requires financial literacy, stage governance, and employment diversification.
Mombasa	Substance abuse and unemployment are visible, but crime may be spatially concentrated in specific urban/coastal zones.	Requires targeted policing and substance-abuse prevention in high-risk spaces.
Nyeri	High unemployment and poverty exist, but crime frequency is lower, suggesting moderating local controls.	Requires strengthening community surveillance, rider accountability, and youth employment pathways.
Kirinyaga	Moderate socio-economic vulnerability linked to rural-market mobility, peer networks, and household pressure.	Requires preventive stage governance and rural livelihood support.
Bomet	Lower vulnerability relative to other counties, but poverty and family pressure remain relevant.	Requires preventive interventions that maintain community accountability and reduce rider hardship.

Source: Objective Three qualitative transcript coding outputs.

After integrating the qualitative themes, the analysis tests whether the vulnerability pattern is statistically associated with crime frequency.

4.7 Relationship Between Socio-Economic Vulnerability and Crime Frequency

Figure 4.11 presents the relationship between the socio-economic vulnerability index and the crime-frequency score. The scatter plot shows a weak positive relationship between the two variables. The fitted line slopes upward, indicating that higher socio-economic vulnerability is generally associated with slightly higher crime-frequency scores. However, the spread of points around the fitted line is wide, meaning that socio-economic vulnerability alone does not explain the frequency of boda-boda-related crime. This finding supports the view that crime is shaped by multiple interacting factors rather than by socio-economic hardship alone (Agnew, 1992; Sampson & Groves, 1989).

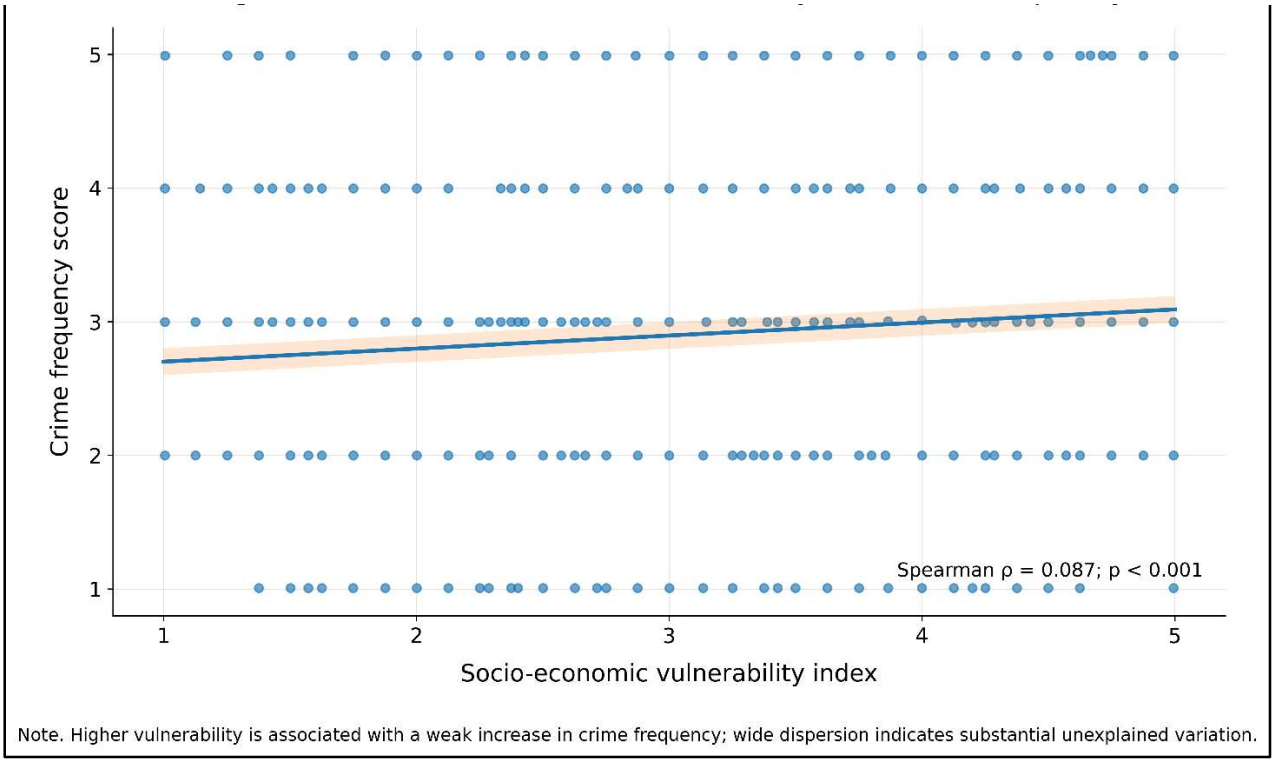


Figure 4.11: Socio-Economic Vulnerability and Crime Frequency
Source: Objective Three quantitative model outputs.

The figure shows the relationship between the socio-economic vulnerability index and crime-frequency score among respondents. The fitted trend line indicates a weak positive association, suggesting that crime frequency tends to increase slightly as socio-economic vulnerability increases. However, the wide dispersion of observations shows that socio-economic vulnerability alone does not fully explain variation in boda-boda-related crime frequency.

The Spearman correlation confirmed the visual pattern shown in Figure 4.5.2. The correlation between the socio-economic vulnerability index and the crime-frequency score was positive and statistically significant, rho = 0.087, p = 0.00002061. This means that respondents with higher socio-economic vulnerability scores tended to report slightly higher crime-frequency scores. However, the size of the correlation was very small. Therefore, although the relationship was statistically significant, it was substantively weak. This distinction is important because statistical significance does not necessarily mean that the effect is large or practically dominant.

The weak positive relationship suggests that socio-economic vulnerability contributes to the crime-risk environment, but it is not sufficient on its own to explain boda-boda-related crime frequency. In criminological terms, unemployment, poverty, debt pressure, family financial pressure, and lack of alternative livelihoods can be interpreted as forms of economic strain. Strain theory argues that individuals may experience pressure when socially valued goals, such as income and economic security, are difficult to achieve through legitimate means (Merton, 1938). Agnew's General Strain Theory further argues that financial stress, blocked opportunities, and inability to meet obligations may generate negative emotions that increase the likelihood of deviant or risky coping behaviour (Agnew, 1992). However, the weak correlation in the present study shows that strain does not automatically become crime.

The scatter plot supports this interpretation. If socio-economic vulnerability strongly predicted crime frequency, the points would cluster closely around the fitted line. Instead, the observations are widely dispersed. Respondents with similar vulnerability scores reported different crime-frequency levels. Some individuals with high vulnerability scores reported low crime frequency, while others with moderate vulnerability scores reported higher crime frequency. This means that socio-economic conditions matter, but they operate through other social, spatial, and institutional conditions. Similar conclusions are found in social disorganization theory, which argues that economic disadvantage becomes more strongly associated with crime where informal social control is weak (Sampson & Groves, 1989).

The regression model using the socio-economic vulnerability index and county further clarified this relationship. When county was included in the model, the socio-economic vulnerability index itself was not a significant predictor of crime frequency, $\beta = 0.007$, $p = 0.753$. This means that after taking county differences into account, a one-unit increase in socio-economic vulnerability was associated with only a very small increase in crime-frequency score. The effect was too small to be statistically meaningful in the county-controlled model.

This finding does not contradict the Spearman correlation. Rather, it refines the interpretation. The correlation shows that vulnerability and crime frequency are weakly related at the bivariate level. However, the regression model shows that once county context is considered, much of the variation in crime frequency is better explained by where respondents are located than by socio-

economic vulnerability alone. In other words, socio-economic vulnerability is part of the explanation, but county-level conditions determine how strongly that vulnerability translates into reported crime frequency. This supports Goodfellow's argument that motorcycle-taxi sectors may produce different levels of disorder depending on local regulation, state capacity, and informal political processes (Goodfellow, 2015).

County effects remained strong in the regression model. Compared with Bomet, Marsabit had a significantly higher crime-frequency score, $\beta = 0.702$, $p < 0.001$. Busia also had a significantly higher crime-frequency score, $\beta = 0.381$, $p < 0.001$. Mombasa, on the other hand, had a significantly lower crime-frequency score, $\beta = -0.185$, $p = 0.010$. These results indicate that county context plays an important role in shaping the frequency of boda-boda-related crime. The effect of living or operating in Marsabit or Busia was stronger than the direct effect of the socio-economic vulnerability index itself.

The Marsabit result is especially important. Marsabit recorded the highest socio-economic vulnerability index and the highest mean crime-frequency score. The regression result confirms that Marsabit remained a high-risk county even after controlling for socio-economic vulnerability. This suggests that Marsabit's higher crime frequency is not explained only by unemployment, poverty, debt pressure, substance abuse, or low education. Rather, these factors appear to interact with the county's frontier conditions, dispersed settlements, long-distance mobility, weak infrastructure, policing challenges, and broader security environment. Where motorcycles are essential for transport and livelihood, they may also be misused for theft, movement of illicit goods, smuggling, surveillance, or escape after crime. This interpretation is consistent with the National Crime Research Centre's finding that boda-boda-related crime in Kenya is linked to unemployment, poverty, weak regulation, drug and substance abuse, peer pressure, weak enforcement, and poor identification of riders (National Crime Research Centre, 2018).

Busia's positive county effect also requires careful interpretation. Busia recorded high socio-economic vulnerability and a high crime-frequency score. However, the regression result suggests that Busia's crime-frequency pattern is not explained by socio-economic vulnerability alone. Its border location is likely important. Boda-boda motorcycles in Busia support legitimate cross-border movement, trade, commuting, and market access. At the same time, border mobility may

create opportunities for smuggling, movement of stolen goods, evasion of formal controls, and movement of offenders. Therefore, in Busia, socio-economic hardship appears to combine with border opportunity structures to increase boda-boda-related crime frequency.

The Mombasa result is equally important because it shows that moderate socio-economic vulnerability does not necessarily produce high crime frequency. Mombasa had visible unemployment, poverty, and substance-abuse concerns, but its county coefficient was negative relative to Bomet. This suggests that crime in Mombasa may be more spatially concentrated, more controlled by urban policing, or shaped by different reporting patterns. It may also reflect the presence of alternative informal livelihoods, tourism-related surveillance, route concentration, or more visible enforcement in particular spaces. Therefore, Mombasa demonstrates that socio-economic vulnerability can exist without translating into uniformly high reported crime frequency across the county.

The ordinal model further supports the importance of county context. The ordinal crime-frequency model showed a positive coefficient for the socio-economic vulnerability index, but the county coefficients were more pronounced, especially for Marsabit and Busia. This reinforces the interpretation that socio-economic vulnerability slightly increases the likelihood of higher crime-frequency categories, but county-level conditions play a stronger role in determining whether respondents report crime as rare, occasional, frequent, or very frequent. This is consistent with social disorganization theory, which emphasizes that crime outcomes depend not only on disadvantage but also on the strength or weakness of community-level controls (Sampson & Groves, 1989).

The findings therefore suggest that socio-economic vulnerability is a background risk factor rather than a direct and sufficient cause of boda-boda-related crime frequency. Poverty, unemployment, debt, substance abuse, low education, and family financial pressure create a pressure environment. However, crime becomes more frequent where that pressure intersects with enabling conditions. These enabling conditions may include weak regulation, poor rider identification, weak stage governance, high mobility, border activities, informal trade, urban anonymity, political interference, inadequate enforcement, and criminal networks that exploit motorcycle transport. The National Crime Research Centre similarly identifies weak regulation, weak law enforcement,

anonymity, unemployment, poverty, drug abuse, and peer pressure as factors that enable boda-boda-related crime in Kenya (National Crime Research Centre, 2018).

The results also support Goodfellow's argument that informal motorcycle transport sectors should not be understood only as transport systems. They are also political, regulatory, and social spaces. In Uganda and Rwanda, Goodfellow shows that motorcycle-taxi sectors developed differently depending on how effectively the state implemented rules and managed informal transport politics (Goodfellow, 2015). This helps explain why counties with similar socio-economic pressures may report different crime-frequency outcomes. The boda-boda sector may be socio-economically vulnerable in many counties, but criminality becomes more pronounced where regulation, enforcement, and informal social control are weak.

From a policy perspective, the findings imply that interventions should be both socio-economic and place-specific. Livelihood interventions are necessary because unemployment, poverty, debt pressure, and lack of alternatives create vulnerability. However, livelihood support alone may not reduce crime if county-level security and regulatory factors remain weak. Similarly, enforcement alone may not reduce crime if economic pressure continues to push riders into risky survival strategies. Effective interventions therefore require an integrated approach that combines youth livelihood support, rider regulation, stage governance, substance-abuse prevention, rider identification, and community policing.

For Marsabit, interventions should combine livelihood support with frontier-sensitive security strategies. This may include youth employment programmes, substance-abuse prevention, rider registration, route monitoring, community policing, and improved policing of remote transport corridors. For Busia, interventions should combine rider regulation with border management, cross-border security coordination, control of illicit mobility, and support for lawful small-scale trade. For Mombasa, interventions should be spatially targeted toward high-risk zones such as nightlife areas, ferry corridors, transport terminals, informal settlements, and market centres. For counties such as Nyeri, Kirinyaga, Bomet, and Machakos, interventions should focus on preventing socio-economic pressure from turning into crime through strong stage governance, rider accountability, financial literacy, and youth livelihood diversification.

Overall, Figure 4.5.2 and the statistical results show that socio-economic vulnerability has a weak but statistically significant positive association with boda-boda-related crime frequency. The relationship is real but limited. County context explains much of the variation in crime frequency. Therefore, boda-boda-related crime should be understood as the outcome of interaction between socio-economic pressure and local opportunity structures. Poverty, unemployment, debt, and weak livelihoods create vulnerability, but crime becomes more frequent where this vulnerability is reinforced by weak regulation, poor enforcement, high mobility, border activities, urban anonymity, peer networks, substance abuse, and weak stage-level control.

Table 4.22: Relationship Between Socio-Economic Vulnerability and Crime Frequency

Statistical result	Value	Interpretation
Spearman correlation between vulnerability index and crime frequency	rho = 0.087; p = 0.00002061	Weak but statistically significant positive relationship.
Vulnerability index coefficient in county-controlled linear model	β = 0.007; p = 0.753	Not a significant predictor after county context is controlled.
Busia county effect relative to Bomet	β = 0.381; p < 0.001	Busia recorded significantly higher crime frequency than Bomet.
Marsabit county effect relative to Bomet	β = 0.702; p < 0.001	Marsabit recorded significantly higher crime frequency than Bomet.
Mombasa county effect relative to Bomet	β = -0.185; p = 0.010	Mombasa recorded significantly lower crime frequency than Bomet.
Main conclusion	—	Socio-economic vulnera

Source: Objective Three model outputs.

Because crime frequency and crime exposure are related but distinct outcomes, the final model examines whether vulnerability increases the odds of exposure to boda-boda-related crime when county differences are controlled.

Logistic Regression: Vulnerability and Crime Exposure. The logistic regression model was used to examine whether socio-economic vulnerability increased the likelihood of crime exposure among respondents, while controlling county differences. Unlike the linear regression model discussed in the previous subsection, which examined crime-frequency scores, the logistic regression model focused on a binary outcome: whether respondents had been exposed to boda-boda-related crime or not. This distinction is important because crime exposure and crime frequency do not measure exactly the same thing. Crime exposure captures whether boda-boda-related crime is experienced, observed, or reported as present, while crime frequency captures how often such crime occurs.

The logistic regression results showed a stronger relationship between socio-economic vulnerability and crime exposure than the relationship observed between socio-economic vulnerability and crime frequency. The coefficient for the socio-economic vulnerability index was positive, indicating that higher vulnerability was associated with higher odds of crime exposure. When converted into an odds ratio, the socio-economic vulnerability index had an odds ratio of 1.229, with $p < 0.001$. This means that each one-unit increase in the socio-economic vulnerability index was associated with approximately 22.9% higher odds of exposure to boda-boda-related crime, holding county constant.

This result is substantively important. It suggests that socio-economic vulnerability may be more strongly related to whether crime becomes visible in a community than to how frequently crime is reported. In practical terms, communities or respondents experiencing higher levels of unemployment, poverty, debt pressure, lack of alternative livelihoods, substance abuse, peer influence, low education, and family financial pressure were more likely to report exposure to boda-boda-related crime. However, the actual frequency of such crime still depended heavily on local conditions, including county context, policing, border mobility, urban structure, stage governance, and criminal opportunity patterns.

The odds ratio was derived from the logistic regression coefficient using the standard exponential transformation:

$$OR = \exp(\beta)$$

For the socio-economic vulnerability index, the estimated coefficient was $\beta = 0.206$. Therefore, the odds ratio is:

$$OR = \exp(0.206) = 1.229$$

This result indicates that a one-unit increase in the socio-economic vulnerability index is associated with a 22.9% increase in the odds of crime exposure, holding other variables constant.

This means that the effect of vulnerability should be interpreted in odds terms rather than as a direct increase in crime frequency. A value above 1 indicates increased odds of crime exposure,

while a value below 1 would indicate reduced odds. Since the vulnerability odds ratio was 1.229, the direction of the relationship was positive. Thus, socio-economic vulnerability increased the likelihood that respondents would be exposed to boda-boda-related crime.

This finding is consistence with strain theory. Merton's strain theory argues that crime may become more likely where individuals face pressure to achieve economic goals but lack legitimate means to do so (Merton, 1938). Agnew's General Strain Theory further explains that financial stress, blocked opportunities, inability to meet obligations, and negative emotional pressure may increase the likelihood of deviant or risky coping behaviour (Agnew, 1992). In the context of this study, youth unemployment, poverty, debt pressure, lack of alternative livelihoods, and family financial pressure represent forms of socio-economic strain. The logistic regression result therefore supports the argument that socio-economic pressure increases vulnerability to crime exposure.

However, the result should not be interpreted to mean that socio-economic vulnerability automatically causes crime. Most economically vulnerable riders are legitimate workers, and most poor or unemployed youth do not engage in criminal activity. Rather, the finding means that socio-economic vulnerability creates a risk environment in which boda-boda-related crime is more likely to be observed, experienced, or reported. Crime exposure increases where economic strain intersects with weak regulation, poor rider identification, peer influence, substance abuse, lack of alternative livelihoods, and criminal misuse of motorcycles.

County effects were also substantial in the logistic regression model. Compared with Bomet, Busia had much higher odds of crime exposure, with an odds ratio of 5.79. This indicates that respondents in Busia had almost six times the odds of reporting crime exposure compared with respondents in Bomet, holding socio-economic vulnerability constant. This is one of the strongest county effects in the model and suggests that Busia's crime-exposure pattern cannot be explained by socio-economic vulnerability alone.

The strong Busia effect is important because Busia is a border county. Boda-boda motorcycles in Busia support legitimate cross-border movement, passenger transport, small-scale trade, commuting, and local livelihoods. However, the same mobility can also be exploited for smuggling, transport of stolen goods, evasion of formal controls, and movement of offenders.

Therefore, the high odds of crime exposure in Busia likely reflect the interaction between socio-economic vulnerability and border-related opportunity structures. Poverty and unemployment may create pressure, but the border environment may provide opportunities through which such pressure becomes connected to crime.

Marsabit also recorded substantially higher odds of crime exposure, with an odds ratio of 4.83 compared with Bomet. This means that respondents in Marsabit had nearly five times the odds of reporting exposure to boda-boda-related crime, holding socio-economic vulnerability constant. This finding is consistent with earlier results showing that Marsabit had the highest socio-economic vulnerability index and the highest mean crime-frequency score. However, the logistic model shows that Marsabit's higher crime exposure remains important even after controlling for vulnerability.

The Marsabit finding suggests that local context is central to understanding boda-boda-related crime exposure. Marsabit combines socio-economic hardship with frontier conditions, long-distance mobility, dispersed settlements, insecurity, weak infrastructure, and policing difficulties. In such settings, motorcycles are essential for legitimate movement and livelihood, but they can also be misused for theft, smuggling, movement of illicit goods, surveillance, and escape after crime. Therefore, the high odds of crime exposure in Marsabit reflect a combination of economic vulnerability and spatial-security conditions.

Nyeri also had higher odds of crime exposure, with an odds ratio of 3.21 compared with Bomet. This means that respondents in Nyeri had more than three times the odds of reporting exposure to boda-boda-related crime, holding vulnerability constant. This result is notable because Nyeri's crime-frequency score was lower than Marsabit and Busia, yet its crime-exposure odds were higher than Bomet. This suggests that boda-boda-related crime may be visible or widely recognized in Nyeri even if it is not reported as highly frequent. The distinction between exposure and frequency is therefore important. A community may report that boda-boda-related crime exists, even if it does not occur very often.

Kirinyaga had an odds ratio of 1.88 compared with Bomet. This indicates that respondents in Kirinyaga had higher odds of crime exposure than respondents in Bomet, although the effect was

weaker than in Busia, Marsabit, and Nyeri. This suggests that socio-economic vulnerability and county-level conditions in Kirinyaga still increase crime exposure, but not to the same extent as in counties with stronger border, frontier, or high-mobility conditions. Kirinyaga's pattern may reflect rural-market mobility, youth unemployment, peer influence, and household financial pressure, but with stronger community familiarity and less anonymity than in some higher-risk counties.

Machakos had higher odds of crime exposure than Bomet, but the effect was not statistically significant. This means that while the direction of the relationship suggested greater exposure, the evidence was not strong enough to conclude that Machakos differed significantly from Bomet after controlling for socio-economic vulnerability. This may indicate that the socio-economic conditions in Machakos are important, but their translation into crime exposure is moderated by local factors such as peri-urban policing, road networks, community surveillance, market organisation, or stage-level controls.

Mombasa was not significantly different from Bomet in terms of crime exposure. This finding is important because Mombasa recorded visible socio-economic pressures, especially youth unemployment, poverty, and substance abuse. However, the logistic model suggests that these pressures did not translate into significantly higher odds of crime exposure relative to Bomet. This may be because crime in Mombasa is more spatially concentrated, more affected by urban policing, or shaped by different reporting patterns. It may also reflect the presence of alternative informal livelihoods, tourism-related surveillance, and stronger enforcement in certain urban zones.

The county effects show that crime exposure is not determined by socio-economic vulnerability alone. If vulnerability were the only explanation, counties with similar vulnerability scores would have similar odds of crime exposure. However, the logistic regression results show large county differences. Busia, Marsabit, and Nyeri had much higher odds of crime exposure than Bomet, while Mombasa was not significantly different. This means that place matters. County-level conditions shape how socio-economic vulnerability becomes visible as crime exposure.

This finding agrees with social disorganization theory. Sampson and Groves argue that low economic status and weak community organisation can create conditions in which crime becomes

more likely, but the strength of local social organisation determines how strongly structural disadvantage translates into crime (Sampson & Groves, 1989). In the boda-boda sector, local social organisation includes rider-stage leadership, rider associations, SACCOs, community recognition of riders, cooperation with chiefs and police, passenger reporting systems, and informal discipline. Where these controls are weak, socio-economic vulnerability may translate more strongly into crime exposure. Where they are stronger, vulnerability may be contained.

The results also agree with Goodfellow's work on informal transport politics. Goodfellow shows that motorcycle-taxi sectors in African contexts may produce different levels of disorder depending on state effectiveness, regulatory implementation, and informal political relationships (Goodfellow, 2015). This is relevant to the present study because the boda-boda sector operates within local political, regulatory, and economic environments. Counties with weak enforcement, politicized rider groups, poor registration systems, and limited stage control may experience higher crime exposure even when socio-economic vulnerability is similar to counties with stronger controls.

The National Crime Research Centre's findings also support the interpretation. The NCRC identified unemployment, poverty, drug and substance abuse, weak regulation, weak law enforcement, peer pressure, and high illiteracy as root causes or enabling factors in boda-boda-related crime in Kenya (National Crime Research Centre, 2018). The present logistic regression results confirm that socio-economic vulnerability is associated with higher odds of crime exposure. However, the county effects add an important insight: crime exposure is also shaped by where vulnerability occurs. Economic hardship becomes more criminogenic where it intersects with weak regulation, high mobility, poor enforcement, and opportunity structures.

The distinction between crime exposure and crime frequency is therefore central. The previous analysis showed that socio-economic vulnerability had only a weak relationship with crime frequency, and that the vulnerability index was not a significant predictor of frequency after county was controlled. In contrast, the logistic regression model showed that socio-economic vulnerability significantly increased the odds of crime exposure. This suggests that socio-economic vulnerability may make boda-boda-related crime more likely to be present or visible, but the regularity or frequency of crime depends on additional factors.

In practical terms, a county may have high socio-economic vulnerability and many people who have heard of, seen, or experienced boda-boda-related crime. However, whether such crime occurs often depends on enforcement, rider organisation, policing capacity, border proximity, road networks, night-time economy, political interference, stage governance, and the presence of organised criminal actors. This explains why Busia and Marsabit had high odds of exposure and high crime-frequency patterns, while Mombasa had visible vulnerability but lower or non-significant county effects in the exposure model.

The logistic regression results have important policy implications. First, they show that reducing socio-economic vulnerability may reduce exposure to boda-boda-related crime. Interventions that address unemployment, poverty, debt pressure, lack of alternatives, substance abuse, and family financial pressure can reduce the risk environment in which crime becomes visible. Second, they show that socio-economic interventions must be combined with county-specific security and regulatory measures. Vulnerability reduction alone may not be enough in counties where border mobility, weak enforcement, and criminal networks create strong opportunity structures.

For Busia, the high odds of crime exposure suggest the need for border-sensitive interventions. These should include rider registration, cross-border cooperation, control of smuggling routes, coordination between security agencies, and protection of legitimate riders from criminal infiltration. For Marsabit, interventions should combine livelihood support with frontier security, route monitoring, substance-abuse prevention, and improved policing of remote corridors. For Nyeri and Kirinyaga, interventions should strengthen community surveillance, rider identification, and stage accountability. For Mombasa, interventions should focus on spatially concentrated crime-prevention strategies in nightlife areas, ferry routes, informal settlements, transport corridors, and high-risk urban zones.

The findings also caution against blanket criminalization of the boda-boda sector. The positive association between vulnerability and crime exposure does not mean that vulnerable riders are criminals. It means that vulnerable operating environments are more exposed to crime. Policies should therefore distinguish between legitimate riders, economically vulnerable riders, opportunistic offenders, and organised criminal actors who use motorcycles. This distinction is

important because indiscriminate crackdowns may worsen economic hardship, reduce cooperation between riders and police, and push some riders further into informal or illegal survival strategies.

Overall, the logistic regression results show that socio-economic vulnerability is a significant predictor of crime exposure, even when county differences are controlled. Each one-unit increase in the vulnerability index increased the odds of crime exposure by approximately 22.9%. However, county effects remained substantial, especially in Busia, Marsabit, and Nyeri. This means that vulnerability is more clearly linked to whether boda-boda-related crime is experienced or observed than to how frequently it occurs. The findings therefore support a contextual interpretation: socio-economic pressure increases the likelihood of crime exposure, but local institutional, spatial, and regulatory conditions determine how strongly that exposure develops into repeated or frequent crime.

Table 4.23**:** Logistic Regression Results for Socio-Economic Vulnerability and Crime Exposure

Predictor	**Coefficient β**	**Odds Ratio**	**Interpretation**
Socio-economic vulnerability index	0.206	1.229	Each one-unit increase in vulnerability increased the odds of crime exposure by about 22.9%.
Busia	1.756	5.79	Respondents in Busia had much higher odds of crime exposure than respondents in Bomet.
Kirinyaga	0.631	1.88	Respondents in Kirinyaga had higher odds of crime exposure than respondents in Bomet.
Machakos	0.280	1.32	Odds were higher than Bomet, but the effect was not statistically significant.
Marsabit	1.576	4.83	Respondents in Marsabit had substantially higher odds of crime exposure than respondents in Bomet.
Mombasa	-0.071	0.93	Mombasa was not significantly different from Bomet.
Nyeri	1.166	3.21	Respondents in Nyeri had substantially higher odds of crime exposure than respondents in Bomet.

Source: Objective Three logistic regression outputs.

The findings of Objective Three align closely with existing scholarship on informal transport, youth livelihoods, social strain, social learning, and community-level crime control, while also extending previous research through empirical evidence across multiple Kenyan counties. Four areas of convergence are especially important: boda-boda work as a livelihood response to youth unemployment, socio-economic strain as an enabling condition, informal transport governance as a mediator of crime risk, and local social control as a moderator of vulnerability (Agnew, 1992; Goodfellow, 2015; Merton, 1938; Sampson & Groves, 1989).

First, the results confirm that boda-boda work is closely linked to youth unemployment and livelihood insecurity. Across all study counties, youth unemployment, poverty, and lack of alternative livelihoods emerged as dominant socio-economic drivers of boda-boda-related crime. This supports previous studies that describe the boda-boda sector as a critical source of employment and daily income for young people, particularly in contexts where formal employment opportunities are limited. Chepkwony, Oino, and Fedha (2025) characterize boda-boda operations in Kenya as a powerful but precarious livelihood strategy that enables income generation, household survival, and asset accumulation, while simultaneously exposing youth to occupational risks such as accidents, substance abuse, and involvement in crime. Similarly, Porter (2014) and Bryceson, Mbara, and Maunder (2003) argue that informal transport systems in sub-Saharan Africa function as livelihood safety nets for economically marginalized populations. The present study reinforces this interpretation by demonstrating that boda-boda participation is strongly rooted in economic necessity rather than criminal intent.

Second, the findings agree with the National Crime Research Centre's conclusion that unemployment and poverty are major root causes of boda-boda-related crimes in Kenya (National Crime Research Centre, 2018). However, the present study extends this conclusion by showing that these factors rarely operate in isolation. Instead, they interact with additional socio-economic pressures, including debt obligations, family financial responsibilities, peer influence, and substance abuse. This multidimensional pattern supports a more nuanced understanding of crime causation, in which structural economic disadvantage combines with social and behavioural factors to create a broader vulnerability environment. In this sense, boda-boda-related crime should be understood as emerging from cumulative socio-economic strain rather than from single isolated causes.

Third, the findings support research on informality and regulation in the motorcycle-taxi sector. Goodfellow's (2015) comparative study of informal transport politics in Uganda and Rwanda demonstrates that motorcycle-taxi sectors may be perceived as disorderly or criminal where rapid expansion occurs in the absence of effective regulation, while stronger institutional control can produce more organised and disciplined systems. The present study provides empirical support for this argument by showing that counties with similar levels of socio-economic vulnerability exhibit different crime-frequency and crime-exposure patterns. For example, Marsabit and Busia recorded

higher crime levels than Mombasa and Nyeri despite broadly similar socio-economic pressures. This suggests that governance, enforcement, rider organisation, and spatial context play a decisive role in shaping whether economic vulnerability translates into criminal activity. Socio-economic hardship may create pressure, but regulatory effectiveness determines whether the boda-boda sector remains a legitimate livelihood system or becomes vulnerable to criminal infiltration.

Fourth, the findings are consistent with broader criminological theory. Merton's strain theory explains how blocked access to legitimate economic opportunities may push some individuals toward illegitimate means of survival (Merton, 1938). Agnew's General Strain Theory extends this argument by suggesting that crime is more likely when strain is severe, perceived as unjust, associated with negative emotions, and experienced in environments with limited coping mechanisms (Agnew, 1992). The socio-economic indicators identified in this study—particularly unemployment, poverty, debt pressure, and family financial obligations—represent clear forms of strain. However, the weak relationship between socio-economic vulnerability and crime frequency, combined with stronger county effects, indicates that strain alone is insufficient to explain crime outcomes.

This is where social disorganization theory provides further explanatory power. Sampson and Groves (1989) argue that socio-economic disadvantage leads to higher crime rates primarily when it weakens informal social control within communities. In the context of the boda-boda sector, informal social control includes rider-stage leadership, SACCO organisation, community recognition of riders, cooperation with local authorities, and peer accountability. Where these structures are weak, socio-economic vulnerability may translate more readily into crime. Where they are strong, the same economic pressures may be mitigated, resulting in lower crime levels despite similar vulnerability conditions.

Overall, the findings of Objective Three demonstrate that socio-economic drivers are central to understanding boda-boda-related crime, but they should not be interpreted deterministically. Most boda-boda riders are legitimate workers striving to earn a living under challenging economic conditions. The presence of unemployment, poverty, and financial pressure does not automatically lead to criminal behaviour. Instead, crime emerges from the interaction between socio-economic

vulnerability and enabling conditions such as weak regulation, high mobility, border dynamics, substance abuse, and ineffective local governance.

These findings have important implications for policy and practice. They suggest that crime-prevention strategies should not focus solely on enforcement or on the criminalization of the boda-boda sector. Instead, interventions should target the structural conditions that increase vulnerability to crime. This includes addressing youth unemployment, expanding alternative livelihood opportunities, improving access to rider training, strengthening regulatory frameworks, enhancing stage-level governance, and supporting community-based policing. By focusing on the conditions that facilitate crime rather than on the sector as a whole, policymakers can reduce criminal risk while preserving the vital economic and mobility functions of the boda-boda industry.

Policy Implications. The findings of Objective Three have important implications for policy, practice, and sector governance. Overall, the results show that boda-boda-related crime cannot be effectively addressed through security enforcement alone. Instead, responses must combine security interventions with livelihood-based and institutional approaches. A purely punitive strategy may reduce visible disorder in the short term but is unlikely to address the structural drivers of vulnerability such as unemployment, poverty, debt pressure, and lack of alternative livelihoods. This aligns with broader criminological and development literature, which emphasizes that crime prevention is most effective when it addresses both structural and situational factors (Agnew, 1992; Sampson & Groves, 1989).

4.8 Five Key Policy Directions Emerge from the Findings

First, youth employment and livelihood diversification should be strengthened, particularly in high-vulnerability counties such as Marsabit and Busia. The study showed that youth unemployment, poverty, and lack of alternative livelihoods were among the strongest socio-economic drivers of boda-boda-related crime. This confirms previous research that identifies the boda-boda sector as a major livelihood strategy for unemployed youth (Chepkwony, Oino, & Fedha, 2025; Porter, 2014). However, over-reliance on this sector may increase vulnerability when income is unstable or competition is high. County governments and national agencies should therefore expand vocational training programmes, youth enterprise funds, agricultural value-chain initiatives, and small-business support schemes. Diversifying livelihood options can reduce

pressure on the boda-boda sector and limit the conditions that push some individuals toward risky or illegal activities.

Second, debt and hire-purchase arrangements within the boda-boda sector should be better regulated. The findings showed that debt pressure is a significant factor, often linked to motorcycle loans, daily remittance systems, and SACCO obligations. Riders operating under strict daily repayment conditions may be forced to work long hours, operate at night, or take risks to meet financial targets. This may increase exposure to crime or vulnerability to criminal involvement. Regulatory reforms should promote fair and transparent financing arrangements, including standardised contracts, reasonable repayment schedules, and oversight of informal leasing systems. Strengthening SACCO-based financing models and providing financial literacy training can help riders manage income, reduce indebtedness, and avoid exploitative arrangements. This recommendation is consistent with studies that highlight the role of financial precarity in shaping behaviour within informal transport sectors (Bryceson et al., 2003).

Third, substance-abuse prevention and control should be integrated into boda-boda stage management and local governance structures. The study found that substance abuse is both a socio-economic and behavioural driver of boda-boda-related crime, often interacting with peer influence and economic stress. Addressing this issue requires a multi-sectoral approach involving public health, law enforcement, and community actors. County governments should collaborate with the National Authority for the Campaign Against Alcohol and Drug Abuse (NACADA), health departments, and local organisations to provide sensitization programmes, counselling services, and referral systems for affected riders. At the same time, enforcement should target drug-distribution networks operating around boda-boda stages and transport corridors. This approach reflects broader public health and crime-prevention frameworks that link substance abuse to violence and criminal behaviour (NCPD, 2017).

Fourth, rider registration, licensing, and training systems should be strengthened, but in ways that are accessible and affordable. The findings show that weak regulation and limited training contribute to vulnerability within the sector. However, many riders cannot afford formal training or licensing fees, particularly those who are unemployed or operating under financial pressure. The National Crime Research Centre recommends subsidized rider training as a way to improve

safety, accountability, and professionalism within the sector (National Crime Research Centre, 2018). Implementing affordable and inclusive training programmes can enhance rider skills, improve compliance with traffic and safety regulations, and reduce opportunities for criminal infiltration. In addition, digital registration systems, visible identification, and standardised licensing procedures can improve traceability and accountability.

Fifth, crime-prevention strategies should clearly distinguish between legitimate riders and criminals who use motorcycles. The study consistently shows that most boda-boda riders are not criminals; rather, they are economically vulnerable workers operating within challenging conditions. Blanket crackdowns and indiscriminate enforcement measures risk punishing the entire sector, undermining livelihoods, and weakening cooperation between riders and law enforcement agencies. Instead, targeted, intelligence-led policing is more appropriate. This should include stage-level accountability systems, SACCO registration, rider identification, community policing, and collaboration between riders and security agencies. Such approaches are more likely to isolate criminal actors while preserving the legitimate economic role of the sector. This recommendation aligns with Goodfellow's (2015) argument that effective governance of informal transport sectors requires a balance between regulation and inclusion rather than repression.

In addition to these five directions, *the findings suggest that policy responses must be context specific.* Counties such as Marsabit and Busia require interventions that address border dynamics, mobility patterns, and security challenges, while counties such as Mombasa require spatially targeted interventions focused on urban hotspots. In contrast, counties such as Nyeri, Kirinyaga, and Bomet may benefit more from preventive strategies that strengthen community-level control, rider accountability, and livelihood stability. This reflects the broader conclusion of the study that socio-economic vulnerability interacts with local institutional and spatial conditions to produce different crime outcomes.

Overall, the policy implications of *Objective Three* emphasise *the need for an integrated approach to boda-boda sector governance.* Crime prevention should not focus solely on enforcement, nor should it treat the sector as inherently criminal. Instead, effective policy must address the structural drivers of vulnerability, strengthen institutional regulation, and support legitimate riders as key actors in local transport systems and community economies. By combining livelihood support,

regulatory reform, and targeted security interventions, policymakers can reduce crime risks while sustaining the economic and social benefits of the boda-boda sector.

Summary of Objective Three Findings. Objective Three established that socio-economic vulnerability is a significant but moderate factor in shaping boda-boda-related crime across the study counties. The findings demonstrate that while economic and social pressures are important, they do not operate in isolation and must be understood within broader institutional and spatial contexts.

First, socio-economic vulnerability was present in all counties, indicating that economic hardship is a widespread structural feature of the boda-boda sector. However, the intensity of vulnerability varied, with Marsabit and Busia recording the highest levels. These counties also showed higher crime-frequency patterns, suggesting that vulnerability may contribute more strongly to crime in certain contexts.

Second, youth unemployment and poverty or low income emerged as the most consistent and dominant economic drivers across all counties. These factors highlight the role of the boda-boda sector as a livelihood strategy for unemployed and economically marginalized youth. However, they also reflect the structural pressures that shape behaviour within the sector.

Third, additional socio-economic factors, including debt pressure, family financial obligations, lack of alternative livelihoods, substance abuse, and peer influence—were found to reinforce vulnerability. These factors create a cumulative pressure environment in which riders face multiple, overlapping constraints. Rather than acting independently, these drivers interact to shape risk exposure and decision-making within the sector.

Fourth, the socio-economic vulnerability index demonstrated acceptable internal consistency, with a Cronbach's alpha of 0.788. This confirms that the selected indicators reliably captured a coherent underlying construct of socio-economic vulnerability and supports the validity of subsequent analysis.

Fifth, the relationship between socio-economic vulnerability and crime frequency was positive but weak. The Spearman correlation showed a statistically significant but small association, indicating

that higher vulnerability is linked to slightly higher reported crime frequency. However, the weak magnitude of the relationship demonstrates that socio-economic conditions alone do not strongly predict how frequently crime occurs.

Sixth, the logistic regression analysis showed a stronger relationship between socio-economic vulnerability and crime exposure. A one-unit increase in the vulnerability index increased the odds of crime exposure by approximately 22.9%, holding county constant. This suggests that socio-economic vulnerability is more closely associated with whether crime is experienced or observed than with how frequently it occurs.

Finally, county context emerged as a stronger explanation of variation in crime frequency than socio-economic vulnerability alone. Counties such as Marsabit and Busia recorded significantly higher crime levels even after controlling for vulnerability, while Mombasa did not. This indicates that economic hardship interacts with local conditions such as governance, security, mobility patterns, border dynamics, urban structure, and regulatory effectiveness.

Overall, the findings show that boda-boda-related crime is partly rooted in socio-economic vulnerability, but vulnerability alone does not explain crime outcomes. Crime emerges where economic pressure intersects with enabling conditions such as weak regulation, limited livelihood alternatives, peer influence, substance abuse, and local opportunity structures.

Therefore, policy responses should adopt an integrated approach that combines livelihood support, rider regulation, substance-abuse prevention, intelligence-led policing, and county-specific interventions. Such an approach recognizes the dual nature of the boda-boda sector as both a critical livelihood system and a context in which crime risks may emerge under certain conditions.

4.9 Institutional Effectiveness and Contextual Risk in Boda-Boda-Related Crime

Objective Four examined the extent to which institutional effectiveness and institutional and contextual weaknesses shape boda-boda-related crime across the seven study counties. The objective was guided by the assumption that boda-boda-related crime is not only a rider-level, socio-economic, or opportunity-based problem, but also a governance problem. In this sense, crime within or around the boda-boda sector may be influenced by how effectively institutions

regulate riders, enforce rules, monitor stages, respond to crime, protect victims and witnesses, and prevent criminal actors from exploiting the sector (Cohen & Felson, 1979; Felson & Clarke, 1998).

In this section, institutional effectiveness refers to respondents' perceptions of the performance of key formal and informal institutions involved in the governance of the boda-boda sector. These included the police, National Government Administration Officers, county transport and enforcement departments, SACCOs, stage leadership, and community policing structures. These actors are important because they represent the main institutional channels through which rider registration, discipline, enforcement, intelligence gathering, dispute resolution, and crime prevention are expected to occur.

The second dimension, institutional and contextual risk, refers to governance weaknesses and enabling conditions that may increase the likelihood of boda-boda-related crime. These risks included weak rider registration, corruption and collusion, political interference, poor agency coordination, weak stage discipline, low reporting, and weak prosecution. These factors are important because they can reduce accountability, weaken deterrence, increase rider anonymity, and allow offenders to hide within the legitimate boda-boda population (National Crime Research Centre [NCRC], 2018; United Nations Office on Drugs and Crime [UNODC], 2024).

The analysis used both quantitative and qualitative evidence. Quantitatively, two composite indices were constructed. The first was the institutional effectiveness index, which summarized respondents' perceptions of how well key institutions performed their regulatory and security roles. The second was the institutional and contextual risk index, which summarized the extent to which respondents perceived governance weaknesses and crime-enabling conditions within the boda-boda sector.

The reliability results showed that both indices were suitable for further analysis. The institutional effectiveness index had acceptable internal reliability, with Cronbach's alpha = 0.751. This indicates that the six indicators used to measure institutional effectiveness were sufficiently consistent and could be interpreted as a coherent construct. The institutional and contextual risk index had stronger reliability, with Cronbach's alpha = 0.814, indicating good internal consistency. This suggests that weak registration, corruption/collusion, political interference, poor

coordination, weak stage discipline, low reporting, and weak prosecution were closely related as components of institutional risk.

Table 4.24: Reliability of Objective Four Institutional Indices

Index	Number of items	Mean	Standard deviation	Cronbach's alpha	Interpretation
Institutional effectiveness index	6	2.87	0.86	0.751	Acceptable reliability
Institutional/contextual risk index	6	2.67	1.03	0.814	Good reliability

Source: Objective Four quantitative outputs.

Table 4.24 shows that the institutional effectiveness index had an overall mean of 2.87 and a standard deviation of 0.86, indicating moderate perceived institutional effectiveness across the study counties. This means that respondents did not view institutions as entirely ineffective, but neither did they perceive them as strongly effective. The moderate score suggests that institutions were present and active to some extent, but their capacity to regulate the boda-boda sector, enforce rules, control crime, and sustain public trust remained limited.

The institutional and contextual risk index had an overall mean of 2.67 and a standard deviation of 1.03. This also indicates a moderate level of institutional risk, but with greater variation among respondents and counties. The higher standard deviation suggests that institutional risk was experienced unevenly across the study sites. Some counties had stronger perceptions of weak registration, corruption, political interference, weak reporting, and poor prosecution, while others reported lower levels of these risks.

The acceptable reliability of the two indices is important because it shows that respondents did not view institutional performance and institutional risk as isolated or unrelated issues. Rather, they perceived them as connected governance conditions shaping the boda-boda sector. Institutional effectiveness and institutional risk therefore represent two sides of the same governance environment. Where institutions are effective, rider identification, enforcement, reporting, and stage discipline are likely to improve. Where institutional risk is high, offenders may benefit from anonymity, weak control, poor coordination, political protection, corruption, and low deterrence, thereby reducing capable guardianship and weakening collective local control (Cohen & Felson, 1979; Sampson *et al*., 1997).

This is particularly important because commercial motorcycle transport operates within overlapping layers of authority. Formal law enforcement agencies, local administration, county transport regulators, SACCO officials, stage leaders, and community policing structures all influence how the sector is governed. When these actors work effectively and coordinate well, they can reduce criminal opportunity. However, when they are weak, fragmented, politically influenced, corrupt, or mistrusted by communities, they may unintentionally create conditions in which boda-boda-related crime becomes easier to commit and harder to control (Kumar, 2011; Tyler, 2006).

Therefore, the reliability results provide a strong foundation for the remaining analysis in this section. The subsequent subsections examine how institutional effectiveness and institutional and contextual risk varied across counties, how qualitative themes explained the meaning of institutional weakness, and how institutional risk and effectiveness were statistically related to organised criminality.

4.9.1 **Institutional Effectiveness by County**

Figure 4.12 presents the mean institutional effectiveness scores across the seven study counties. Institutional effectiveness was measured using respondents' perceptions of the performance of key institutions involved in the regulation, security, and governance of the boda-boda sector. These institutions included the police, National Government Administration Officers, county transport and enforcement departments, SACCOs, stage leadership, and community policing structures. Together, these actors represent the formal and informal governance architecture through which boda-boda operations are expected to be regulated, monitored, disciplined, and secured.

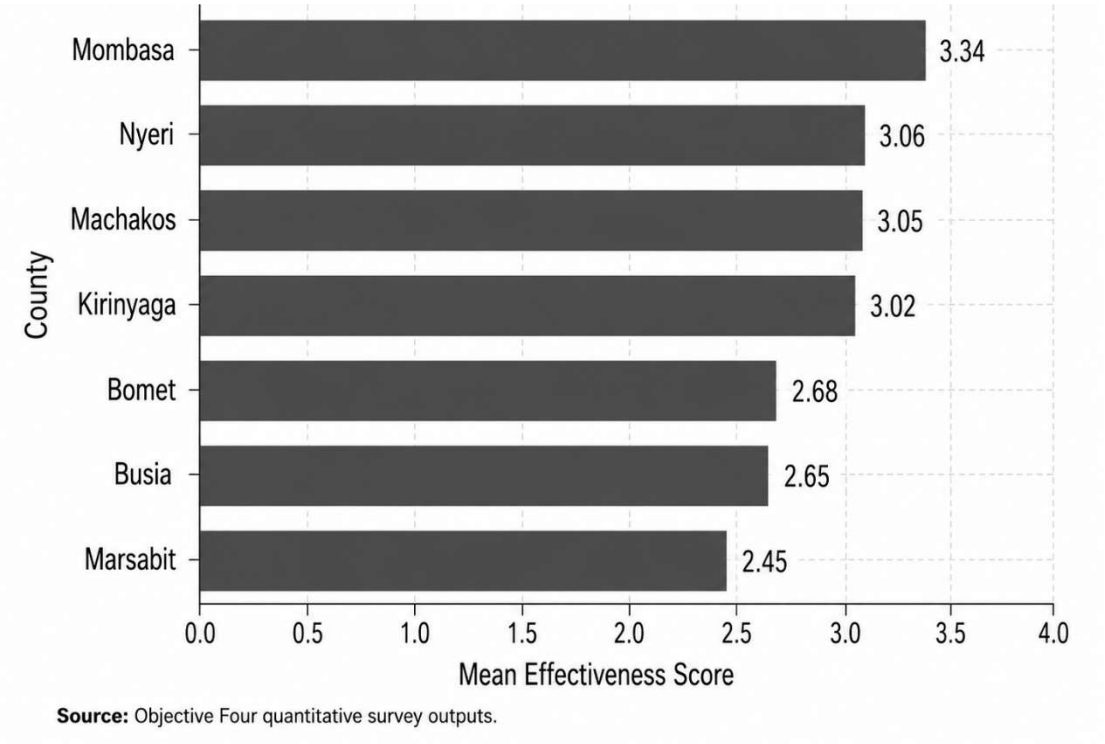


Figure 4.12**:** Institutional Effectiveness by County

Figure 4.12 shows visible county-level variation in institutional effectiveness. The overall mean institutional effectiveness score was 2.87, with a standard deviation of 0.86, indicating moderate perceived institutional effectiveness across the study area. This means that respondents did not view institutions as entirely ineffective, but neither did they perceive them as strongly effective. The institutional effectiveness index had acceptable internal consistency, with Cronbach's alpha = 0.751, suggesting that the six indicators measured a coherent institutional-effectiveness construct.

At county level, Mombasa recorded the highest mean institutional effectiveness score at 3.34. This suggests that respondents in Mombasa perceived stronger institutional presence and relatively better performance by agencies and structures responsible for boda-boda governance. The higher score may reflect greater visibility of policing, county transport regulation, enforcement patrols, SACCO organisation, stage-level control, and community-based security mechanisms in a highly urbanized coastal environment. In dense urban settings, institutions are often more visible because

transport activity is concentrated around roads, termini, markets, port-related spaces, informal settlements, commercial centres, and nightlife areas.

Nyeri recorded the second-highest institutional effectiveness score at 3.06, followed closely by Machakos at 3.05 and Kirinyaga at 3.02. These three counties therefore showed relatively stronger perceived institutional performance. Their scores suggest that respondents viewed institutional actors as moderately capable of regulating the boda-boda sector, maintaining stage discipline, responding to crime, and supporting local order. In these counties, the relatively higher effectiveness scores may reflect stronger local administrative visibility, better stage organisation, more active SACCO structures, or closer relationships between community policing actors, riders, and local security agencies.

By contrast, Marsabit recorded the lowest mean institutional effectiveness score at 2.45. This indicates that respondents perceived institutional response capacity to be weakest in Marsabit. The low score may be interpreted in relation to the county's large geographical size, dispersed settlements, long travel corridors, frontier-like conditions, and limited enforcement reach. In such settings, formal institutions may find it more difficult to monitor riders, patrol routes, verify stage membership, respond quickly to incidents, or maintain consistent security presence. Institutional weakness in Marsabit may therefore reflect not only poor performance, but also the practical challenges of governing a large, sparsely populated, and mobile transport environment.

Busia recorded an institutional effectiveness score of 2.65, while Bomet recorded 2.68. These scores were also below the overall mean, indicating comparatively weaker perceived institutional performance. Busia's lower score is significant because the county's border location may complicate boda-boda governance. Cross-border mobility, informal trade, smuggling opportunities, and rider movement across jurisdictional boundaries may reduce the effectiveness of local regulation and enforcement. Bomet's lower score shows that weaker institutional effectiveness is not only a border or frontier issue. It may also occur where stage governance, political influence, local enforcement consistency, and reporting systems are weak.

The county pattern suggests that institutional effectiveness is spatially uneven. Mombasa, Nyeri, Machakos, and Kirinyaga appeared to have relatively stronger institutional environments, while

Marsabit, Busia, and Bomet showed weaker perceived institutional performance. However, institutional effectiveness should not be interpreted as a simple measure of whether crime exists or does not exist. A county may have stronger perceived institutions and still experience boda-boda-related crime in particular hotspots. Similarly, a county may have weak perceived institutions but not necessarily record the highest organised-criminality exposure if crime is underreported, dispersed, opportunistic, or shaped by different local conditions.

The findings are consistent with Kumar's political-economy interpretation of commercial motorcycle transport in African cities. Kumar (2011) argues that the expansion of motorcycle taxis in sub-Saharan Africa is linked to gaps in formal transport provision, governance weaknesses, limited institutional capacity, and the difficulty of regulating rapidly expanding informal transport systems. This argument is relevant to the present findings because counties with lower institutional effectiveness scores, especially Marsabit, Busia, and Bomet, appear to face weaker formal and informal control mechanisms. In such contexts, boda-boda operators may fill transport and livelihood gaps, but the sector may also become difficult to regulate when registration, enforcement, stage discipline, and accountability are weak.

The findings also show that institutional effectiveness should be understood beyond the presence of institutions. Police stations, county enforcement departments, SACCOs, and stage leaders may exist, but their effectiveness depends on whether they can actually identify riders, enforce rules, respond to incidents, cooperate with communities, prevent corruption, and discipline offenders. Therefore, the important issue is not merely institutional presence, but institutional performance. Institutions become effective when they reduce anonymity, improve traceability, support reporting, strengthen prosecution, and prevent criminal actors from hiding within the legitimate rider population.

From a crime-prevention perspective, the institutional effectiveness pattern has important implications. Counties with higher effectiveness scores may have better capacity to reduce criminal opportunity through visible policing, stronger rider identification, more active stage leadership, and better cooperation with communities. Counties with lower effectiveness scores may be more vulnerable to weak reporting, unregistered riders, poor stage control, corruption,

political interference, and slow response. These weaknesses can reduce deterrence and allow offenders to exploit the boda-boda sector's speed, mobility, and informal organisation.

Overall, Figure 4.6.1 demonstrates that institutional effectiveness varied meaningfully across the seven counties. Mombasa had the strongest perceived institutional effectiveness, while Marsabit had the weakest. Nyeri, Machakos, and Kirinyaga showed relatively stronger institutional performance, whereas Busia and Bomet remained below the overall mean. This pattern supports the broader argument of Objective Four: boda-boda-related crime is not only a matter of rider behaviour or socio-economic vulnerability, but also a governance issue shaped by the strength, visibility, credibility, and coordination of institutions.

4.9.2 **Institutional and Contextual Risk by County**

Figure 4.13 presents the mean institutional and contextual risk scores across the seven study counties. Institutional and contextual risk refers to the governance weaknesses and enabling conditions that may increase the likelihood of boda-boda-related crime. These risks included weak rider registration, corruption and collusion, political interference, poor agency coordination, weak stage discipline, low reporting, and weak prosecution. These factors were considered important because they can reduce accountability, weaken enforcement, lower deterrence, increase rider anonymity, and allow offenders to operate within or around the legitimate boda-boda sector.

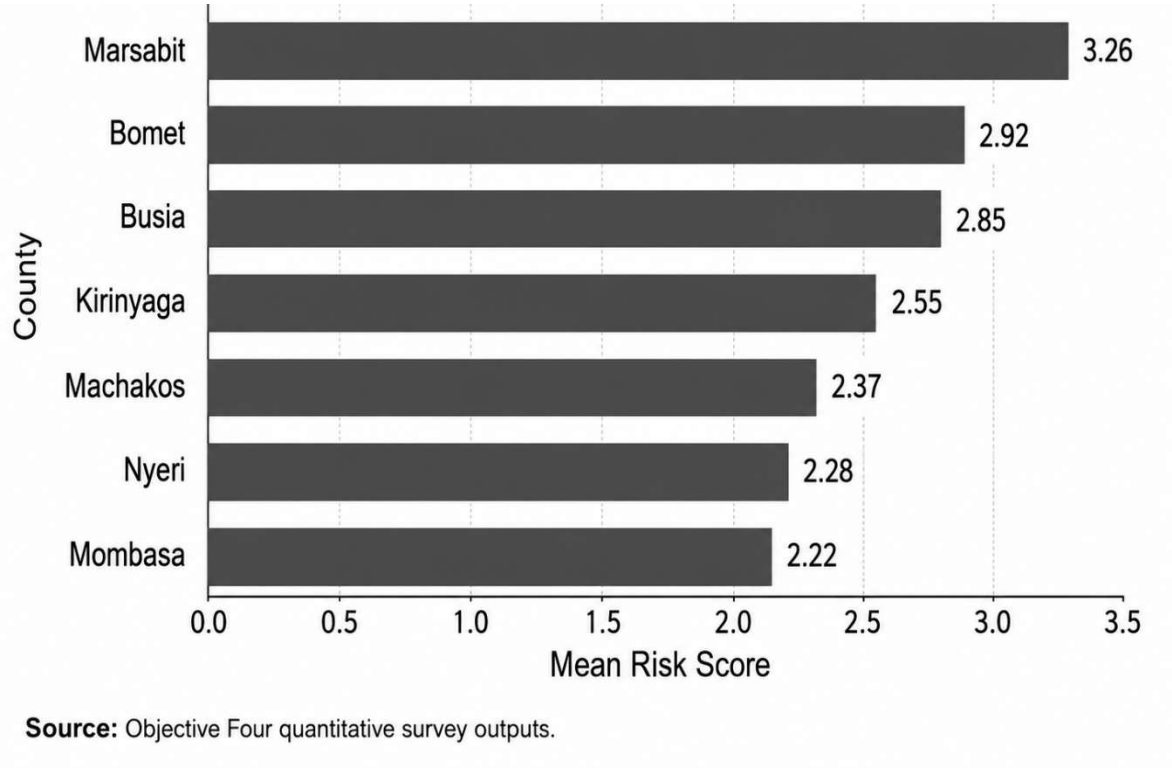


Figure 4.13: Institutional and Contextual Risk by County

The overall institutional risk index had a mean score of 2.67 and a standard deviation of 1.03, indicating a moderate level of institutional risk across the study counties. The relatively high standard deviation suggests that perceptions of institutional risk varied meaningfully across the counties. The institutional risk index also showed good internal reliability, with Cronbach's alpha = 0.814. This indicates that weak registration, corruption/collusion, political interference, poor coordination, weak stage discipline, low reporting, and weak prosecution formed a coherent risk construct. Therefore, the index was suitable for comparing institutional-risk environments across counties.

Figure 4.13 shows that Marsabit recorded the highest mean institutional risk score at 3.26. This suggests that respondents in Marsabit perceived the boda-boda sector to operate within a relatively weak institutional environment. The high risk score may be linked to the county's frontier-like conditions, large geographical coverage, dispersed settlements, long transport corridors, insecurity exposure, weak enforcement reach, and difficulties in maintaining consistent monitoring of rider

movements. In such a context, rider registration, policing, stage control, community reporting, and prosecution follow-up may be more difficult to sustain.

However, Marsabit's high institutional risk should be interpreted carefully. Although it had the highest institutional risk score, it did not record the highest organised-criminality exposure. This suggests that institutional risk in Marsabit may be expressed through weak control, low reporting, unregulated movement, insecurity exposure, opportunistic offending, and under-detection rather than through clearly organised criminal networks. In other words, weak institutions may create vulnerability, but the form of crime that emerges depends on local context.

Bomet recorded the second-highest institutional risk score at 2.92. This finding is important because Bomet is not primarily a border county like Busia or a frontier county like Marsabit. Its relatively high institutional risk score suggests that governance weaknesses may also arise in counties where local enforcement is inconsistent, stage discipline is weak, political protection is present, or reporting mechanisms are underdeveloped. Bomet's high organised-crime exposure percentage, when considered alongside its institutional-risk score, suggests that local institutional weaknesses may be creating opportunity structures for repeated or semi-organised offending.

Busia recorded the third-highest institutional risk score at 2.85. This finding is consistent with the county's border location and with earlier results in the study showing stronger crime exposure and organised-criminality indicators in Busia. Border environments may intensify institutional risk because boda-boda riders operate across formal and informal crossing points, transport goods and passengers, and move through spaces where jurisdictional boundaries can complicate enforcement. Weak rider registration, poor inter-agency coordination, and limited traceability may therefore increase the risk of smuggling, theft, robbery, and other forms of cross-border criminal facilitation.

Kirinyaga recorded a moderate institutional risk score of 2.55. This suggests that institutional and contextual risks were present but not as pronounced as in Marsabit, Bomet, and Busia. The score indicates that the county still faced challenges related to registration, enforcement, reporting, stage discipline, or prosecution, but these risks were comparatively lower. Kirinyaga's position in the middle of the distribution suggests that institutional weaknesses should be addressed before they develop into more serious crime-enabling conditions.

Machakos recorded a lower institutional risk score of 2.37. This indicates that respondents perceived fewer institutional-risk conditions compared to the high-risk counties. Machakos also recorded relatively low organised-criminality indicators, suggesting that lower institutional risk may be associated with reduced opportunity for organised boda-boda-related crime. However, this does not mean that crime is absent. Rather, it suggests that the institutional environment may be less enabling for repeated or coordinated crime.

Nyeri recorded an institutional risk score of 2.28, making it one of the lower-risk counties. This suggests relatively stronger institutional control or lower perceived exposure to governance weaknesses. However, Nyeri's organised-criminality mean was not the lowest among the counties. This indicates that organised-criminality patterns may persist even where institutional risk is relatively low. Other factors, such as local networks, stage-level dynamics, repeat offending, or specific crime opportunities, may still influence boda-boda-related criminality.

Mombasa recorded the lowest institutional risk score at 2.22. This suggests that respondents perceived Mombasa as having the least institutional-risk environment among the seven counties. This result is consistent with Mombasa's high institutional effectiveness score reported in the previous subsection. The lower risk score may reflect greater institutional visibility, more concentrated policing, stronger county enforcement presence, better public transport regulation, and stronger oversight of urban transport spaces. However, low institutional risk should not be interpreted as the absence of boda-boda-related crime. In an urban coastal county such as Mombasa, crime may be spatially concentrated in particular locations, including transport nodes, informal settlements, nightlife areas, port-linked spaces, and commercial zones.

Overall, the highest institutional-risk counties were Marsabit, Bomet, and Busia, while the lowest-risk counties were Mombasa and Nyeri. This pattern shows that institutional weakness is spatially uneven. It varies according to geography, settlement patterns, enforcement capacity, border dynamics, stage organisation, political influence, reporting behaviour, and prosecution effectiveness. Therefore, policy responses should not assume that all counties face the same institutional risks. Each county requires interventions that respond to its specific governance conditions.

The findings are consistent with the National Crime Research Centre's study on boda-boda transport and security challenges in Kenya. The NCRC identified weak law enforcement, weak regulation of the boda-boda subsector, corruption among sections of enforcement agencies, rider anonymity, and inadequate security responses as major challenges in controlling boda-boda-related crime (NCRC, 2018). These issues closely match the institutional-risk indicators used in this study. The present findings therefore confirm that boda-boda-related crime is not only a rider-level problem, but also a problem of institutional weakness, weak regulation, and poor accountability.

The findings also support Kumar's argument that motorcycle taxi governance in African cities is shaped by weaknesses in formal transport provision, governance capacity, and regulatory control (Kumar, 2011). Where institutions are unable to respond effectively to the rapid growth of motorcycle transport, the sector may expand faster than the capacity to regulate it. This creates spaces where legitimate transport activity and criminal opportunity may overlap. In the present study, the relatively higher institutional-risk scores in Marsabit, Bomet, and Busia suggest that weak regulation, weak enforcement, and limited traceability can create conditions in which offenders exploit the boda-boda sector.

From a crime-prevention perspective, the institutional-risk pattern is important because it shows how crime opportunities are created. Weak registration makes offenders harder to identify. Corruption and collusion reduce the certainty of punishment. Political interference weakens enforcement neutrality. Poor coordination prevents institutions from sharing information. Weak stage discipline allows unknown riders to operate in legitimate spaces. Low reporting reduces police intelligence. Weak prosecution reduces deterrence. Together, these risks form a chain of institutional vulnerability that may enable repeated or semi-organised boda-boda-related crime (Cohen & Felson, 1979; Felson & Clarke, 1998).

Therefore, Figure 4.6.2 demonstrates that institutional and contextual risk is a central governance dimension of boda-boda-related crime. Counties with higher institutional risk require stronger registration systems, better coordination between enforcement actors, improved reporting channels, anti-corruption measures, protection from political interference, and stronger prosecution follow-up. The results reinforce the broader argument of Objective Four: boda-boda-

related crime cannot be addressed effectively through rider punishment alone. It requires institutional strengthening that reduces anonymity, improves traceability, builds public trust, and closes the governance gaps exploited by criminal actors.

Table 4.25: Institutional Effectiveness, Institutional Risk and Organised Criminality by County

County	**Mean institutional effectiveness**	**Mean institutional risk**	Mean organised criminality	Organised crime exposure (%)	**n**
Marsabit	2.45	3.26	1.41	0.0	381
Bomet	2.68	2.92	2.52	13.1	388
Busia	2.65	2.85	2.44	6.8	383
Kirinyaga	3.02	2.55	1.64	2.2	357
Machakos	3.05	2.37	1.08	0.3	384
Nyeri	3.06	2.28	2.32	4.2	353
Mombasa	3.34	2.22	1.72	1.0	385

Source: Objective Four integrated quantitative and qualitative summary outputs.

Table 4.25 confirms that institutional effectiveness and institutional risk do not always move in a simple opposite direction. Mombasa had both the highest effectiveness and the lowest risk, suggesting a relatively stronger institutional environment. Marsabit had the lowest effectiveness and highest risk, suggesting a weaker governance environment. However, the relationship between institutional conditions and organised criminality was more complex. For example, Marsabit had the highest institutional risk but recorded low organised-crime exposure. By contrast, Bomet and Busia had relatively high institutional risk and higher organised-criminality indicators.

This means that weak institutions may create opportunities for crime, but the form of crime depends on county context. In some counties, weak institutions may produce opportunistic offending, low reporting, and unregulated mobility. In others, especially where repeat offenders, political protection, or coordinated rider groups exist, weak institutions may support semi-organised or organised criminality.

4.9.3 **Qualitative Institutional Themes by County**

Figure 4.14 presents the qualitative institutional themes that emerged from the Objective Four transcript coding across the seven study counties: Bomet, Busia, Kirinyaga, Machakos, Marsabit, Mombasa, and Nyeri. The purpose of this qualitative analysis was to explain the meanings behind the quantitative institutional-effectiveness and institutional-risk scores. While the quantitative results showed differences in institutional performance and risk levels by county, the qualitative

findings clarified how respondents understood political interference, corruption, weak registration, poor enforcement, low reporting, weak prosecution, poor coordination, and weak stage discipline in relation to boda-boda-related crime.

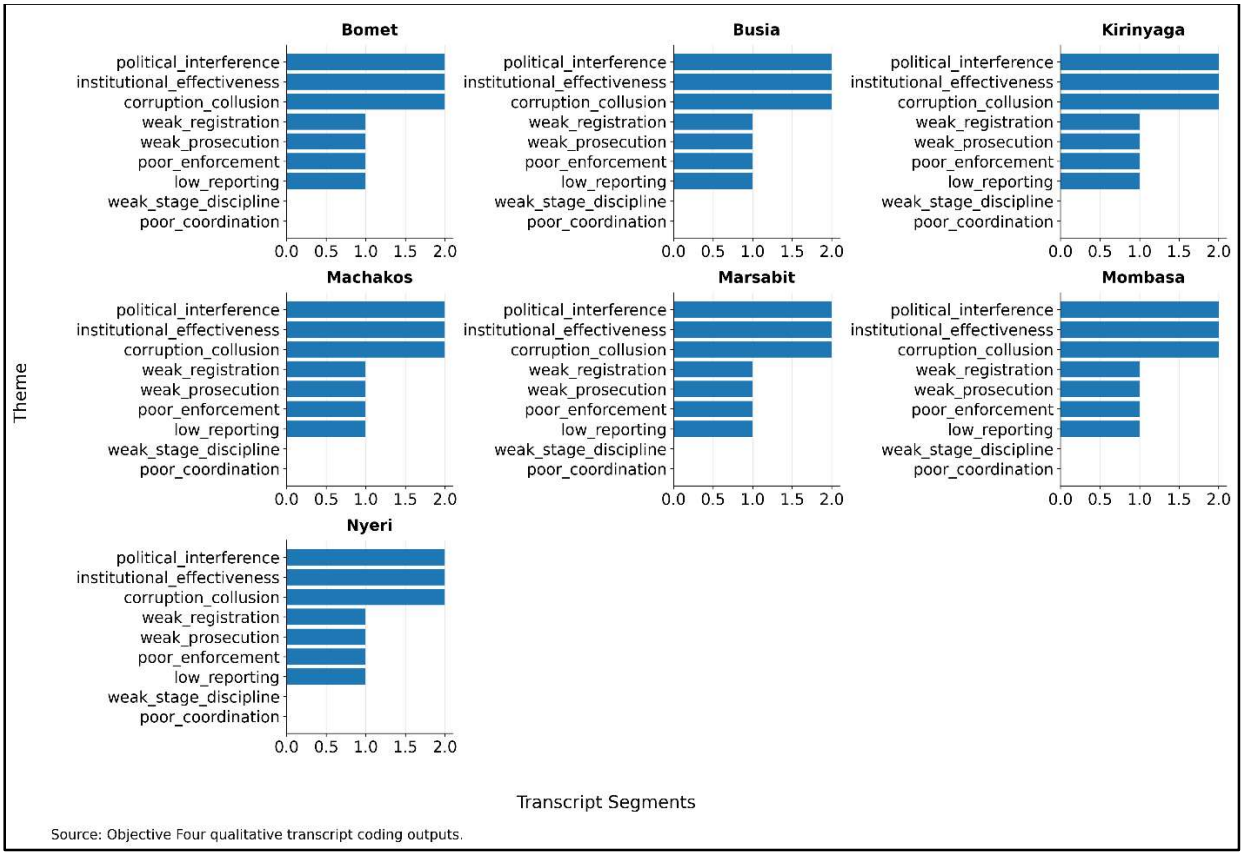


Figure 4.14: Objective Four Qualitative Institutional Themes by County
***Source:** Objective Four qualitative transcript coding outputs.*

Figure 4.14 shows that institutional themes were broadly similar across counties. The most recurrent themes were political interference, institutional effectiveness, and corruption/collusion. These appeared strongly in the county-level qualitative summaries, suggesting that respondents associated boda-boda-related crime not only with rider behaviour, but also with the way governance systems function. Other recurrent themes included weak registration, poor enforcement, low reporting, and weak prosecution. Poor coordination and weak stage discipline were less visible in the qualitative counts, although they remained analytically important in explaining institutional risk.

The recurrence of these themes supports the wider argument of Objective Four: boda-boda-related crime is also a governance problem. Respondents did not view crime control simply as the arrest of offenders after incidents occur. Instead, they linked crime prevention to the ability of institutions to register riders, monitor stages, enforce rules consistently, respond to reports, protect witnesses, reduce corruption, and prosecute offenders effectively.

Political interference was one of the most prominent themes across counties. Respondents associated it with campaigns, elections, political protection, intimidation, and interference by political actors. This suggests that the boda-boda sector may sometimes be drawn into local political networks because riders are mobile, youthful, numerous, and useful during campaigns or public mobilization. Where riders become politically useful, enforcement may become selective, allowing some criminal riders or groups to avoid punishment through political protection or fear of political consequences among enforcement officers (Goodfellow & Titeca, 2012).

Political interference weakens enforcement neutrality. In principle, laws and regulations should apply equally to all riders. However, when some riders are politically protected, enforcement becomes uneven and deterrence is reduced. Offenders may believe that political connections can shield them from arrest, prosecution, or sanctions. This may also discourage public reporting where communities believe offenders are protected by powerful actors.

Institutional effectiveness also appeared strongly across counties. Respondents repeatedly referred to the role of police, National Government Administration Officers, county officials, SACCOs, stage leaders, community policing structures, prosecutors, courts, and transport regulators. This shows that communities recognize both formal and informal institutions as important in controlling boda-boda-related crime. However, institutional presence alone does not guarantee effectiveness. Institutions become effective when they identify riders, monitor stages, respond quickly to incidents, share information, protect witnesses, enforce rules fairly, and support prosecution. They become weak when they are absent, slow, under-resourced, mistrusted, politically influenced, corrupt, or unable to follow cases through to conclusion.

Corruption and collusion formed another dominant theme. Respondents associated this theme with bribe-taking, informal payments, protection of certain riders, corrupt officials, and payments to

police or other enforcement actors. This explains why formal rules may exist but fail to produce effective control. If offenders can avoid arrest or punishment through payments, connections, or informal arrangements, enforcement loses credibility. Corruption reduces the certainty of punishment and weakens public trust because victims and witnesses may believe that reporting crime is useless if offenders can buy their way out of the justice process (UNODC, 2024; Tyler, 2006).

Corruption is especially significant in the boda-boda sector because the sector depends heavily on everyday contact between riders, enforcement officers, stage leaders, and local administrators. Where these interactions are governed by informal payments rather than transparent rules, enforcement becomes negotiated instead of consistent. This may burden legitimate riders through arbitrary enforcement while allowing criminal actors with money, connections, or protection to continue operating.

Weak registration was also present across counties. Respondents linked it to unregistered riders, fake or incomplete records, unknown riders, poor rider identification, and weak motorcycle traceability. This theme is central to boda-boda-related crime because anonymity allows offenders to hide within the legitimate rider population. When riders are not properly registered, it becomes difficult to know who operates from a particular stage, who owns a motorcycle, which routes riders use, and whether a rider has been linked to previous offences. Weak registration therefore reduces traceability and weakens investigation (NCRC, 2018).

Weak registration also allows offenders to move between stages, counties, or routes without detection. A rider may operate temporarily in one area, commit offences, and then shift elsewhere. Without reliable records, stage leaders, police, SACCOs, and county enforcement officers may be unable to identify such movement. Registration should therefore be understood not only as an administrative requirement, but also as a security tool that helps distinguish legitimate riders from offenders.

Poor enforcement was reflected in references to weak patrols, slow response, limited police presence, poor monitoring, and inadequate security. This weakens deterrence because offenders may believe that the likelihood of detection or arrest is low. The problem is particularly serious in

the boda-boda sector because motorcycles provide speed, flexibility, and escape capability. If enforcement is slow or absent, offenders can commit crimes and leave the scene quickly, increasing opportunity and reducing the perceived risk of offending (Cohen & Felson, 1979; Felson & Clarke, 1998).

The findings also suggest that enforcement may be spatially uneven. Some areas have visible police presence, while remote routes, border points, informal stages, night-time spaces, and poorly lit roads may have limited monitoring. This allows offenders to select areas where detection risk is low. Effective enforcement should therefore be intelligence-led and spatially targeted, focusing on high-risk routes, repeated crime locations, unregistered stages, and riders linked to repeated complaints.

Low reporting was linked to fear of retaliation, witness intimidation, mistrust of police, poor evidence, court delays, and weak prosecution. Low reporting is a serious institutional problem because it reduces the flow of information from communities to law enforcement agencies. If victims and witnesses do not report crime, police may not know the real scale, location, or pattern of boda-boda-related crime. Repeat offenders may remain unidentified, and official records may understate the everyday experience of crime (NCRC, 2018; Tyler, 2006).

Low reporting also reflects weak institutional trust. People may avoid reporting if they believe offenders are protected, police are compromised, or cases will not succeed in court. Fear of retaliation may be particularly strong where offenders are known locally or where riders operate within close community networks. Improving reporting therefore requires witness protection, confidentiality, timely police response, stronger prosecution, and visible action on reported cases.

Weak prosecution was closely related to low reporting and poor enforcement. Respondents associated it with weak evidence, delays, failure to complete cases, and offenders returning to the community. Weak prosecution reduces deterrence because offenders may believe that arrest does not necessarily lead to punishment. It also discourages victims and witnesses from cooperating with law enforcement. If communities repeatedly see suspects released or cases collapse, they may conclude that reporting is not worthwhile. This creates a cycle in which weak prosecution lowers

reporting, low reporting weakens evidence, and weak evidence further undermines prosecution (Felson & Clarke, 1998; Tyler, 2006).

Although poor coordination was less visible in the qualitative counts, it remains important for understanding institutional weakness. Boda-boda-related crime cuts across several institutional mandates, including transport regulation, criminal investigation, county by-law enforcement, border control, and community security. If police, county enforcement officers, NGAO, SACCOs, stage leaders, community policing actors, and prosecution agencies do not share information, offenders may exploit the gaps between institutions. For example, a rider known to stage leaders may not be known to police, a stolen motorcycle may be reported to one agency but not circulated to others, or a repeat offender may move to another stage without records being shared.

Weak stage discipline was also less visible in the qualitative counts but remains analytically significant. Boda-boda stages are the immediate operating spaces of riders. Strong stage leadership can help regulate who operates from a stage, identify strangers, enforce rider conduct, report suspicious behaviour, and remove repeat offenders. Weak stage discipline allows unknown, unregistered, or criminal riders to blend into the legitimate rider population. SACCOs and stage leaders should therefore be treated as important governance actors, while also being subjected to accountability safeguards.

Table 4.26: Summary of Qualitative Institutional Themes

Theme	Pattern across counties	Interpretation
Political interference	Strong across all counties	Politicians, campaigns, elections, political protection, intimidation, and interference by political actors were repeatedly associated with weak enforcement.
Corruption/collusion	Strong across all counties	Bribe-taking, informal payments, protection of riders, corrupt officials, and payments to enforcement officers weakened control.
Institutional effectiveness	Strong across all counties	Respondents repeatedly referred to the role of police, NGAO, county officials, SACCOs, stage leaders, and community policing actors.
Weak registration	Present across all counties	Unregistered riders, fake or incomplete records, unknown riders, and weak identification reduced traceability.
Poor enforcement	Present across all counties	Weak patrols, slow response, limited police presence, poor monitoring, and inadequate security reduced deterrence.
Low reporting	Present across all counties	Fear of retaliation, witness intimidation, mistrust of police, poor evidence, and court delays discouraged reporting.
Weak prosecution	Present across all counties	Weak evidence, delays, and failure to complete cases reduced punishment certainty.
Poor coordination	Less visible in qualitative coding	Although less frequently coded, coordination gaps remain important where agencies fail to share information.
Weak stage discipline	Less visible in qualitative coding	Weak stage control can allow unknown or criminal riders to operate within legitimate rider spaces.

Source: *Objective Four supporting quotations and qualitative theme coding.*

Table 4.26 shows that the qualitative themes formed an interconnected institutional-risk chain. Weak registration creates anonymity. Poor enforcement lowers the risk of detection. Corruption and collusion reduce the likelihood of punishment. Political interference protects selected riders or groups. Low reporting reduces intelligence. Weak prosecution reduces deterrence. Poor coordination limits institutional response. Weak stage discipline allows offenders to remain within legitimate rider spaces. Together, these conditions create an enabling environment for boda-boda-related crime.

The findings are consistent with Goodfellow and Titeca's work on Kampala's informal economy, which shows that political configurations can subvert city governance and that informal workers, including boda-boda drivers, may become connected to political bargaining and protection (Goodfellow & Titeca, 2012). This helps explain why political interference emerged as a major theme in the present study. Where boda-boda riders are politically useful, protected, or mobilized, enforcement may become inconsistent and the sector may become harder to regulate.

The findings also align with the National Crime Research Centre's work on boda-boda transport and security challenges in Kenya. The NCRC identifies weak law enforcement, weak regulation, corruption among enforcement agencies, rider anonymity, and inadequate security responses as challenges in controlling boda-boda-related crime (NCRC, 2018). These issues correspond closely with the themes identified in this study, especially weak registration, corruption/collusion, poor enforcement, low reporting, and weak prosecution.

Overall, Figure 4.14 and Table 4.26 show that boda-boda-related crime is not simply a matter of individual wrongdoing among riders. It is shaped by institutional arrangements that either increase or reduce criminal opportunity. Where registration is strong, enforcement is fair, corruption is controlled, reporting is protected, prosecution is credible, and stage leadership is accountable, criminal actors are easier to identify and remove. Where these systems are weak, offenders can hide within the sector, exploit public mistrust, avoid punishment, and continue operating. Therefore, the qualitative evidence strengthens the central conclusion of Objective Four: institutional governance is a key component of boda-boda crime prevention (Cohen & Felson, 1979; Felson & Clarke, 1998).

Relationship Between Institutional Risk, Institutional Effectiveness, and Organised Criminality. This subsection examines the statistical relationship between institutional risk, institutional effectiveness, and organised criminality in the boda-boda sector. The purpose was to determine whether weak institutional environments increase organised-criminality patterns and whether stronger institutional effectiveness reduces exposure to organised boda-boda-related crime. The analysis used bivariate correlation, county-adjusted linear regression, logistic regression, and an expanded regression model that included specific institutional-risk indicators.

The bivariate correlation results showed weak and statistically non-significant relationships between the institutional indices and organised criminality. Institutional risk had a very weak positive correlation with organised criminality, with Spearman's rho = 0.020, p = 0.327. Institutional effectiveness had a weak negative correlation with organised criminality, with rho = -0.031, p = 0.132. At the simple correlation level, therefore, institutional risk and institutional effectiveness did not strongly explain organised criminality.

This weak correlation pattern is important because it shows that the relationship between institutions and crime is not direct or automatic. A simple correlation examines whether two variables move together without controlling for county context, local political economy, enforcement reach, border dynamics, stage organisation, or reporting practices. In this study, these contextual factors mattered. The same institutional weakness may produce different crime outcomes in different counties. For example, weak registration in a border county may support cross-border anonymity and smuggling opportunities, while weak registration in a rural or frontier county may be associated more with underreporting, limited enforcement reach, and unregulated mobility.

However, the regression models provided a more nuanced picture. In the county-adjusted linear regression model, institutional risk had a positive and statistically significant association with organised criminality, $\beta = 0.123$, $p < 0.001$. This means that after controlling for county differences, higher institutional risk was associated with higher organised-criminality scores. In practical terms, respondents who perceived stronger weak registration, corruption/collusion, political interference, poor coordination, weak stage discipline, low reporting, and weak prosecution were more likely to report stronger organised-criminality patterns.

Institutional effectiveness had a negative association with organised criminality in the same county-adjusted model, $\beta = -0.073$, although this relationship was only marginally significant at $p = 0.067$. The direction of this coefficient is still meaningful. It suggests that stronger perceived performance by police, National Government Administration Officers, county enforcement officers, SACCOs, stage leadership, and community policing structures may reduce organised criminality. However, the marginal significance indicates that institutional effectiveness alone may not be sufficient unless it directly reduces the specific risks through which boda-boda-related crime becomes repeated, coordinated, or organised.

Table 4.27: Correlation and Regression Summary for Objective Four

Model/test	Predictor	Estimate/statistic	p-value	Interpretation
Spearman correlation	Institutional risk vs organised criminality	rho = 0.020	0.327	Weak positive relationship; not statistically significant
Spearman correlation	Institutional effectiveness vs organised criminality	rho = -0.031	0.132	Weak negative relationship; not statistically significant
Linear regression	Institutional risk index	β = 0.123	< 0.001	Higher institutional risk predicts higher organised criminality
Linear regression	Institutional effectiveness index	β = -0.073	0.067	Higher effectiveness tends to reduce organised criminality
Expanded regression	Political interference	β = 0.084	0.004	Significant positive predictor
Expanded regression	Institutional effectiveness	β = -0.113	0.009	Significant protective predictor
Logistic regression	Institutional risk index	OR = 1.536	< 0.001	One-unit increase raises odds of organised-crime exposure by about 53.6%
Logistic regression	Institutional effectiveness index	OR = 0.790	0.072	One-unit increase lowers odds by about 21.0%, but marginally significant

Source: *Objective Four model outputs.*

The logistic regression results provided the clearest evidence that institutional risk increases organised-crime exposure. A one-unit increase in institutional risk increased the odds of organised-crime exposure by approximately 53.6%, with OR = 1.536, $p < 0.001$. This means that respondents in higher-risk institutional environments were substantially more likely to fall into the organised-crime exposure category than those in lower-risk institutional environments. The effect was statistically significant, suggesting that institutional risk is not merely a background condition but a measurable predictor of organised boda-boda-related crime.

Institutional effectiveness reduced the odds of organised-crime exposure by approximately 21.0%, with OR = 0.790, although this effect was marginal rather than conventionally significant, $p = 0.072$. This suggests that stronger institutions may reduce organised-crime exposure, but their protective effect is weaker than the risk-enhancing effect of institutional weakness. The implication is that improving institutional effectiveness is necessary, but it must be accompanied by targeted reduction of specific institutional risks such as political interference, corruption, weak reporting, weak registration, poor coordination, and weak prosecution.

The expanded regression model provided further insight into which institutional-risk factors mattered most. Political interference emerged as a statistically significant positive predictor of

organised criminality, β = 0.084, p = 0.004. This was one of the most important findings of Objective Four. It shows that organised criminality is not influenced only by poor enforcement or weak registration; it is also shaped by the politicization of the boda-boda sector. Where political actors protect riders, mobilize them during campaigns, interfere with enforcement, or shield criminal riders from sanctions, the deterrent effect of law enforcement is weakened.

Political interference can reduce enforcement neutrality. Enforcement agencies may hesitate to act against riders or groups that are politically connected, especially during election periods or in areas where boda-boda groups are used for mobilization, intimidation, or campaign activity. This creates a perception that some offenders are protected. Once riders or groups believe they are protected by political actors, they may operate with reduced fear of arrest, prosecution, or punishment. This weakens the rule of law and increases opportunities for repeated or coordinated offending (Goodfellow & Titeca, 2012).

The expanded model also showed that institutional effectiveness became statistically significant once specific institutional-risk factors were included, β = -0.113, p = 0.009. This finding is important because it clarifies how institutions reduce crime. Institutions do not reduce organised criminality simply by existing. They reduce crime when they actively control the risks that allow crime to become organised. These risks include political protection, corruption, poor reporting, weak prosecution, weak stage discipline, and weak registration. Therefore, the effect of institutional effectiveness becomes stronger when it is examined together with the concrete risk pathways through which crime occurs.

The results also suggest that weak stage discipline and low reporting, although not the strongest predictors in the expanded model, remain analytically important. Weak stage discipline allows unknown, unregistered, or criminal riders to operate within legitimate rider spaces. Low reporting reduces the flow of information from communities, victims, passengers, riders, and stage leaders to enforcement agencies. When reporting is low, police intelligence becomes weak, repeat offenders remain unidentified, and prosecution becomes difficult. These factors may not always appear as the strongest statistical predictors, but they form part of the institutional environment that enables criminality.

The findings therefore point to an important distinction between institutional presence and institutional performance. Institutional presence refers to the existence of police stations, county enforcement structures, SACCOs, stage leadership, and community policing mechanisms. Institutional performance refers to whether these institutions actually identify riders, monitor stages, enforce rules, respond to reports, prevent corruption, protect witnesses, coordinate information, and support prosecution. The results suggest that institutional performance is more important than mere institutional presence. Institutions become protective only when they reduce the specific opportunity structures that allow offenders to avoid detection and punishment.

This interpretation is consistent with the qualitative findings presented earlier in this section. The qualitative evidence showed that political interference, corruption/collusion, weak registration, poor enforcement, low reporting, and weak prosecution were recurrent institutional themes across counties. These themes explain why institutional risk had a stronger statistical effect than institutional effectiveness alone. Weak institutions create conditions that offenders can exploit. Strong institutions reduce crime only when they directly close these gaps.

The findings also help explain why the county pattern was complex. Some counties may have relatively strong institutional effectiveness but still experience organised-criminality indicators because specific risks remain unresolved. For example, a county may have visible police presence but still suffer from political interference, low reporting, or weak prosecution. Conversely, a county may have weak institutional effectiveness but not record high organised-criminality exposure if crime is underreported, dispersed, opportunistic, or not clearly coordinated. This explains why the bivariate correlations were weak while the regression and logistic models were more informative.

Theoretically, the results support the view that crime is shaped by opportunity and guardianship. Weak registration reduces traceability. Poor enforcement reduces the risk of detection. Corruption reduces the certainty of punishment. Political interference reduces enforcement neutrality. Low reporting reduces intelligence. Weak prosecution reduces deterrence. Together, these conditions create an opportunity structure in which offenders can exploit the boda-boda sector's mobility, flexibility, anonymity, and informal organisation (Cohen & Felson, 1979; Felson & Clarke, 1998).

The results also show that institutional risk is a stronger predictor of organised boda-boda-related crime than institutional effectiveness alone. This does not mean that institutional effectiveness is unimportant. Rather, it means that institutional effectiveness must be directed toward concrete risk reduction. It is not enough to have police, SACCOs, stage leaders, or county enforcement officers in place. These actors must work in a coordinated, accountable, corruption-free, and politically neutral manner. They must be able to register riders, monitor stages, identify repeat offenders, protect complainants, follow cases through prosecution, and prevent criminal actors from hiding within the legitimate rider population.

In conclusion, the relationship between institutional risk, institutional effectiveness, and organised criminality is best understood as a conditional relationship. Institutional risk increases organised criminality by weakening guardianship, reducing deterrence, encouraging impunity, and creating protection opportunities for offenders. Institutional effectiveness reduces organised criminality when it actively addresses these risks. The findings therefore reinforce the central argument of Objective Four: boda-boda-related crime is not only a rider-level problem, but also a governance problem. Effective crime control requires reducing institutional risk while strengthening the credibility, coordination, neutrality, and accountability of institutions responsible for regulating the boda-boda sector.

The findings of Objective Four are consistent with previous criminological and transport-governance scholarship which argues that crime is shaped not only by offender motivation, but also by institutional weakness, opportunity structures, weak social control, and low public trust in enforcement systems (Cohen & Felson, 1979; Felson & Clarke, 1998; Sampson et al., 1997; Tyler, 2006). In this study, institutional risk was more strongly associated with organised criminality than institutional effectiveness alone. This means that boda-boda-related crime is not explained simply by the presence or absence of institutions, but by whether those institutions can reduce specific risks such as weak registration, corruption, political interference, low reporting, weak stage discipline, and weak prosecution.

The findings are in consonance with routine activity theory. Cohen and Felson (1979) argue that crime occurs when motivated offenders, suitable targets, and the absence of capable guardians converge in time and space. In the boda-boda sector, weak rider registration, limited patrols, poor

reporting, and weak prosecution reduce capable guardianship. When riders are not properly registered, offenders can hide within the legitimate rider population. When patrols are limited, offenders face a lower risk of detection. When communities do not report crime, police intelligence becomes weak. When prosecution is ineffective, punishment becomes uncertain. These conditions make it easier for offenders to use motorcycles for theft, robbery, smuggling, intimidation, and escape.

Routine activity theory is particularly useful for interpreting boda-boda-related crime because the sector is highly mobile, informal, and spatially flexible. Motorcycles can move through narrow roads, informal settlements, border routes, market areas, rural paths, and urban congestion more easily than many other transport modes. This mobility creates legitimate livelihood opportunities, but it can also create criminal opportunity where institutional guardianship is weak. In this study, weak registration, poor enforcement, low reporting, and weak prosecution reduced the capacity of institutions to act as capable guardians. As a result, offenders could exploit the speed, anonymity, and flexibility of boda-boda transport.

The findings also support opportunity theory and situational crime-prevention perspectives. Felson and Clarke (1998) argue that opportunity is central to crime because settings can either increase or reduce the likelihood of offending. According to this perspective, crime prevention should focus not only on offender motivation but also on changing the conditions that make crime easy, rewarding, or low-risk. In the present study, weak registration, corruption, political interference, low reporting, and weak prosecution created opportunities for offenders by reducing traceability and punishment certainty. Therefore, institutional reform should focus not only on punishing offenders after crime has occurred, but also on changing the opportunity structure of the boda-boda sector.

From an opportunity-theory perspective, boda-boda-related crime can be reduced by increasing the effort required to offend, increasing the risk of detection, reducing the rewards of crime, and removing excuses for criminal behaviour. Rider registration increases traceability. Stage discipline makes unknown riders more visible. Intelligence-led policing increases the likelihood of detection. Strong prosecution increases punishment certainty. Anti-corruption measures reduce protection for offenders. Community reporting improves information flow. These measures do not

criminalize all riders; rather, they make it harder for offenders to hide within the legitimate boda-boda population.

The findings further relate to collective efficacy theory. Sampson et al. (1997) define collective efficacy as social cohesion among community members combined with their willingness to intervene for the common good. In the boda-boda context, collective efficacy can be expressed through stage leadership, SACCOs, community policing committees, village elders, local administrators, riders, passengers, and residents who cooperate to maintain order. Where these structures are trusted and active, they can identify unknown riders, discipline members, report repeat offenders, support investigations, and prevent criminal riders from using legitimate stages as cover.

Collective efficacy is important because formal policing alone cannot effectively monitor every rider, stage, route, and incident. Boda-boda operations are local and relational. Stage leaders often know who belongs to a stage, which riders are new, which motorcycles are suspicious, and which routes are associated with complaints. SACCOs and rider associations can maintain member records, regulate stage access, and discipline members. Community policing structures can connect residents, riders, and security agencies. Where these informal and semi-formal structures are strong, they increase local guardianship. Where they are weak, captured, or politically influenced, criminal actors can hide within the legitimate rider population.

The findings also align with police legitimacy and procedural justice theory. Tyler's work on police legitimacy argues that public cooperation with police depends not only on fear of punishment, but also on whether citizens view police as fair, respectful, neutral, and trustworthy (Tyler, 2006). This is directly relevant to the low-reporting theme in this study. The qualitative findings showed that fear of retaliation, mistrust of police, witness intimidation, poor evidence, court delays, and weak prosecution reduced willingness to report boda-boda-related crime. When communities fear that offenders are protected, police are compromised, or cases will fail in court, reporting declines. Low reporting then weakens intelligence-led policing, investigation, prosecution, and deterrence.

Police legitimacy theory therefore helps explain why institutional effectiveness is not simply about increasing enforcement presence. Communities may have police posts, patrols, administrators, and county enforcement officers, but they may still avoid reporting crime if they believe institutions are corrupt, politically influenced, slow to respond, or unable to protect witnesses. For boda-boda crime prevention to be effective, enforcement agencies must build trust, treat communities fairly, protect complainants, respond consistently, and demonstrate that reports lead to credible action. Without trust, communities remain silent, and offenders benefit from weak intelligence and low prosecution certainty.

The Kenyan evidence also fits the National Crime Research Centre's findings on boda-boda motorcycle transport and security challenges. The NCRC reported that the sector faces weak law enforcement and regulation, corruption among sections of security and law-enforcement agencies, impunity among some operators, rider anonymity, unregistered motorcycles, fear of victimization, and inadequate security personnel (NCRC, 2018). These issues closely correspond to the institutional-risk indicators in this study, especially weak registration, corruption/collusion, poor enforcement, low reporting, and weak prosecution.

The NCRC findings are important because they show that boda-boda-related crime is partly a regulatory and governance problem. The sector's informality makes it difficult to distinguish legitimate livelihood actors from offenders who use motorcycles to facilitate crime. Weak registration reduces traceability. Rider anonymity protects offenders. Corruption weakens deterrence. Fear of victimization discourages reporting. Inadequate security personnel reduce enforcement reach. These conditions create an opportunity structure that allows offenders to exploit the legitimate boda-boda sector for criminal purposes.

The present findings extend the NCRC evidence by showing that institutional risk is not uniform across counties. Mombasa recorded the highest institutional effectiveness and the lowest institutional risk, suggesting comparatively stronger institutional visibility and regulatory presence. Marsabit recorded the highest institutional risk and the lowest institutional effectiveness, suggesting a weaker institutional environment, although this did not necessarily translate into the highest organised-criminality exposure. Busia and Bomet showed a closer alignment between high institutional risk and stronger organised-criminality indicators. This suggests that institutional

weakness becomes more criminogenic where local opportunity structures allow repeated offending, political protection, weak stage discipline, or coordinated crime.

The findings are also consistent with Goodfellow and Titeca's work on informal-sector governance in East Africa. Their study of Kampala shows that informal workers, including boda-boda drivers, may become embedded in political networks through protection, mobilization, and bargaining (Goodfellow & Titeca, 2012). This is relevant to the present study because political interference emerged as a major institutional theme and a statistically significant predictor of organised criminality. Where boda-boda riders are politically mobilized, protected, or used during campaigns, enforcement may become selective. Criminal riders or groups may avoid punishment if they are politically useful or connected.

This argument helps explain why formal rules may exist but fail to produce effective control. Institutions may have laws, regulations, registration requirements, and enforcement mandates, but those rules may be weakened by political pressure, informal protection, patronage, or corruption. In such contexts, boda-boda-related crime becomes embedded in local governance arrangements rather than remaining merely a problem of individual rider behaviour. Political interference therefore weakens institutional neutrality and creates conditions for impunity.

The corruption and collusion findings are also consistent with organised-crime literature. The United Nations Office on Drugs and Crime notes that corruption and organised crime are often intertwined because corruption enables criminal groups to operate, expand, evade detection, bypass law enforcement, and avoid punishment (UNODC, 2024). In the present study, corruption and collusion were repeatedly associated with bribe-taking, informal payments, protected riders, corrupt officials, and payment to police or other enforcement officers. This shows that corruption does not merely weaken enforcement; it can actively create protection systems for criminal actors.

Corruption is especially dangerous in the boda-boda sector because the sector depends on regular interaction between riders, police, county enforcement officers, stage leaders, SACCO officials, and local administrators. If these interactions are governed by informal payments rather than transparent rules, enforcement becomes negotiated rather than consistent. Criminal riders may remain active if they can pay bribes or rely on protection, while legitimate riders may lose trust in

institutions. This reduces deterrence, discourages reporting, and increases the perception that offenders can act with impunity.

Kumar's work on motorcycle taxis in African cities also helps interpret the broader governance context. Kumar (2011) argues that the growth of commercial motorcycles in sub-Saharan African cities reflects gaps in formal transport provision, weak sector performance, and difficulties in institutional regulation. This is relevant because boda-boda transport expands where formal transport systems are inadequate and where livelihoods are scarce. However, when the sector grows faster than the capacity of institutions to regulate it, governance gaps emerge. These gaps can be exploited by offenders, especially where registration, enforcement, and accountability systems are weak.

Taken together, the findings show that Objective Four is supported by several complementary theoretical perspectives. Routine activity theory explains how weak guardianship increases opportunities for crime (Cohen & Felson, 1979). Opportunity theory explains why crime prevention must alter the settings that enable offending (Felson & Clarke, 1998). Collective efficacy theory explains the importance of stage leadership, SACCOs, community policing, and local cooperation (Sampson et al., 1997). Police legitimacy theory explains why trust, fairness, and protection of reporters are essential for effective enforcement (Tyler, 2006). Informal-sector governance literature explains how political bargaining and protection can weaken formal regulation (Goodfellow & Titeca, 2012). Organised-crime literature explains how corruption creates impunity and allows criminal actors to avoid punishment (UNODC, 2024).

Therefore, the findings confirm that boda-boda-related crime should not be understood only as a rider-level problem. Most boda-boda riders are livelihood actors. However, weak institutions allow criminal actors to exploit the sector's mobility, anonymity, and informal organisation. This distinction is important because a punitive approach that treats all riders as criminals may undermine livelihoods and reduce cooperation with law enforcement. A more effective approach is targeted institutional strengthening: registering riders, improving stage governance, strengthening SACCO accountability, protecting reporting channels, reducing corruption, insulating enforcement from political interference, and improving prosecution follow-up.

In conclusion, the findings of Objective Four extend previous scholarship by showing that institutional risk is spatially uneven and county-specific. Institutional weakness does not produce the same outcome everywhere. In Marsabit, institutional risk may be linked more to frontier conditions, dispersed settlements, weak enforcement reach, and low reporting. In Busia, institutional risk may interact with border mobility, smuggling routes, and rider anonymity. In Bomet, risk may be linked to local networks, stage discipline, and political protection. In Mombasa, stronger institutional effectiveness and lower institutional risk may suggest better governance visibility, although localised crime risks may remain. Therefore, effective boda-boda crime prevention requires county-sensitive institutional strengthening rather than uniform enforcement or blanket criminalization.

Integrated Interpretation. The combined quantitative and qualitative findings show that institutional conditions significantly shape boda-boda-related crime, but they do not operate in a simple linear manner. Institutional risk was a statistically significant predictor of organised criminality in both the regression and logistic models. Institutional effectiveness also had a protective effect, especially in the expanded model where specific institutional-risk factors were included. However, the weak bivariate correlations show that institutional variables alone do not fully explain county differences in boda-boda-related crime. This means that institutional risk and institutional effectiveness must be interpreted together with county context, local opportunity structures, enforcement geography, reporting behaviour, stage organisation, political influence, and the specific form of crime being observed.

The most important interpretation is that boda-boda-related crime emerges where weak institutions interact with local opportunity structures. Institutional weakness by itself does not automatically produce organised criminality. Rather, it creates conditions that may be exploited differently depending on the county context. Where weak institutions coincide with rider anonymity, poor stage discipline, political protection, corruption, low reporting, and weak prosecution, the risk of repeated or organised offending increases. Where weak institutions exist but crime is dispersed, underreported, or more opportunistic, the same institutional weaknesses may not appear as high organised-criminality exposure.

Marsabit illustrates this complexity. The county recorded the highest institutional risk and the lowest institutional effectiveness, indicating a weak institutional environment. However, this did

not translate into the highest organised-crime exposure. This suggests that institutional weakness in Marsabit may manifest differently from counties where organised criminality is more visible. In Marsabit, institutional risk may be linked to frontier conditions, dispersed settlements, long transport corridors, weak enforcement reach, insecurity exposure, unregulated mobility, and low reporting. These conditions may create vulnerability and insecurity, but not necessarily clearly structured or coordinated criminal networks. Therefore, Marsabit's pattern suggests that weak institutions may produce diffuse insecurity, opportunistic offending, and under-detection rather than organised criminality in the strict sense.

Bomet and Busia present a different pattern. Both counties showed a stronger connection between institutional risk and organised-criminality indicators. In Bomet, institutional risk may be linked to weak stage discipline, inconsistent enforcement, local protection networks, and repeated offending. The relatively high organised-crime exposure in Bomet suggests that institutional weaknesses may be enabling more patterned or semi-organised offending. In Busia, the institutional-risk pattern is likely intensified by the county's border location. Cross-border movement, informal trade, smuggling routes, rider anonymity, and jurisdictional complexity may create opportunities for repeated and coordinated crime. Therefore, in Bomet and Busia, institutional weakness appears more closely connected to organised or semi-organised criminality.

Mombasa recorded the highest institutional effectiveness and the lowest institutional risk. This may indicate stronger visibility of institutions, denser enforcement presence, more concentrated transport regulation, and better traceability within an urbanized setting. The county's lower institutional-risk score suggests that police, county enforcement structures, SACCOs, stage leaders, and community policing mechanisms may be more visible or better positioned to regulate the sector. However, this does not mean that boda-boda-related crime is absent in Mombasa. Rather, crime may be more spatially concentrated in particular urban spaces, including transport nodes, nightlife areas, informal settlements, commercial centres, port-related spaces, and high-mobility corridors. Thus, Mombasa's pattern suggests that stronger institutional visibility may reduce generalized institutional risk, while localised crime risks may persist in specific urban settings.

The qualitative findings deepen this interpretation by showing how institutional weaknesses combine to create a cycle of vulnerability. Political interference, corruption and collusion, weak

registration, poor enforcement, low reporting, and weak prosecution were not isolated problems. They formed an interconnected institutional-risk chain. Weak registration allows offenders to remain anonymous. Poor enforcement reduces the likelihood of detection. Corruption and collusion allow offenders to avoid sanctions. Political interference protects selected riders or groups from enforcement. Low reporting weakens intelligence flow from communities to security agencies. Weak prosecution reduces deterrence because offenders may believe that arrest will not lead to punishment. Together, these conditions create an enabling environment for repeated and organised boda-boda-related crime.

Political interference is especially important in this cycle because it weakens enforcement neutrality. Where riders or groups believe they are protected by political actors, enforcement becomes selective and deterrence declines. Boda-boda riders may be politically useful because of their mobility, numbers, youthfulness, and ability to mobilize quickly during campaigns or local political activities. When political actors protect riders or interfere with enforcement, criminal riders may operate with reduced fear of arrest or prosecution. This transforms boda-boda-related crime from a purely security issue into a governance and political-economy issue (Goodfellow & Titeca, 2012).

Corruption and collusion further weaken institutional control. When offenders believe that they can pay bribes, use connections, or rely on protection from compromised officials, punishment becomes uncertain. This reduces the credibility of enforcement and undermines public trust. Corruption also discourages reporting because victims and witnesses may believe that offenders will be released or protected. In this way, corruption does not simply weaken law enforcement; it can actively create protection systems for criminal actors. Where corruption becomes normalized, legitimate riders may also lose confidence in institutions, making cooperation with police and county enforcement more difficult (UNODC, 2024; Tyler, 2006).

Low reporting completes the cycle of institutional vulnerability. When communities fear retaliation, distrust police, or believe that offenders are politically protected, they are less likely to report crime. Low reporting weakens intelligence-led policing because security agencies depend on information from victims, witnesses, riders, passengers, stage leaders, and local residents. If crimes are not reported, repeat offenders remain unidentified, crime hotspots remain hidden, and prosecution becomes difficult. Low reporting also creates a false impression that crime is lower

than it actually is. Therefore, improving reporting is not only a community-relations issue; it is central to crime detection, prosecution, and deterrence.

Weak prosecution reinforces the same pattern. Even where offenders are arrested, cases may collapse if evidence is weak, witnesses are intimidated, investigations are poorly conducted, or court processes are delayed. When offenders return to the community after failed cases, public confidence declines further. Victims and witnesses may then become even less willing to report future crimes. This creates a feedback loop in which weak prosecution reduces reporting, low reporting weakens evidence, and weak evidence further undermines prosecution.

The integrated findings therefore show that boda-boda-related crime should not be understood as a problem of riders alone. Most boda-boda riders are livelihood actors who depend on motorcycle transport for income. They operate in a sector that provides employment, mobility, and transport access, especially where formal transport systems are limited (Kumar, 2011). However, weak institutions create opportunities for offenders to exploit the same sector. Criminal actors can hide within the legitimate rider population, use motorcycles for mobility and escape, exploit weak registration, benefit from poor enforcement, and avoid punishment where corruption or political protection exists.

This distinction is important for policy. A punitive approach that treats all boda-boda riders as criminals may undermine livelihoods, increase mistrust, and reduce cooperation between riders and security agencies. Such an approach may also push legitimate riders away from formal systems, making registration and monitoring more difficult. A targeted institutional approach is more appropriate. This approach should distinguish between legitimate livelihood actors and criminal offenders. It should strengthen rider and motorcycle registration, improve stage governance, build police-community trust, protect reporting channels, enforce rules consistently, reduce corruption, improve prosecution follow-up, and investigate political or enforcement collusion (Felson & Clarke, 1998; NCRC, 2018; Tyler, 2006).

The integrated interpretation also shows that institutional reform must be county-sensitive. Marsabit requires interventions that address enforcement reach, route monitoring, registration in dispersed settlements, and safe reporting in frontier conditions. Busia requires stronger cross-border coordination, traceability, anti-smuggling intelligence, and inter-agency information sharing. Bomet requires stronger stage discipline, monitoring of repeated offending, and protection

from political interference. Mombasa requires continued institutional visibility and targeted hotspot management in dense urban spaces. Therefore, a uniform national approach is necessary for setting standards, but county-specific strategies are required for implementation.

Overall, the findings show that institutional risk increases organised criminality by weakening guardianship, reducing deterrence, lowering reporting, and creating protection opportunities for offenders. Institutional effectiveness reduces organised criminality when it directly addresses these risks. The relationship between institutions and crime is therefore conditional: institutions matter most when they are credible, coordinated, fair, corruption-free, politically neutral, and capable of reducing the specific opportunity structures that offenders exploit. Boda-boda-related crime is thus both a security problem and a governance problem. Effective crime prevention requires strengthening institutions while protecting legitimate boda-boda livelihoods.

Policy Implications. The findings of Objective Four point to five major policy implications for strengthening institutional governance and reducing boda-boda-related crime. The central policy message is that boda-boda-related crime should not be addressed only through arrests, crackdowns, or blanket restrictions on riders. The findings show that crime is partly enabled by institutional weaknesses, including weak rider registration, corruption and collusion, political interference, poor enforcement, low reporting, weak prosecution, weak stage discipline, and poor coordination among responsible agencies. Therefore, policy responses should focus on strengthening institutions, improving accountability, reducing anonymity, and separating legitimate boda-boda operators from criminal actors who exploit the sector.

First, rider and motorcycle registration should be strengthened. Registration should not be treated as a routine administrative requirement only, but as a core security and governance tool. A strengthened registration system should link rider identity, national identification details, motorcycle ownership, motorcycle registration number, stage location, SACCO or association membership, county of operation, normal operating routes, and contact details. Such a system would reduce anonymity and improve traceability. Where riders and motorcycles are properly registered, it becomes easier to identify suspects, trace stolen motorcycles, verify legitimate riders, monitor movement between stages, and hold SACCOs or stage leaders accountable for riders operating under their jurisdiction.

The registration system should also be county-linked and interoperable across counties. This is important because boda-boda operations are mobile, and offenders may shift from one stage, ward, sub-county, or county to another after committing crime. A county-linked digital database would allow police, county enforcement officers, NTSA, SACCO officials, and stage leaders to verify rider identity and motorcycle ownership more easily. It would also help identify repeat offenders, unregistered motorcycles, motorcycles used in crime, and riders operating outside their authorized areas. However, such a database should include privacy safeguards, controlled access, and clear rules to prevent misuse of rider information.

Second, enforcement should be intelligence-led rather than purely punitive. The results showed that institutional risk significantly increased organised-crime exposure, while institutional effectiveness became protective when specific institutional-risk factors were included. This implies that enforcement should move beyond general crackdowns and focus on specific risks, offenders, stages, routes, and crime patterns. Police, National Government Administration Officers, county enforcement officers, NTSA, SACCOs, stage leaders, and community policing structures should share information on repeat offenders, stolen motorcycles, suspicious riders, crime hotspots, politically protected offenders, and stages associated with repeated complaints.

An intelligence-led approach would be more effective because it targets criminal misuse of the boda-boda sector without criminalizing all riders. Many boda-boda operators are legitimate livelihood actors. Blanket enforcement operations may temporarily disrupt crime, but they can also alienate lawful riders, reduce cooperation with security agencies, and push some operators into informal arrangements. By contrast, intelligence-led enforcement can focus on high-risk individuals, unregistered motorcycles, repeat-offence areas, and specific routes linked to robbery, smuggling, theft, intimidation, or assault. This approach is consistent with the National Crime Research Centre's recommendation for stronger regulation, registration, intelligence-led policing, and coordinated institutional response to boda-boda-related security challenges (NCRC, 2018).

Third, political interference should be addressed directly. The results showed that political interference was a statistically significant predictor of organised criminality. This finding has serious policy implications because it suggests that crime control is weakened where political actors protect riders, use them during campaigns, interfere with enforcement, or shield criminal riders from sanctions. Enforcement agencies should therefore be protected from political pressure.

Action against criminal riders should be based on evidence and law, not political affiliation, electoral usefulness, local patronage, or informal protection (Goodfellow & Titeca, 2012).

To reduce political interference, enforcement procedures should be transparent, standardised, and properly documented. Arrests, investigations, release decisions, and prosecution follow-up should be recorded clearly so that politically sensitive cases cannot easily be withdrawn or weakened through informal pressure. County security committees should monitor cases involving politically connected boda-boda groups, especially during election periods or periods of heightened political mobilization. Political leaders should also be held accountable where they incite, protect, finance, or mobilize riders for intimidation, violence, or criminal activity. Without addressing political interference, enforcement may remain selective and deterrence may remain weak.

Fourth, reporting systems should be improved and protected. The findings showed that low reporting was an important institutional risk. Victims, witnesses, passengers, riders, and community members may fail to report boda-boda-related crime because they fear retaliation, mistrust police, believe offenders are politically protected, or expect cases to collapse in court. Low reporting weakens intelligence-led policing because law enforcement agencies depend on community information to identify repeat offenders, crime hotspots, suspicious stages, and emerging criminal patterns. When communities remain silent, offenders continue operating and official crime data may underestimate the true scale of the problem.

To address this, counties should establish safe, accessible, and confidential reporting channels. These may include anonymous reporting hotlines, digital reporting platforms, community policing forums, trusted local administrators, secure police-community liaison points, and confidential complaint mechanisms within SACCOs and stages. Witness protection should also be strengthened, especially in cases involving organised groups, politically connected offenders, or repeated intimidation. Communities are more likely to report when they believe that reports will be acted upon, complainants will be protected, and offenders will not be shielded by corruption or political influence (NCRC, 2018; Tyler, 2006).

Reporting systems should also be linked to prosecution follow-up. Reporting will remain low if communities see suspects released without explanation, cases delayed indefinitely, or witnesses intimidated. Police, prosecutors, and courts should therefore improve evidence collection, witness handling, case tracking, and feedback to complainants. Faster response and credible prosecution

can build public trust and increase willingness to report. In this way, improved reporting becomes both a security measure and a trust-building mechanism.

Fifth, SACCOs and stage leadership should be integrated into local security governance, but with accountability safeguards. SACCOs and stage leaders are strategically important because they operate closest to riders. They know who belongs to a stage, which motorcycles operate there, which riders are new, which members have disciplinary problems, and which routes or times are associated with risk. They can help identify legitimate riders, regulate stage access, discipline members, report suspicious behaviour, enforce operating norms, and support police investigations (NCRC, 2018; Sampson et al., 1997).

However, SACCOs and stage leadership should not be treated as automatically trustworthy or self-regulating. The findings showed that weak stage discipline and institutional risk can create opportunities for criminal riders to hide within legitimate rider spaces. Stage leaders can also be captured by powerful riders, criminal networks, corrupt officials, or political actors. Therefore, integrating SACCOs and stage leaders into security governance should be accompanied by oversight. Counties should require stages to maintain updated rider registers, report new entrants, record complaints, cooperate with investigations, and remove members linked to repeated criminal activity. At the same time, riders and passengers should have channels to report abusive, corrupt, or politically captured stage officials.

Beyond these five main implications, the findings also suggest the need for stronger inter-agency coordination. Boda-boda governance cuts across several institutions, including police, NTSA, county governments, National Government Administration Officers, SACCOs, stage leaders, community policing structures, prosecutors, and courts. Weak coordination allows offenders to exploit institutional gaps. For example, a rider known to stage leaders may not be known to police; a stolen motorcycle reported in one county may not be flagged in another; or a case may fail because investigators and prosecutors do not coordinate evidence properly. A coordinated framework should define institutional roles, establish information-sharing protocols, support joint operations, and monitor enforcement outcomes.

The policy response should also be county-sensitive. The results showed that institutional risk and effectiveness varied across counties. Marsabit had the highest institutional risk and lowest institutional effectiveness, while Mombasa had the lowest institutional risk and highest

institutional effectiveness. Busia and Bomet showed stronger alignment between institutional risk and organised-criminality indicators. This means that a uniform policy response may not be sufficient. Marsabit may require stronger enforcement reach, reporting protection, route monitoring, and registration in dispersed settlements. Busia may require cross-border coordination, anti-smuggling intelligence, and traceability of riders moving across border spaces. Bomet may require stronger stage discipline, protection from political interference, and monitoring of repeat offending. Mombasa may require continued institutional visibility and targeted hotspot policing in urban transport nodes, informal settlements, nightlife zones, and port-related mobility spaces.

The findings further imply that anti-corruption measures should be treated as part of boda-boda crime prevention. Corruption and collusion weaken enforcement by allowing offenders to avoid sanctions or continue operating under protection. Anti-corruption measures may include internal oversight of enforcement officers, anonymous reporting of corrupt practices, monitoring of repeated release patterns, rotation of officers in high-risk areas, public complaint mechanisms, and sanctions against officials who protect offenders. If corruption is not addressed, increasing enforcement presence may not reduce crime because compromised institutions can become part of the protection system.

Finally, policy should protect legitimate livelihoods while targeting criminal misuse of the sector. Most boda-boda riders depend on motorcycle transport for income. Policies that treat all riders as criminals may undermine livelihoods, provoke resistance, and reduce cooperation with enforcement agencies. A balanced approach should therefore formalize and secure the sector rather than punish it collectively. Registration, training, SACCO accountability, stage discipline, intelligence-led enforcement, anti-corruption safeguards, and improved prosecution can help protect legitimate riders while isolating offenders (Kumar, 2011; NCRC, 2018).

In summary, the findings of Objective Four show that boda-boda-related crime can be reduced by strengthening institutional governance and reducing the specific risks that allow offenders to exploit the sector. The priority policy actions are stronger rider and motorcycle registration, intelligence-led enforcement, protection from political interference, improved reporting systems, accountable SACCO and stage governance, better inter-agency coordination, anti-corruption measures, improved prosecution, and county-specific crime-prevention strategies. Such an

approach would protect legitimate boda-boda livelihoods while closing the governance gaps that enable criminal actors to operate within the sector.

Summary of Objective Four Findings. Objective Four examined how institutional effectiveness and institutional and contextual risk shape boda-boda-related crime across the seven study counties. The findings show that boda-boda-related crime is not only a rider-level problem, nor only a socio-economic or opportunity-based problem. It is also a governance problem. The way institutions register riders, regulate stages, enforce rules, respond to crime, prevent corruption, protect witnesses, and prosecute offenders has a direct bearing on whether the boda-boda sector remains a legitimate livelihood space or becomes vulnerable to criminal exploitation.

The first major finding was that institutional effectiveness was moderate overall. The institutional effectiveness index had a mean score of 2.87 and a standard deviation of 0.86, suggesting that respondents viewed institutional performance as neither very weak nor very strong. The reliability of the index was acceptable, with Cronbach's alpha = 0.751, indicating that the six indicators of institutional effectiveness formed a coherent construct. These indicators included the perceived effectiveness of police, National Government Administration Officers, county transport/enforcement structures, SACCOs, stage leadership, and community policing mechanisms.

At county level, institutional effectiveness varied substantially. Mombasa recorded the strongest perceived institutional effectiveness, with a mean score of 3.34. It was followed by Nyeri at 3.06, Machakos at 3.05, and Kirinyaga at 3.02. These counties therefore appeared to have relatively stronger institutional visibility and governance capacity. By contrast, Marsabit recorded the lowest institutional effectiveness score at 2.45, while Busia and Bomet recorded lower scores of 2.65 and 2.68, respectively. This pattern shows that the capacity of institutions to regulate the boda-boda sector was uneven across counties.

The second major finding was that institutional and contextual risk was also moderate overall, but with clearer county-level concentration. The institutional risk index had a mean score of 2.67 and a standard deviation of 1.03. Its reliability was good, with Cronbach's alpha = 0.814, indicating that weak registration, corruption/collusion, political interference, poor coordination, weak stage discipline, low reporting, and weak prosecution formed a reliable institutional-risk construct. This

confirms that respondents perceived these weaknesses as related features of the governance environment surrounding the boda-boda sector.

Institutional risk was highest in Marsabit, which recorded a mean score of 3.26. It was followed by Bomet at 2.92 and Busia at 2.85. These three counties therefore represented the strongest institutional-risk environments. Kirinyaga recorded a moderate risk score of 2.55, while Machakos, Nyeri, and Mombasa recorded lower risk scores of 2.37, 2.28, and 2.22, respectively. The institutional profile was therefore most favourable in Mombasa, which had the highest institutional effectiveness and the lowest institutional risk. Marsabit presented the opposite profile, with the lowest institutional effectiveness and the highest institutional risk.

The third major finding was that institutional conditions did not produce a simple linear crime pattern. Although Marsabit had the highest institutional risk and the lowest institutional effectiveness, it did not record the highest organised-criminality exposure. This suggests that institutional weakness may manifest differently across county contexts. In Marsabit, institutional weakness may be associated more with dispersed settlements, long travel corridors, weak enforcement reach, low reporting, insecurity exposure, unregulated mobility, and opportunistic offending rather than clearly organised criminal networks. In contrast, Bomet and Busia showed a closer relationship between institutional risk and organised-criminality indicators. This suggests that institutional risk becomes more criminogenic where local opportunity structures allow repeat offending, political protection, weak stage discipline, or coordinated criminal activity.

The fourth major finding was that the qualitative evidence confirmed and deepened the quantitative results. The most recurrent qualitative institutional themes were political interference, institutional effectiveness, and corruption/collusion. Other important themes included weak registration, poor enforcement, low reporting, and weak prosecution. Weak stage discipline and poor coordination were less visible in the qualitative theme counts, but they remained important in the broader institutional-risk index. These qualitative findings show that respondents connected boda-boda-related crime to institutional weaknesses, selective enforcement, corruption, political protection, weak trust, poor reporting, and limited prosecution effectiveness.

The qualitative findings also explained the mechanisms through which institutional weakness affects crime. Weak registration allows offenders to hide within the legitimate rider population. Poor enforcement reduces the likelihood of detection and arrest. Corruption and collusion allow

offenders to avoid sanctions or continue operating. Political interference weakens enforcement neutrality and may protect riders or groups linked to political actors. Low reporting reduces police intelligence and weakens investigation. Weak prosecution reduces deterrence because offenders may believe that arrest will not lead to punishment. Together, these conditions create a cycle of institutional vulnerability that enables repeated or semi-organised offending.

The fifth major finding was that simple bivariate correlations between institutional indices and organised criminality were weak and statistically non-significant. Institutional risk had a very weak positive correlation with organised criminality, Spearman's rho = 0.020, $p = 0.327$. Institutional effectiveness had a weak negative correlation, rho = -0.031, $p = 0.132$. These results show that institutional risk and effectiveness, when examined alone, did not strongly explain organised criminality. This means that boda-boda-related crime cannot be understood through institutional variables in isolation. County context, mobility patterns, border dynamics, political economy, enforcement reach, reporting behaviour, and stage organisation also matter.

The sixth major finding was that regression models revealed a stronger relationship once county context was taken into account. In the county-adjusted linear model, institutional risk had a positive and statistically significant association with organised criminality, $\beta = 0.123$, $p < 0.001$. This means that higher institutional risk predicted higher organised-criminality scores after controlling for county differences. Institutional effectiveness had a negative association with organised criminality, $\beta = -0.073$, although this effect was marginal at $p = 0.067$. The direction of the coefficient suggests that stronger institutions tend to reduce organised criminality, but that their effect depends on whether they directly address the concrete risks that enable crime.

The seventh major finding was that the logistic regression model confirmed the importance of institutional risk. A one-unit increase in institutional risk increased the odds of organised-crime exposure by approximately 53.6%, with OR = 1.536, $p < 0.001$. Institutional effectiveness reduced the odds of organised-crime exposure by approximately 21.0%, with OR = 0.790, although this effect was marginal at $p = 0.072$. These results show that institutional risk was the clearer and stronger predictor of organised-crime exposure, while institutional effectiveness had a protective but less direct effect.

The eighth major finding was that political interference emerged as the most important specific institutional-risk predictor of organised criminality. In the expanded regression model, political

interference had a positive and statistically significant effect, $\beta = 0.084$, $p = 0.004$. This finding is particularly important because it shows that boda-boda-related crime is not only enabled by weak enforcement or poor registration. It is also shaped by the politicization of the sector. Where political actors protect riders, use them during campaigns, interfere with enforcement, or shield criminal riders from punishment, enforcement becomes selective and deterrence declines.

The ninth major finding was that institutional effectiveness became statistically significant in the expanded model, $\beta = -0.113$, $p = 0.009$. This means that institutional effectiveness becomes more protective when specific institutional-risk factors are considered. The implication is that institutions reduce organised criminality not merely by existing, but by actively addressing the risks that make crime possible. Effective institutions must reduce anonymity, improve registration, enforce rules consistently, prevent corruption, protect reporting channels, support prosecution, discipline stages, and resist political interference.

Overall, Objective Four established that boda-boda-related crime is partly a product of institutional weakness. Crime becomes more likely where rider identity is unclear, enforcement is inconsistent, political actors interfere, corruption protects offenders, communities fear reporting, and prosecution is weak. However, institutional weakness does not produce the same crime outcome everywhere. County context remains important. In some counties, weak institutions may produce underreporting, opportunistic offending, insecurity exposure, or unregulated mobility. In others, weak institutions may support repeated, coordinated, semi-organised, or organised criminal activity (Cohen & Felson, 1979; Felson & Clarke, 1998; Goodfellow & Titeca, 2012).

The findings therefore show that boda-boda-related crime should not be understood as a problem of riders alone. Most boda-boda riders are legitimate livelihood actors. However, weak institutions create opportunities for offenders to exploit the sector's mobility, anonymity, flexible routes, and informal organisation. This distinction is important because a punitive approach that treats all riders as criminals may undermine livelihoods, reduce cooperation with law enforcement, and deepen mistrust between riders and security agencies.

The overall conclusion is that effective intervention should combine national regulation with county-specific institutional strengthening. Priority should be given to rider and motorcycle registration, stage-level governance, SACCO accountability, intelligence-led policing, community trust-building, protection of reporting channels, anti-corruption measures, improved prosecution

follow-up, and protection of enforcement processes from political interference. The goal should be to protect legitimate boda-boda livelihoods while closing the governance gaps that allow criminal actors to exploit the sector.

This finding provides a transition to the next objective by showing that crime patterns are not only shaped by individual behaviour, socio-economic vulnerability, or institutional weakness, but also by place. County context, spatial mobility, transport corridors, border dynamics, stage location, and enforcement geography influence how boda-boda-related crime emerges and is controlled. Therefore, the spatial dimension of boda-boda-related crime requires further analysis.

4.10 Spatial Distribution of Boda-Boda-Related Crime and Risk Sites

Objective Five examined the spatial distribution of boda-boda-related crime and risk sites across the study counties. The objective sought to determine whether crime and insecurity associated with the boda-boda sector were randomly distributed or whether they were concentrated in identifiable spatial environments such as remote roads, market centres, stage points, border routes, informal settlements, residential estates, highways, and entertainment or nightlife areas (Anselin *et al*., 2000; Weisburd, 2015).

This objective was important because boda-boda-related crime is not only a social, economic, or institutional issue, but also a spatial problem. The location in which riders operate, passengers board or alight, goods are transported, and offenders escape can influence both the likelihood and form of crime. Areas with limited surveillance, poor lighting, weak police visibility, porous movement routes, and high human or goods traffic may create favourable conditions for theft, robbery, smuggling, assault, extortion, and other forms of boda-boda-related offending (Brantingham & Brantingham, 1993; Cohen & Felson, 1979; Eck & Weisburd, 1995).

The analysis combined GIS point mapping, questionnaire responses, hotspot-reason indicators, DBSCAN hotspot clustering, county-level spatial risk scores, and qualitative spatial themes from respondent narratives. This mixed spatial approach made it possible to examine not only where boda-boda crime and risk sites were located, but also why certain places were perceived as hotspots (Anselin *et al.,* 2000; Ester *et al*., 1996).

The findings show that boda-boda-related crime is strongly shaped by place. Crime risk was not evenly distributed within or across counties. Instead, it concentrated around movement corridors, poorly controlled spaces, weakly lit areas, locations with limited police presence, and areas that offered easy escape after offending. This suggests that spatial opportunity structures play a significant role in shaping boda-boda-related crime patterns across the study counties (Sherman et al., 1989; Weisburd, 2015).

4.10.1 Overall Spatial Distribution of Boda-Boda-Related Crime and Risk Sites

Figure 4.7.1 presents the spatial distribution of boda-boda-related crime and risk sites across the sampled counties. The map plots reported and observed crime/risk sites using longitude and

latitude coordinates and overlays them on a Kenya base map. The purpose of the figure is to provide an initial visual assessment of whether boda-boda crime and risk sites are randomly distributed or whether they form identifiable spatial concentrations.

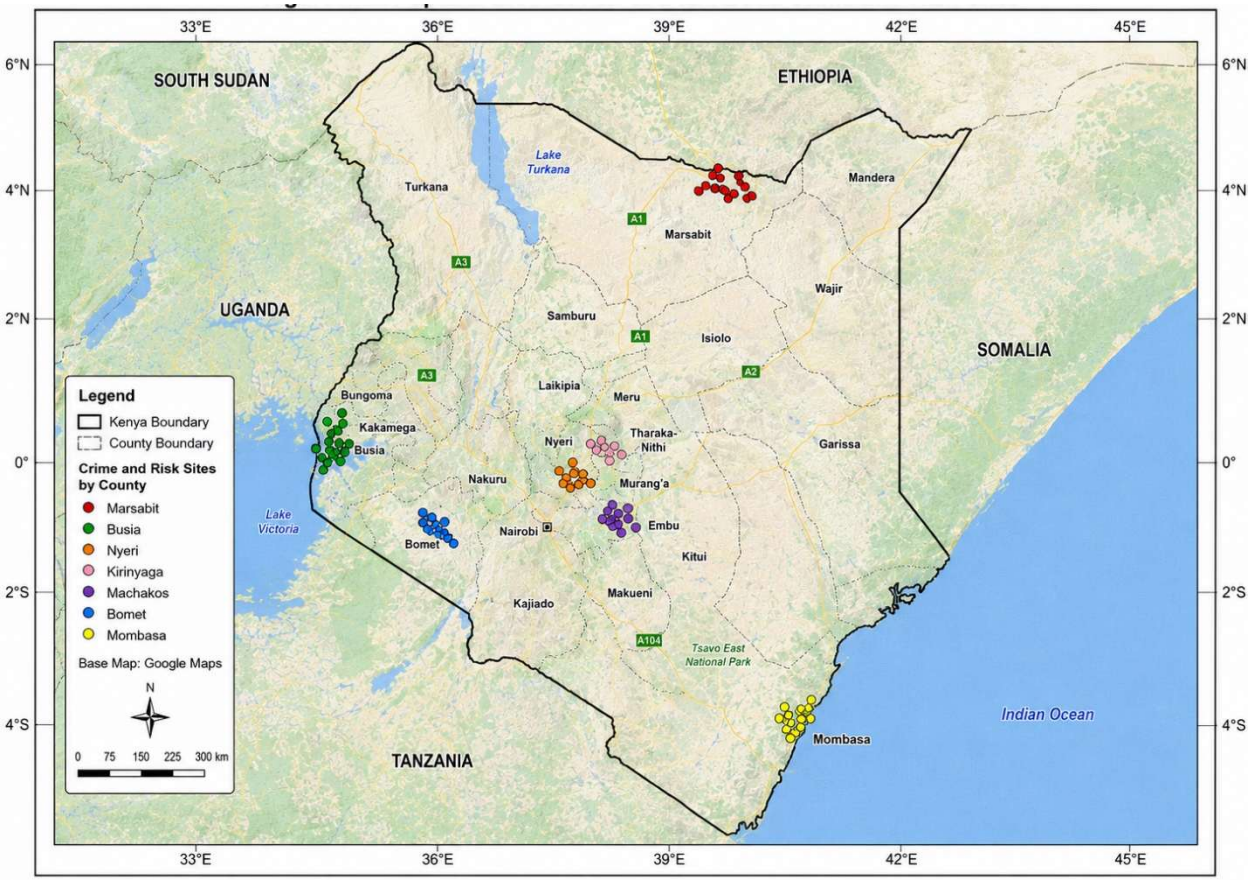


Figure 4.15: Spatial Distribution of Boda-Boda-Related Crime and Risk Sites

The map shows that boda-boda crime and risk sites are not evenly distributed across Kenya. Instead, the points form distinct county-level clusters in western Kenya, central Kenya, eastern Kenya, northern Kenya, and the coastal region. These clusters correspond to the study counties of Busia, Bomet, Nyeri, Kirinyaga, Machakos, Marsabit, and Mombasa. This pattern indicates that boda-boda-related crime is geographically patterned rather than spatially random. It also supports the wider criminological argument that crime tends to concentrate in particular places rather than being evenly spread across space (Sherman *et al*., 1989; Weisburd, 2015).

The western cluster is associated mainly with Busia and Bomet. In Busia, the spatial pattern reflects the county's border position near Uganda and Lake Victoria. Boda-boda operations in this

context are influenced by cross-border movement, trade routes, market activity, informal routes, passenger circulation, and goods transport. These conditions may increase opportunities for theft, robbery, smuggling, and other forms of mobility-based crime. In contrast, the Bomet cluster is more localised and appears to be linked to county-level settlement concentration, market activity, transport stages, and rural–urban movement rather than border dynamics. This difference shows that even counties located in the same broad region may experience different spatial forms of boda-boda-related risk.

The central and eastern clusters include Nyeri, Kirinyaga, Machakos, and Bomet. These counties are characterised by a mixture of agricultural activity, market centres, residential areas, feeder roads, stage points, peri-urban growth, and inter-county transport corridors. The spatial concentration of risk sites in these counties suggests that boda-boda-related crime is shaped by routine movement between homes, markets, schools, farms, towns, and transport nodes. These findings are consistent with crime-pattern theory, which argues that crime opportunities emerge around nodes, paths, and edges where offenders, targets, and weak guardianship converge (Brantingham & Brantingham, 1993).

The northern cluster corresponds to Marsabit. This county presents a distinct frontier and remote-road pattern. Its spatial risk appears to be shaped by long-distance movement, low population density, border-linked routes, pastoral mobility, weak surveillance, and limited police visibility across a large geographical area. Unlike more urban counties where risk is concentrated around dense settlements, Marsabit's pattern reflects the importance of distance, remoteness, and corridor-based movement in shaping boda-boda-related insecurity.

The coastal cluster corresponds to Mombasa. This cluster represents a more urban and coastal form of boda-boda crime risk. In Mombasa, risk is associated with dense settlement, port-related movement, ferry-linked transport, nightlife areas, informal settlements, high passenger circulation, and coastal transport corridors. This suggests that boda-boda-related crime can be intensified not only by remoteness or border mobility, but also by dense urban movement and night-time activity.

Overall, Figure 4.15 shows that boda-boda-related crime is strongly shaped by place. Busia represents a border and trade-route risk environment; Marsabit represents a frontier and remote-

road risk environment; Mombasa represents an urban, coastal, and nightlife-related risk environment; Machakos reflects peri-urban and inter-county corridor risk; Nyeri and Kirinyaga reflect agricultural, market, and settlement-linked risk; while Bomet reflects localised rural–urban transport risk. This confirms that boda-boda crime cannot be explained through a single national pattern. Instead, it varies according to the geographical, economic, institutional, and mobility conditions of each county.

The figure also supports the interpretation that boda-boda-related crime is opportunity-based. Crime and risk sites appear in areas where mobility is high, where riders and passengers interact frequently, where goods and cash circulate, where escape routes are available, and where surveillance or police presence may be weak. This is consistent with routine activity theory, which argues that crime occurs when motivated offenders, suitable targets, and absence of capable guardianship converge in space and time (Cohen & Felson, 1979). It also aligns with situational crime-prevention theory, which emphasises the importance of reducing opportunities for crime through targeted environmental and regulatory interventions (Clarke, 1997).

A key implication from Figure 4.15 is that boda-boda crime prevention should not be generalised across all places. Instead, interventions should be guided by spatial evidence. Counties should identify specific roads, market centres, border routes, stages, informal settlements, residential areas, remote roads, and nightlife zones where risk is concentrated. The national map therefore provides a foundation for the county-level maps that follow, which give more detailed insight into the local environments where boda-boda-related crime risk is concentrated.

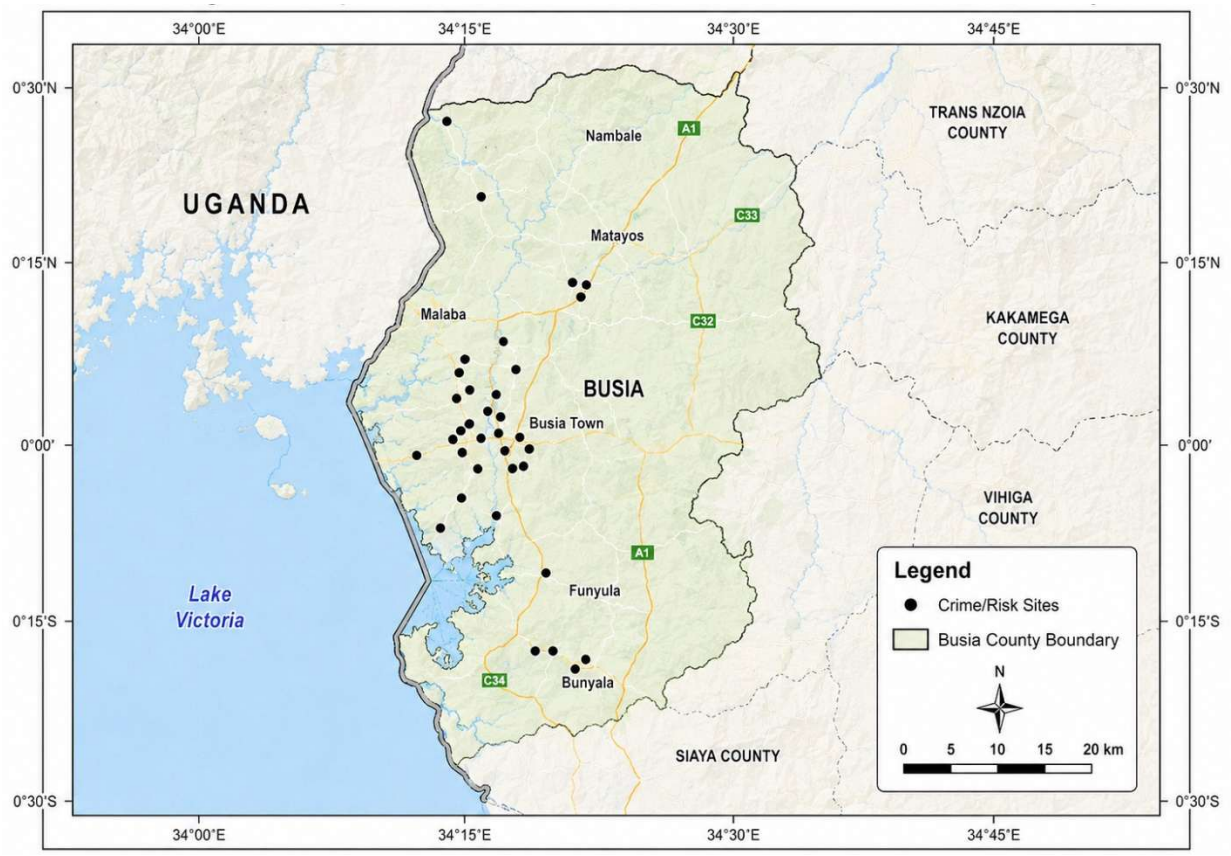


Figure 4.7.2: Spatial Distribution of Boda-Boda-Related Crime and Risk Sites in Busia County

Figure 4.16 presents the spatial distribution of boda-boda-related crime and risk sites in Busia County. The map shows that the reported sites are not evenly distributed across the county. Instead, they are concentrated around Busia Town, the Matayos–Busia corridor, the Malaba area, and the southern parts of the county toward Funyula and Bunyala. This confirms that boda-boda-related crime in Busia is spatially clustered rather than randomly spread across the county.

The strongest concentration appears around Busia Town and its surrounding transport corridors. This is expected because Busia Town functions as a major commercial, administrative, and border-related urban centre. It attracts riders, passengers, traders, informal workers, cross-border travellers, and goods movement. Such high levels of movement and interaction create opportunities for theft, robbery, assault, extortion, smuggling, and other forms of boda-boda-related crime.

The map also shows several sites extending northwards toward Matayos and Malaba. This pattern is important because Busia and Malaba are key border-linked areas between Kenya and Uganda. The presence of crime and risk sites along this corridor suggests that boda-boda-related insecurity may be influenced by cross-border movement, informal trade, passenger transport, and goods circulation. Border environments often involve multiple actors, frequent movement, informal exchanges, and difficulty in monitoring all routes effectively.

Another visible pattern is the spread of risk sites toward Funyula and Bunyala. These areas are closer to Lake Victoria and include rural, peri-urban, and lake-adjacent movement routes. The presence of risk sites in this zone suggests that boda-boda-related crime in Busia is not limited to the main urban centre. It also occurs along rural access routes where surveillance may be weaker, police response may be slower, and offenders may have easier escape options.

Overall, Figure 4.16 shows that boda-boda-related crime in Busia County is concentrated around transport corridors, border-linked areas, commercial nodes, rural feeder roads, and lake-adjacent movement routes. Prevention strategies should therefore prioritise Busia Town, the Matayos–Malaba corridor, market centres, border-adjacent routes, rural feeder roads, and the Funyula–Bunyala zone. Appropriate interventions include improved police visibility, better lighting, rider registration, stage monitoring, community reporting, and coordinated cross-border security measures (Clarke, 1997).

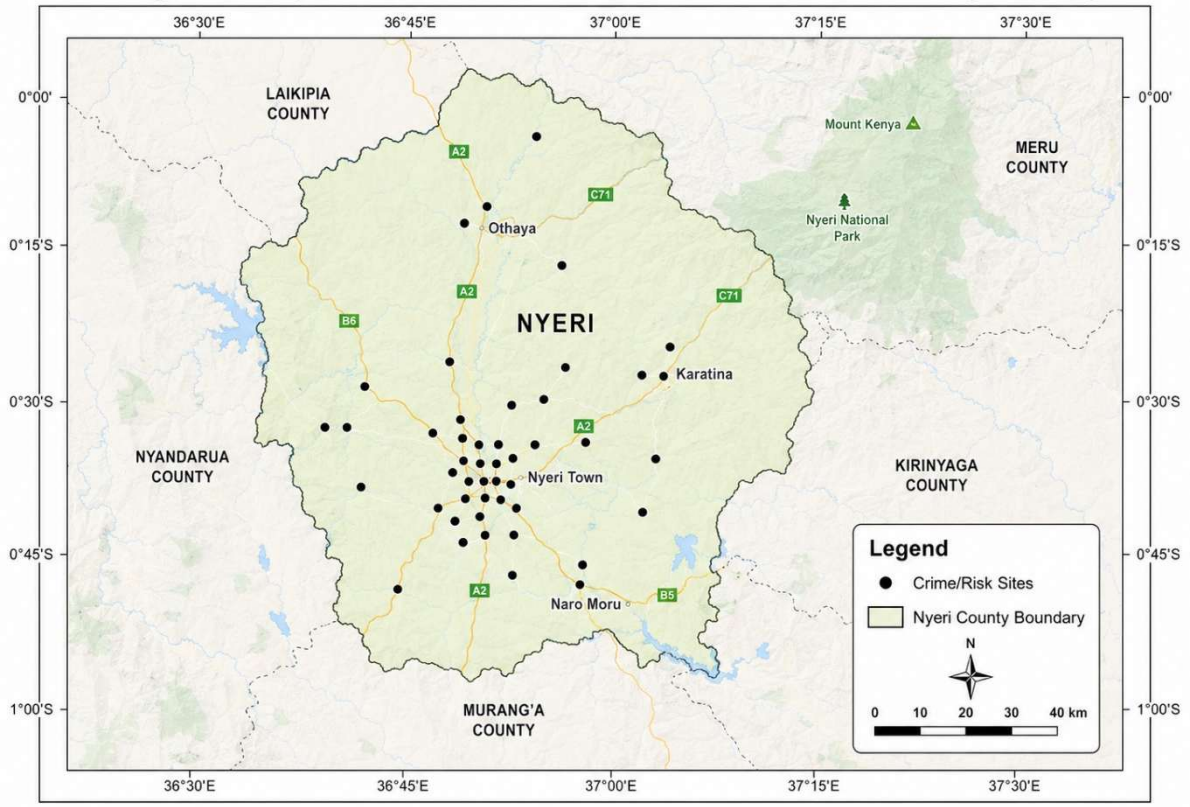


Figure 4.17 Spatial Distribution of Boda-Boda-Related Crime and Risk Sites in Nyeri County

Figure 4.17 presents the spatial distribution of boda-boda-related crime and risk sites in Nyeri County. The map shows that crime and risk sites are concentrated mainly around Nyeri Town and along key transport corridors connecting Nyeri Town to Othaya, Karatina, Naro Moru, and surrounding settlements. This indicates that boda-boda-related crime risk in Nyeri is clustered around major mobility routes, urban nodes, and settlement-linked transport zones.

The strongest concentration appears around Nyeri Town, the county's main commercial, administrative, and transport centre. The town attracts riders, passengers, traders, students, workers, and goods movement. This concentration of people and motorcycles increases opportunities for theft, robbery, passenger-related offences, assault, and other forms of boda-boda-related crime.

The map also shows risk sites along routes radiating from Nyeri Town, including roads leading toward Othaya, Karatina, and Naro Moru. This suggests that boda-boda-related crime in Nyeri is influenced by movement corridors rather than being confined to the town centre. Roads linking

urban centres, residential areas, markets, and rural settlements provide opportunities for both legitimate transport and criminal activity. Offenders may use these routes to approach victims, move stolen goods, or escape quickly after crime (Brantingham & Brantingham, 1993; Cohen & Felson, 1979).

Scattered risk sites in western and northern parts of the county suggest that boda-boda crime risk also extends into peri-urban and rural transport spaces. Such areas may be more vulnerable because of lower population density, reduced police visibility, limited lighting, and longer response times. The eastern side of the county, toward Karatina and the Kirinyaga boundary, also shows that inter-town and inter-county movement contributes to spatial risk.

Overall, Figure 4.17 shows that boda-boda-related crime in Nyeri County is concentrated around Nyeri Town, major transport routes, market-linked areas, residential access roads, and settlement corridors. Prevention should therefore target not only the town centre but also feeder roads, road junctions, residential routes, and routes toward Othaya, Karatina, and Naro Moru. Practical responses include improved lighting, rider registration, visible stage management, targeted patrols, community reporting, and closer monitoring of routes linking town centres with rural and peri-urban settlements (Clarke, 1997).

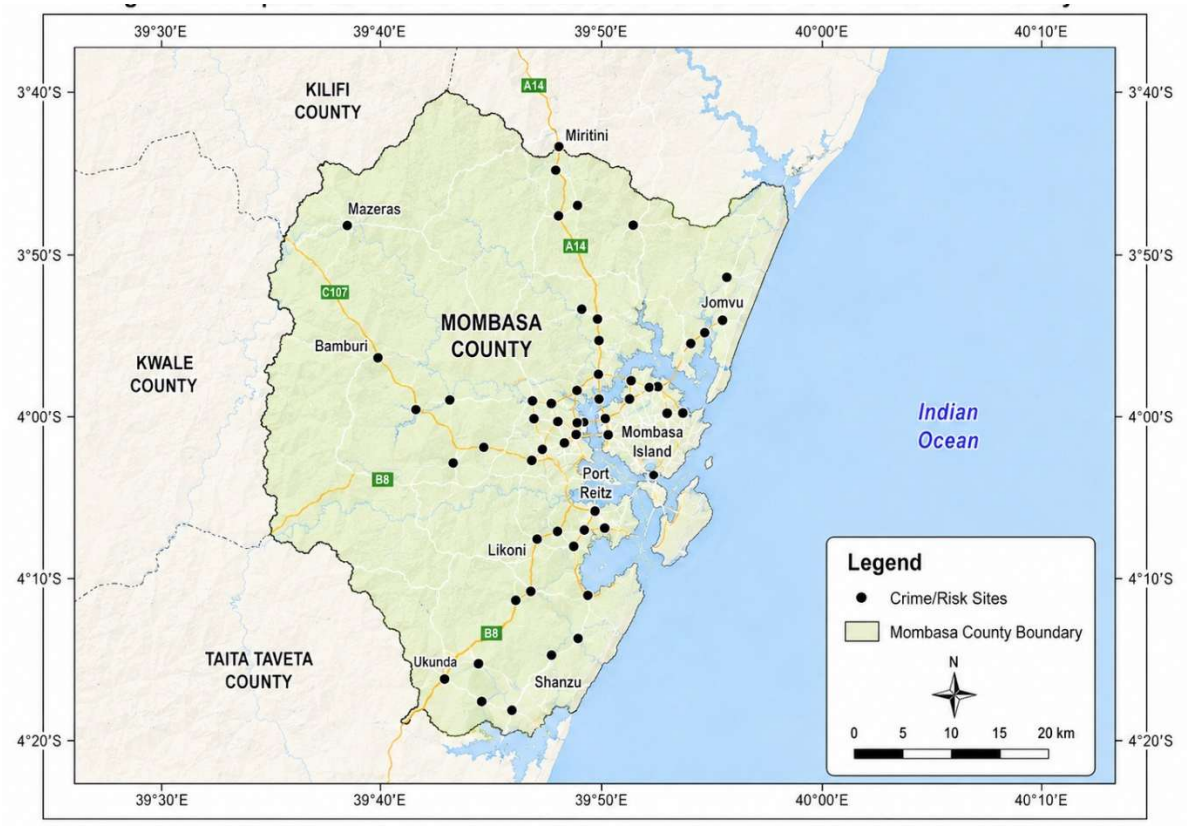


Figure 4.18: Spatial Distribution of Boda-Boda-Related Crime and Risk Sites in Mombasa County

Figure 4.18 presents the spatial distribution of boda-boda-related crime and risk sites in Mombasa County. The map shows that crime and risk sites are concentrated around the most urbanised and highly connected parts of the county, including Mombasa Island, Port Reitz, Likoni, Jomvu, Miritini, Bamburi, Shanzu, and the main transport corridors linking these areas. This pattern indicates that boda-boda-related crime in Mombasa is shaped by urban mobility, coastal settlement patterns, transport infrastructure, and high-density activity spaces.

The strongest concentration appears around Mombasa Island and Port Reitz. These areas function as major commercial, administrative, transport, and service centres. They attract riders, passengers, traders, commuters, tourists, workers, and informal operators. Such high-density interaction increases opportunities for theft, robbery, harassment, extortion, passenger targeting, and other forms of crime.

The map also shows several crime and risk sites around Likoni and the southern coastal corridor. Likoni is a major movement gateway connecting Mombasa Island with the southern mainland.

Transport transition zones, ferry-related movement, road junctions, passenger transfers, congestion, and night-time movement may all increase vulnerability to boda-boda-related offences.

Another visible pattern is the spread of sites along the Miritini–Jomvu–Mombasa Island corridor. This corridor connects mainland transport routes to the island and links residential, industrial, commercial, and transit zones. The northern part of the county, including Bamburi, Shanzu, and Jomvu, also contains reported risk sites. These areas are associated with residential expansion, tourism, commercial movement, informal settlements, and coastal nightlife. This suggests that boda-boda-related crime in Mombasa is influenced by both daytime commuter movement and night-time activity (Cohen & Felson, 1979).

Overall, Figure 18 shows that boda-boda-related crime and risk in Mombasa County are concentrated around urban transport corridors, coastal movement zones, residential-commercial interfaces, ferry-linked routes, informal settlements, and nightlife areas. Prevention strategies should prioritise Mombasa Island, Port Reitz, Likoni, Jomvu, Miritini, Bamburi, Shanzu, major road corridors, ferry access zones, transport stages, informal settlements, and night-time transport routes. Appropriate interventions include improved lighting, visible patrols, regulation of boda-boda stages, rider identification, monitoring of night-time routes, community reporting systems, and coordination between police, county enforcement officers, rider associations, and local security actors (Clarke, 1997).

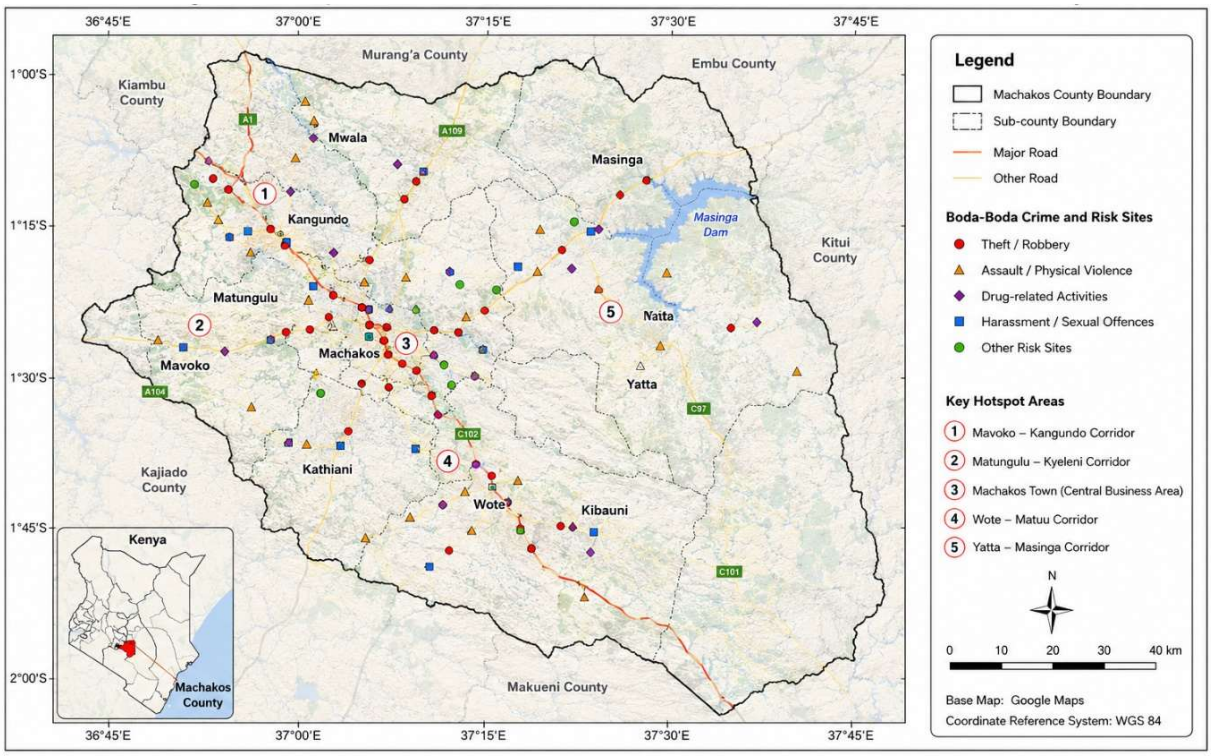


Figure 4.19: Spatial Distribution of Boda-Boda-Related Crime and Risk Sites in Machakos County

Figure 4.19 presents the spatial distribution of boda-boda-related crime and risk sites in Machakos County. The map shows that crime and risk sites are concentrated along major transport corridors, urban centres, market-linked areas, and peri-urban routes. The strongest concentration appears around Machakos Town and the surrounding road network, with additional risk zones extending toward Mavoko, Kangundo, Matungulu, Kathiani, Yatta, Masinga, and Wote-linked routes.

The most visible concentration is around Machakos Town, the county's main administrative, commercial, and transport centre. This area attracts riders, passengers, traders, students, workers, and informal-sector actors. Such daily movement increases opportunities for theft, robbery, assault, harassment, and other forms of boda-boda-related crime.

The Mavoko–Kangundo corridor is also significant because Mavoko links Machakos County to the Nairobi metropolitan region and major transport routes. The presence of risk sites along this corridor suggests that peri-urban expansion, commuter movement, industrial activity, informal settlements, and high motorcycle mobility contribute to boda-boda-related insecurity.

The Matungulu–Kyeleni, Wote–Matuu, and Yatta–Masinga corridors also appear as important risk zones. These areas show that boda-boda crime risk in Machakos is not limited to the county's main urban centre. It extends into rural, semi-remote, and inter-county routes where population movement is frequent but formal surveillance may be weaker. Such corridors may provide offenders with opportunities to target passengers or goods and escape through feeder roads, local paths, or less monitored routes.

The map also indicates different forms of risk, including theft or robbery, assault or physical violence, drug-related activities, harassment or sexual offences, and other risk sites. This suggests that boda-boda-related crime in Machakos reflects a mixed crime environment where mobility, weak surveillance, anonymity, and opportunity interact across different locations.

Overall, Figure 4.19 shows that boda-boda-related crime and risk in Machakos County are concentrated around Machakos Town, Mavoko, Kangundo, Matungulu, Yatta, Masinga, Wote-linked routes, and major road corridors. Prevention strategies should therefore target Machakos Town, Mavoko, Kangundo, Matungulu, Kathiani, Masinga, Yatta, and major inter-county routes. Practical interventions should include improved lighting, stronger stage management, rider identification, targeted patrols, feeder-road monitoring, community reporting, and inter-county coordination along routes connecting Machakos with Nairobi, Kitui, Makueni, Kajiado, and neighbouring counties (Clarke, 1997).

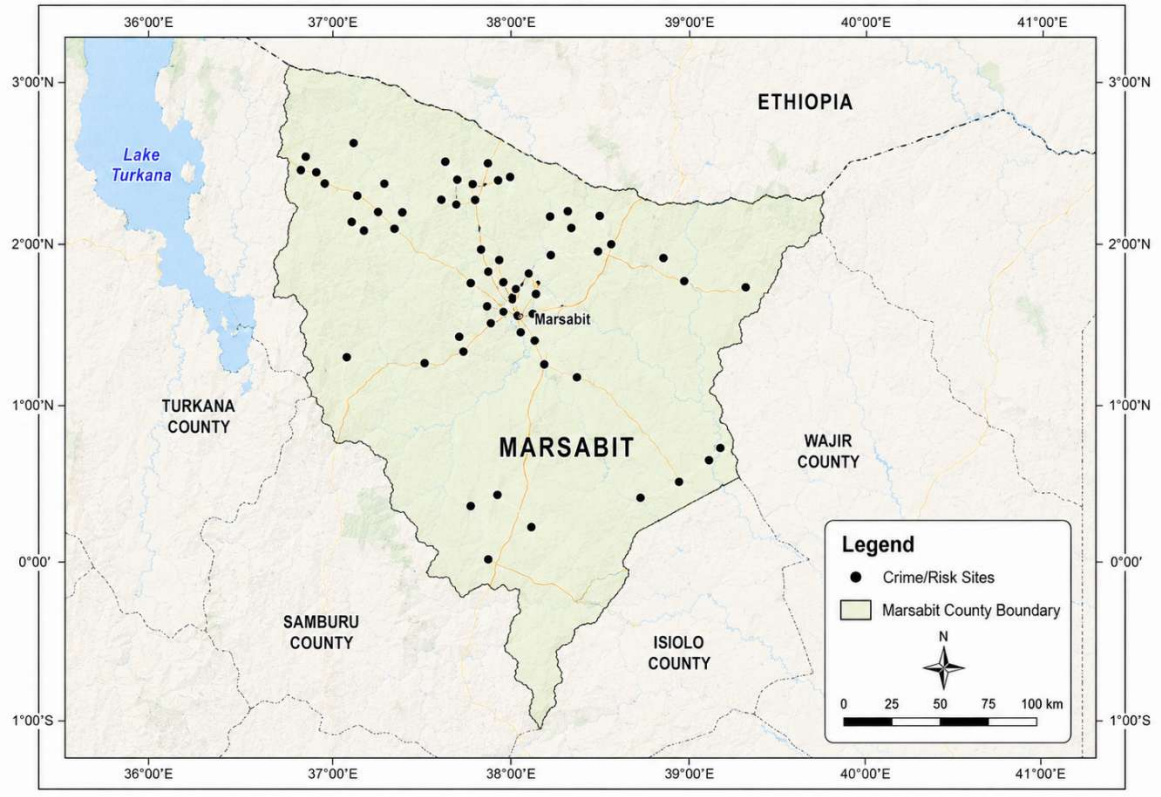


Figure 4.20 Spatial Distribution of Boda-Boda-Related Crime and Risk Sites in Marsabit County

Figure 4.20 presents the spatial distribution of boda-boda-related crime and risk sites in Marsabit County. The map shows that crime and risk sites are widely spread across the county, but with a clear concentration around Marsabit Town and surrounding road networks. Unlike more urban counties where risk sites are concentrated around dense settlements, Marsabit displays a frontier and corridor-based spatial pattern. This reflects the county's large geographical size, low population density, long-distance movement routes, and proximity to international and inter-county boundaries.

The strongest concentration appears around Marsabit Town, the county's main administrative, commercial, transport, and service centre. The town attracts riders, passengers, traders, pastoralist communities, transporters, security actors, and travellers moving between northern Kenya, Isiolo, Moyale, and Ethiopia. Clustering around the town suggests that boda-boda crime risk is partly linked to high-interaction spaces where transport demand, trade, and settlement activity are concentrated.

A second important pattern is the spread of risk sites along routes radiating outward from Marsabit Town. These routes connect settlements, markets, grazing areas, remote roads, and border-linked corridors. Because motorcycles can move easily through both formal and informal routes, boda-boda activity may become associated with theft, robbery, smuggling, movement of stolen goods, or escape after crime (Cohen & Felson, 1979; Kumar, 2011).

The northern and north-eastern parts of the county are especially significant because Marsabit borders Ethiopia. The presence of risk sites in these areas suggests that cross-border movement may contribute to spatial vulnerability. Border-adjacent environments often involve long-distance travel, informal trade, pastoral mobility, and limited surveillance over large areas. The western side of the county, toward Lake Turkana and Turkana County, also contains risk sites, suggesting that remote and sparsely policed routes are important in shaping crime vulnerability.

Overall, Figure 4.20 shows that boda-boda-related crime and risk in Marsabit County are spatially distributed around Marsabit Town, border-linked routes, remote roads, and inter-county movement corridors. The pattern confirms that crime risk in Marsabit has a strong frontier character. It is shaped not only by settlement activity but also by distance, mobility, weak surveillance, and limited spatial control. Prevention strategies should therefore target remote roads, border-adjacent routes, inter-county corridors, and settlement-linked transport stages. Practical measures should include route-based patrols, rider registration, stage monitoring, community collaboration, intelligence-sharing, cross-border security coordination, and stronger surveillance of routes connecting Marsabit to Ethiopia, Isiolo, Samburu, Turkana, and Wajir (Clarke, 1997).

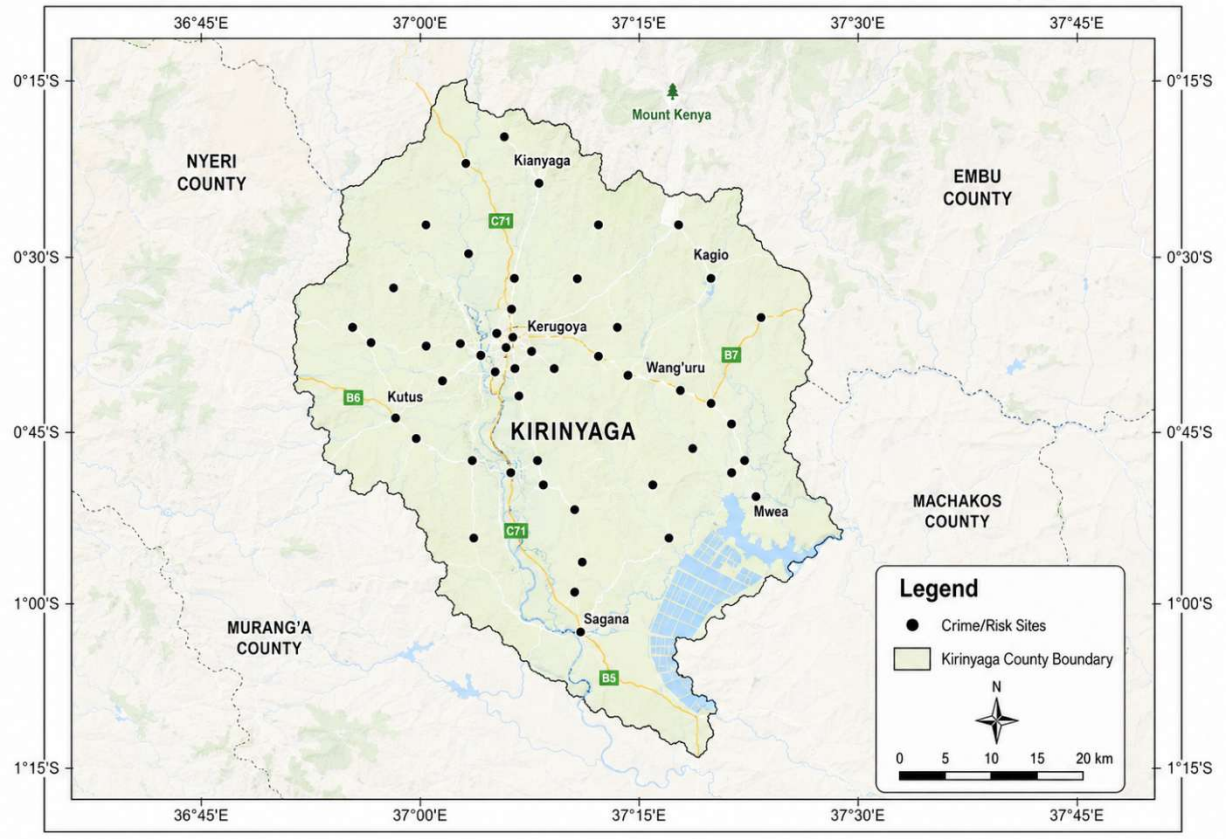


Figure 4.21: Spatial Distribution of Boda-Boda-Related Crime and Risk Sites in Kirinyaga County

Figure 4.21 presents the spatial distribution of boda-boda-related crime and risk sites in Kirinyaga County. The map shows that risk sites are concentrated around key settlement centres, market areas, transport routes, and agriculturally active zones. The strongest concentration appears around Kerugoya, Kutus, Wang'uru, Mwea, Sagana, Kagio, and the surrounding road network.

The concentration around Kerugoya is significant because Kerugoya is one of the county's main administrative, commercial, and transport centres. It attracts boda-boda riders, passengers, traders, students, workers, and informal-sector actors. The presence of many risk sites around this area suggests that boda-boda-related crime is associated with spaces where there is frequent interaction between riders and the public.

The map also shows several sites around Kutus, an important educational, residential, and commercial node. Boda-boda operations in such areas are linked to student movement, local commuting, market access, and transport to residential areas. Where rider regulation, lighting, and

police visibility are weak, these routine movement patterns may create opportunities for criminal activity.

Another important pattern is the distribution of risk sites toward Wang'uru and Mwea. This area is associated with agricultural production, market activity, irrigation schemes, and movement of farm produce. The boda-boda sector plays an important role in transporting people, goods, farm inputs, and small-scale produce. The presence of risk sites in this zone suggests that boda-boda-related crime may be linked to market-day activity, produce movement, and transport along rural and agricultural access roads.

Overall, Figure 4.21 shows that boda-boda-related crime and risk sites in Kirinyaga County are concentrated around Kerugoya, Kutus, Wang'uru, Mwea, Sagana, Kagio, and the main road corridors linking these areas. The spatial pattern confirms that crime risk is strongly associated with places where mobility, commerce, agriculture, and weak surveillance intersect. Prevention strategies should prioritise market centres, transport stages, agricultural produce routes, feeder roads, and night-time movement corridors. Practical interventions should include improved street lighting, strengthened stage management, rider registration, police patrols along high-risk routes, community reporting mechanisms, and closer monitoring of market-day and night-time movement (Clarke, 1997).

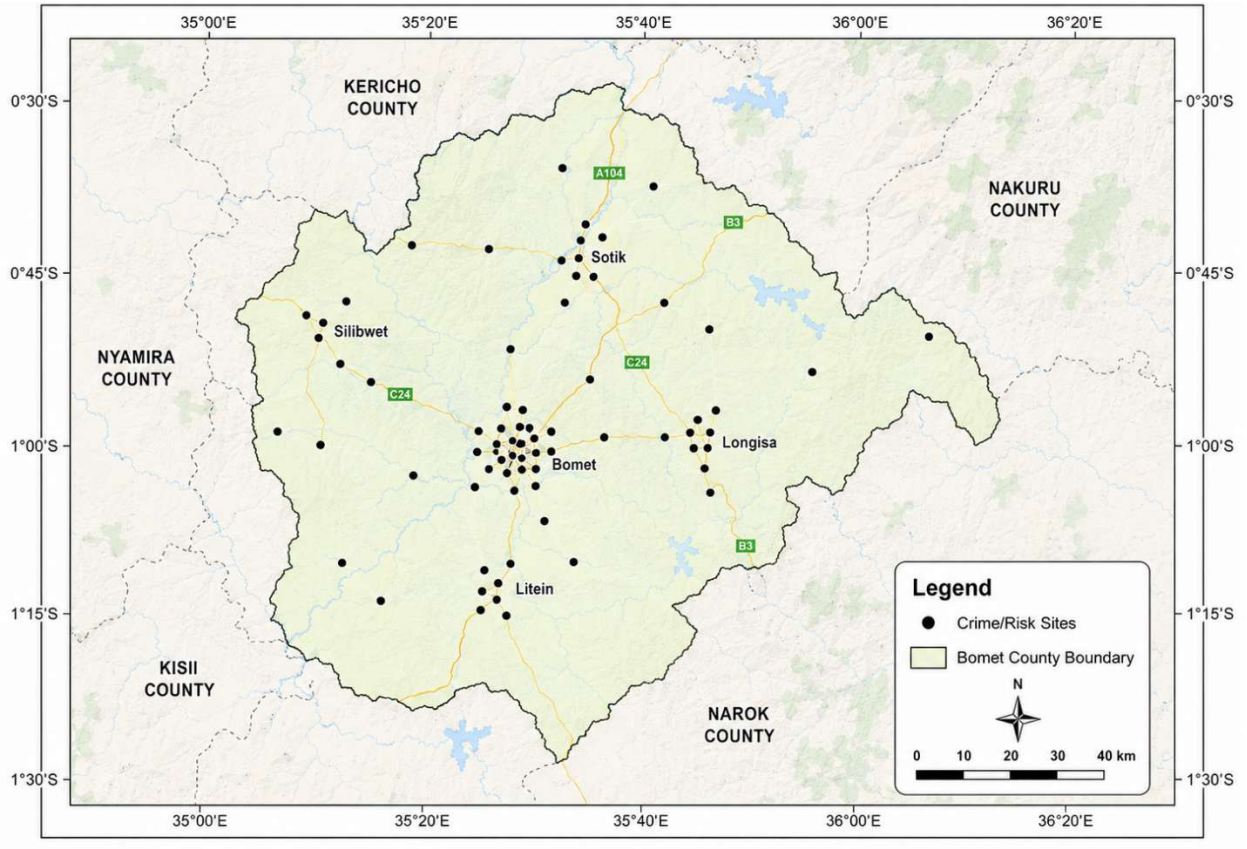


Figure 4.22: Spatial Distribution of Boda-Boda-Related Crime and Risk Sites in Bomet County

Figure 4.22 presents the spatial distribution of boda-boda-related crime and risk sites in Bomet County. The map shows that crime and risk sites are concentrated around Bomet Town and along key road corridors connecting the town to Sotik, Litein, Longisa, Silibwet, and surrounding rural and peri-urban areas. This pattern suggests that boda-boda-related crime in Bomet is shaped by settlement concentration, road connectivity, market activity, and local transport movement.

The strongest concentration appears around Bomet Town, the county's main administrative, commercial, and transport centre. It attracts riders, passengers, traders, students, workers, and other road users. The clustering of points around the town indicates that boda-boda-related crime risk is associated with places where rider-passenger interaction is frequent and where movement of people, goods, and cash is high.

The map also shows a visible extension of risk sites toward Sotik in the northern part of the county. Sotik is an important commercial and transport node linking Bomet to neighbouring counties such

as Kericho and Nakuru. The presence of risk sites along this route suggests that boda-boda-related crime in Bomet is partly corridor-based. Roads connecting Bomet Town to Sotik support legitimate mobility but may also provide escape opportunities after crime.

Another concentration appears toward Litein in the southern part of the county. The Bomet–Litein route connects residential, rural, commercial, and service areas. The presence of risk sites along this corridor suggests that crime risk is not limited to the central town. It also occurs along feeder roads and settlement access routes where police visibility may be lower, lighting may be weaker, and response times may be longer.

The eastern section of the county, particularly around Longisa, and the western section, including Silibwet, also contain reported risk sites. These locations show that boda-boda-related crime occurs in both urban and rural settings. In rural and peri-urban areas, limited surveillance, lower police presence, poor lighting, and less formalised stage control may increase vulnerability.

Compared with Mombasa, Busia, and Marsabit, Bomet appears to show a more localised and moderate spatial-risk pattern. However, the presence of identifiable risk sites confirms that lower mean risk should not be interpreted as absence of crime. Rather, it indicates relatively lower intensity compared with counties where risk is more strongly linked to urban density, border movement, smuggling corridors, or remote frontier conditions.

Overall, Figure 4.22 shows that boda-boda-related crime and risk sites in Bomet County are concentrated around Bomet Town and along the main transport corridors connecting Sotik, Litein, Longisa, Silibwet, and surrounding rural areas. The findings imply that prevention strategies in Bomet should be spatially targeted. Priority areas should include Bomet Town, major boda-boda stages, market centres, the Bomet–Sotik corridor, the Bomet–Litein corridor, Longisa, Silibwet, and rural feeder roads. Practical interventions should include improved lighting, stronger stage management, rider registration, targeted police patrols, community reporting systems, and closer monitoring of evening and night-time movement.

In summary, the spatial distribution maps confirm that boda-boda-related crime and risk sites are clustered rather than randomly distributed. Across the study counties, risk is shaped by different place-based conditions, including border mobility in Busia, urban and coastal density in Mombasa,

frontier and remote-road conditions in Marsabit, peri-urban and inter-county corridors in Machakos, agricultural and market-linked movement in Kirinyaga and Nyeri, and localised rural–urban transport corridors in Bomet. These findings demonstrate that boda-boda-related crime is both a mobility problem and a spatial problem. Effective prevention therefore requires county-specific and hotspot-specific interventions rather than generalised control of the entire boda-boda sector.

4.10.2 **Reported Boda-Boda Crime Locations by County**

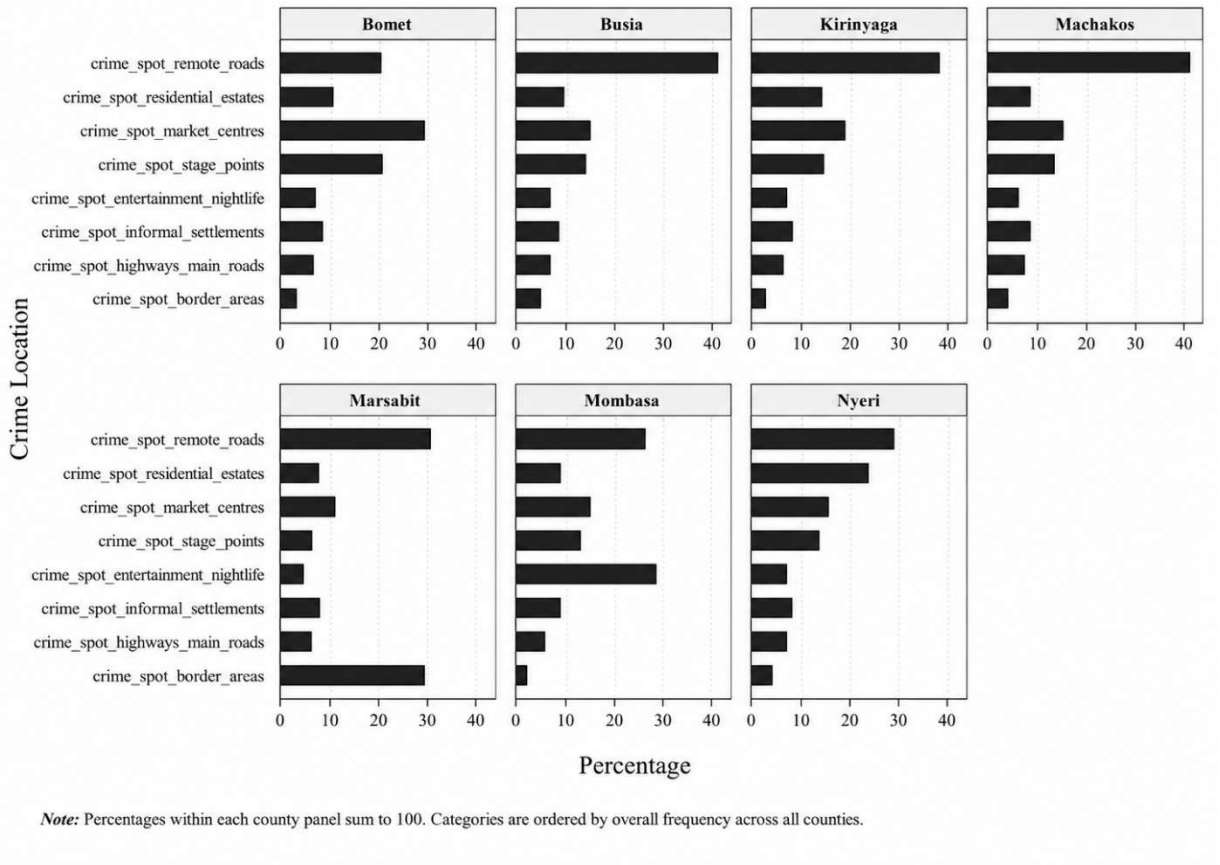


Figure 4.23: Reported Boda-Boda Crime Locations by County

Figure 4.23 presents the reported locations of boda-boda-related crime across the study counties. The figure compares the percentage distribution of crime locations by county, including remote roads, residential estates, market centres, stage points, entertainment and nightlife areas, informal settlements, highways or main roads, and border areas. The results show clear spatial variation in where boda-boda-related crime was perceived to occur. Although some locations recur across

several counties, each county displays a distinctive crime-location profile shaped by settlement structure, transport routes, policing environment, economic activity, and mobility patterns (Anselin *et al*., 2000; Sherman *et al*., 1989).

A major finding from Figure 4.23 is that remote roads were the most consistent crime location across the counties. Remote roads appeared as the leading reported location in Busia, Kirinyaga, Machakos, Marsabit, and Nyeri. This suggests that boda-boda-related crime is strongly associated with low-surveillance environments where offenders may find it easier to target riders, passengers, or goods and escape without immediate detection. Remote roads are especially important because boda-boda motorcycles operate effectively in areas that are difficult for larger vehicles or formal policing systems to monitor continuously. These roads may include feeder roads, rural access routes, isolated road sections, border-linked paths, and peri-urban routes connecting settlements to markets or main roads.

In Bomet, the leading reported crime locations were market centres at 20.2%, followed by stage points at 18.6% and remote roads at 17.6%. This indicates that boda-boda-related crime in Bomet is strongly associated with commercial and transport nodes. Market centres attract traders, customers, passengers, riders, and goods, creating opportunities for theft, robbery, extortion, harassment, and disputes. The relatively high percentage for stage points is also significant because boda-boda stages are spaces where riders assemble, passengers board, fares are negotiated, and informal regulation takes place. Where stage control is weak, such spaces may become vulnerable to criminal coordination, passenger targeting, rider impersonation, or conflicts among operators. The Bomet pattern therefore suggests a localised crime environment shaped by markets, stages, and rural–urban movement rather than by border or nightlife dynamics.

In Busia, remote roads were the leading reported crime location at 21.4%, followed by market centres at 17.3% and residential estates at 13.6%. This pattern reflects Busia's position as a border county with intense movement of people, goods, traders, and transport operators. The dominance of remote roads suggests that boda-boda-related crime may occur along routes connecting trading centres, rural settlements, informal crossing points, and urban spaces. Although border areas accounted for a lower percentage at 2.8%, the broader spatial pattern suggests that border-related

crime may not be confined to the formal border itself. Instead, it may occur along feeder roads, informal routes, and settlement corridors linked to cross-border movement.

In Kirinyaga, remote roads accounted for the largest share of reported crime locations at 27.9%, followed by residential estates at 17.3% and entertainment or nightlife areas at 13.1%. This pattern suggests that boda-boda-related crime in Kirinyaga is shaped by both rural mobility and settlement-based vulnerability. Remote roads may provide opportunities for theft, robbery, and assault because they often have limited lighting, fewer witnesses, and lower police visibility. The high proportion of residential estates indicates that crime may also occur during routine movement between homes, trading centres, schools, farms, and transport stages. The presence of entertainment and nightlife areas further suggests that night-time passenger movement, alcohol-related vulnerability, and poorly lit routes may increase exposure to crime.

In Machakos, remote roads were especially dominant, accounting for 32.8% of reported crime locations. This was the highest share of remote-road reporting among the counties. Residential estates followed at 14.1%, while market centres accounted for 13.5%. The dominance of remote roads indicates that boda-boda-related crime in Machakos is strongly route-based. The county has extensive peri-urban, rural, and inter-county transport corridors connecting it to Nairobi, Kajiado, Kitui, Makueni, and other neighbouring areas. Such routes may provide offenders with low-surveillance environments and quick exit options after committing offences.

In Marsabit, remote roads were also the most frequently reported crime location at 29.9%, followed by border areas at 19.7% and stage points at 16.2%. This is one of the clearest frontier-risk patterns in the study. Marsabit is a large and sparsely populated county with long-distance roads, remote settlements, pastoral mobility, and proximity to Ethiopia. The high share of remote roads suggests that boda-boda-related crime may be facilitated by distance, weak surveillance, and limited police response across vast spaces. The relatively high proportion of border areas distinguishes Marsabit from most other counties and indicates that cross-border movement, informal routes, and frontier mobility may contribute to crime risk.

In Mombasa, the leading reported crime location was entertainment and nightlife areas at 21.8%, followed by remote roads at 19.3% and informal settlements at 14.8%. This profile differs from

the more rural and frontier counties. Mombasa's crime-location pattern appears more urban and night-time oriented. Entertainment and nightlife areas attract passengers, riders, tourists, workers, informal traders, and late-night commuters. Such spaces may increase vulnerability because of alcohol use, darkness, crowding, anonymity, and movement at late hours. The presence of informal settlements as a major location also suggests that crime risk is linked to high-density settlements, narrow access routes, uneven policing, and socio-economic vulnerability.

In Nyeri, remote roads accounted for 21.6% of reported crime locations, followed closely by residential estates at 20.6% and market centres at 13.2%. The close relationship between remote roads and residential estates suggests that boda-boda-related crime in Nyeri may occur during movement between homes, town centres, markets, and less visible roads. Residential estates are important because boda-boda riders are frequently used for short-distance transport between homes and commercial areas. Where access roads are poorly lit, weakly patrolled, or isolated, passengers and riders may become vulnerable to theft, robbery, assault, or harassment.

Taken together, the county patterns show that boda-boda crime locations are shaped by both common and context-specific spatial conditions. Remote roads represent the most common risk environment because they combine mobility with weak surveillance. Market centres are important because they concentrate people, cash, goods, and transport activity. Stage points are significant because they are the organizational spaces of the boda-boda sector and may become vulnerable where rider regulation is weak. Residential estates are important because many offences occur during routine passenger movement between homes and commercial centres. Border areas are especially relevant in frontier counties such as Marsabit and, indirectly, Busia. Entertainment and nightlife areas are most prominent in Mombasa and Kirinyaga, where night-time mobility increases passenger vulnerability. Informal settlements are particularly important in Mombasa, where urban density and uneven enforcement create additional risk.

Overall, Figure 4.23 shows that remote roads are the most consistent spatial crime environment across the counties, while the importance of markets, stages, residential estates, border routes, informal settlements, highways, and nightlife areas varies according to county context. The implication is that crime-prevention strategies should be tailored to county-specific spatial risks. In rural and frontier counties, priority should be given to remote roads, border-linked routes, and

stage points. In urban counties, interventions should focus on nightlife zones, informal settlements, transport terminals, and high-density corridors. In mixed agricultural and peri-urban counties, attention should be directed to market centres, residential access roads, and feeder routes linking settlements to commercial areas (Clarke, 1997).

Table 4.28: Leading Reported Boda-Boda Crime Locations by County

County	Leading reported location	Percentage	Secondary location	Percentage	Third location	Percentage
Bomet	Market centres	20.2%	Stage points	18.6%	Remote roads	17.6%
Busia	Remote roads	21.4%	Market centres	17.3%	Residential estates	13.6%
Kirinyaga	Remote roads	27.9%	Residential estates	17.3%	Entertainment/nightlife	13.1%
Machakos	Remote roads	32.8%	Residential estates	14.1%	Market centres	13.5%
Marsabit	Remote roads	29.9%	Border areas	19.7%	Stage points	16.2%
Mombasa	Entertainment/night life	21.8%	Remote roads	19.3%	Informal settlements	14.8%
Nyeri	Remote roads	21.6%	Residential estates	20.6%	Market centres	13.2%

4.10.3 **Perceived Reasons for Boda-Boda Crime Hotspots**

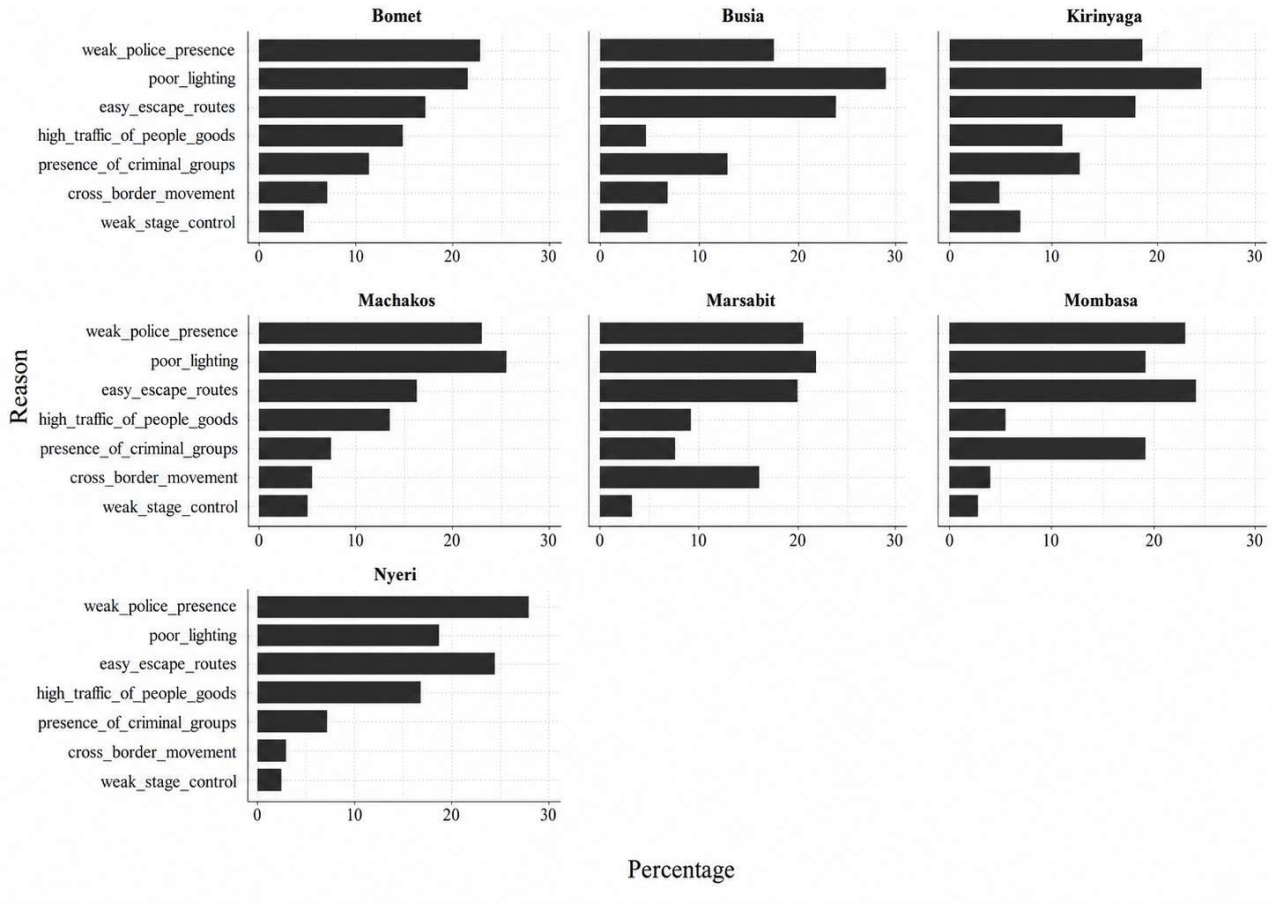


Figure 4.7.10: Perceived Reasons for Boda-Boda Crime Hotspots

Figure 4.24 presents respondents' perceptions of the main reasons why particular areas become boda-boda crime hotspots. The analysis examined several hotspot-generating conditions, including weak police presence, poor lighting, easy escape routes, high traffic of people and goods, presence of criminal groups, cross-border movement, and weak stage control. The results show that boda-boda crime hotspots are largely explained by the interaction between environmental vulnerability and institutional weakness. In particular, poor lighting, weak police visibility, and easy escape routes emerged as the most consistent explanations across the counties (Clarke, 1997; Cohen & Felson, 1979).

A major finding from Figure 4.24 is that crime hotspots are not simply places where many boda-boda riders operate. Rather, they are locations where transport activity intersects with weak guardianship, limited surveillance, and favourable escape conditions. This means that a busy road,

market, stage, residential access route, or nightlife area becomes risky when offenders can identify targets, commit offences, and leave the scene with limited chances of detection or arrest.

In Bomet, weak police presence was the leading explanation for boda-boda crime hotspots at 23.2%, followed by poor lighting at 21.9% and easy escape routes at 17.4%. This suggests that crime hotspots in Bomet are closely associated with limited formal surveillance and weak guardianship. Where police patrols are infrequent or enforcement visibility is low, offenders may feel more confident committing theft, robbery, harassment, or extortion. The importance of poor lighting further indicates that some hotspot areas may become more dangerous during evening or night hours, especially around markets, stages, rural access roads, and residential routes.

In Busia, poor lighting was the leading perceived reason for crime hotspots at 28.9%, followed by easy escape routes at 23.5% and weak police presence at 17.7%. This pattern is important because Busia is a border county with strong movement of people and goods. Poor lighting may increase the vulnerability of passengers, traders, riders, and residents, especially along roads connecting markets, residential areas, informal routes, and border-linked spaces. The high percentage for easy escape routes is consistent with Busia's route-based and border-related risk environment, where offenders may exploit roads, feeder paths, informal crossings, and settlement corridors to move quickly after committing crimes.

In Kirinyaga, poor lighting accounted for 24.5%, weak police presence for 19.1%, and easy escape routes for 18.3%. This indicates that boda-boda crime hotspots in Kirinyaga are associated with poorly lit spaces, limited police visibility, and routes that allow offenders to move easily. The result is consistent with the county's mixed rural, agricultural, and market-linked transport environment. Boda-boda riders frequently operate along roads connecting farms, markets, residential areas, schools, and trading centres. Where such routes are poorly lit or weakly monitored, the risk of theft, robbery, passenger harassment, or assault may increase.

In Machakos, poor lighting was also the leading explanation at 25.4%, followed by weak police presence at 22.9% and easy escape routes at 15.9%. This reinforces the interpretation that boda-boda crime in Machakos is strongly linked to remote roads, peri-urban corridors, and low-surveillance environments. The county has extensive road networks linking urban centres, rural

settlements, and neighbouring counties. Poor lighting along these routes may increase vulnerability, especially at night, while weak police presence may reduce deterrence in areas where patrol coverage is limited or response distances are long.

In Marsabit, poor lighting accounted for 21.6%, weak police presence for 20.6%, easy escape routes for 19.9%, and cross-border movement for 15.9%. Marsabit's pattern is distinctive because cross-border movement appears as a more prominent explanation than in most other counties. This reflects the county's frontier geography, proximity to Ethiopia, long-distance mobility, remote roads, and sparse policing environment. Poor lighting and weak police presence indicate that many hotspot areas may lack basic surveillance infrastructure and consistent enforcement coverage. Easy escape routes are also important because Marsabit's vast territory and remote-road network may allow offenders to move across long distances or into less monitored areas.

In Mombasa, easy escape routes were the leading explanation at 23.9%, followed by weak police presence at 23.2%, poor lighting at 19.1%, and presence of criminal groups at 19.0%. This pattern differs from more rural and frontier counties because Mombasa's hotspots appear to be shaped by dense urban mobility, informal settlements, nightlife areas, and criminal-group presence. The leading role of easy escape routes suggests that offenders may exploit narrow streets, informal pathways, congested roads, and coastal or settlement corridors to evade detection. The relatively high presence of criminal groups indicates that some hotspots may involve repeated offending, organised local actors, or group-based control of spaces.

In Nyeri, weak police presence was the strongest explanation at 27.0%, followed by easy escape routes at 24.5%, poor lighting at 18.8%, and high traffic of people and goods at 16.5%. This suggests that boda-boda crime hotspots in Nyeri are linked to weak enforcement visibility and opportunity-rich movement spaces. The high score for easy escape routes is consistent with the spatial concentration of crime around roads connecting Nyeri Town, residential estates, markets, and surrounding settlements. Poor lighting remains significant, particularly on residential access roads and less visible routes.

Across all counties, three factors stand out as the most consistent hotspot explanations: poor lighting, weak police presence, and easy escape routes. Poor lighting increases concealment and

reduces the ability of victims, residents, and security actors to identify offenders. Weak police presence reduces deterrence and allows offenders to operate with greater confidence. Easy escape routes increase offender mobility and reduce the likelihood of arrest immediately after a crime. These three factors combine to create favourable conditions for boda-boda-related crime, especially in locations where riders, passengers, goods, and cash are frequently present.

The findings also show that hotspot causes vary by county context. In border and frontier counties such as Marsabit and Busia, movement routes, cross-border dynamics, and escape opportunities are especially important. In urban settings such as Mombasa, easy escape routes, weak policing, nightlife activity, informal settlements, and criminal-group presence are more prominent. In agricultural and peri-urban counties such as Kirinyaga, Nyeri, Machakos, and Bomet, hotspots are linked to poor lighting, weak surveillance, market activity, stage areas, residential access routes, and feeder roads.

These findings are consistent with routine activity and crime-pattern perspectives, which explain that crime tends to concentrate where motivated offenders encounter suitable targets in places with weak guardianship. In the context of boda-boda crime, suitable targets may include passengers, riders, motorcycles, cash, mobile phones, goods, or vulnerable road users. Weak guardianship may take the form of poor lighting, limited police patrols, weak stage control, absence of community surveillance, or lack of rider identification. Easy escape routes then make it possible for offenders to leave the scene quickly, especially using motorcycles or informal road networks.

Overall, Figure 4.24 shows that boda-boda crime hotspots are largely preventable because many of the leading explanations are linked to modifiable conditions. Improving lighting, strengthening police visibility, regulating boda-boda stages, improving rider identification, monitoring escape routes, and involving communities in reporting suspicious activity could reduce the conditions that allow hotspots to form. The findings therefore support spatially targeted crime prevention rather than broad or punitive control of all boda-boda riders (Clarke, 1997).

4.10.4 **Spatial Crime Risk Index Across Boda-Boda Sites**

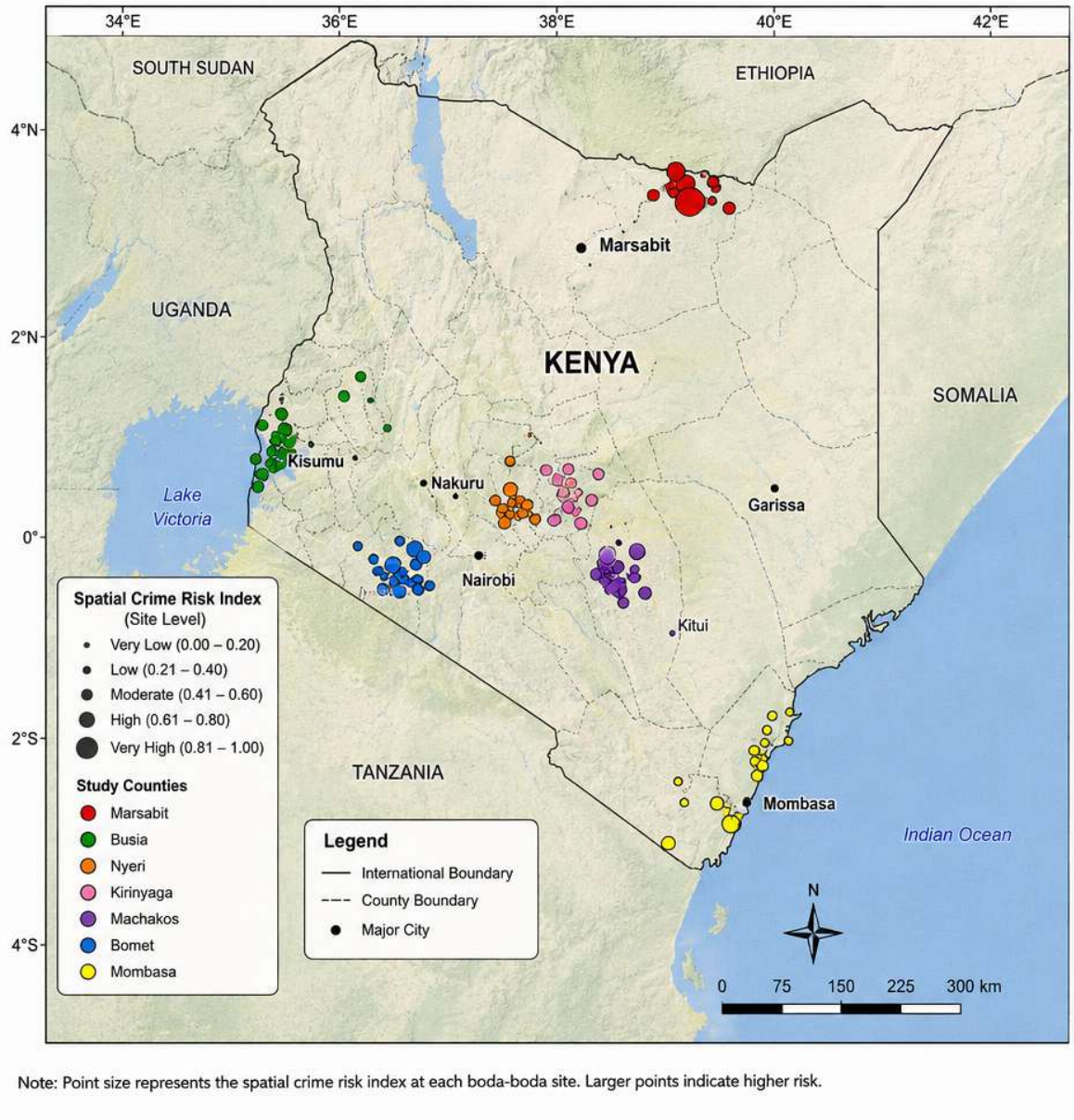


Figure 4.25: Spatial Crime Risk Index Across Boda-Boda Sites

Figure 4.25 presents the spatial crime risk index across the mapped boda-boda crime and risk sites. In this figure, the size of each plotted point represents the magnitude of the spatial crime risk index at that site. Larger points indicate higher risk values, while smaller points indicate lower risk values. The purpose of the figure is to move beyond simple location mapping and show differences in the intensity of risk across sites. Rather than treating all mapped locations as equally risky, the spatial crime risk index allows the analysis to distinguish between lower-risk and higher-risk sites

based on the number and combination of crime-related risk conditions present (Anselin *et al.*, 2000; Weisburd, 2015).

The map shows that spatial crime risk is not uniform across all boda-boda sites. Risk intensity varies considerably from one site to another. Some points are relatively small, indicating fewer spatial risk indicators, while others are much larger, indicating that multiple risk conditions overlap at the same location. This confirms that boda-boda-related crime risk is unevenly distributed and that some sites are substantially more vulnerable than others. The distribution of larger points also shows that higher-risk locations are not randomly scattered across the study area. Instead, they tend to appear in identifiable clusters, particularly in counties and locations associated with route-based mobility, border-related exposure, urban nightlife activity, theft-prone environments, or weak spatial control.

A key contribution of the spatial crime risk index is that it captures the cumulative nature of risk. A site was not considered high risk merely because crime had been reported there once. Rather, high-risk sites were those where several vulnerability indicators converged. These indicators included conditions such as theft proneness, robbery proneness, smuggling-route exposure, night insecurity, and weak spatial control. When several of these indicators occurred at the same site, the overall risk score increased. This means that a hotspot should not be understood simply as a place where crime occurs. Instead, it should be understood as a place where multiple crime-facilitating conditions overlap and reinforce one another.

The figure therefore supports a more nuanced interpretation of boda-boda crime hotspots. A hotspot is not only a matter of frequency or location; it is also a matter of intensity and complexity of risk. For example, one site may be associated only with occasional theft, while another may combine theft exposure, robbery exposure, weak regulation, unsafe night-time movement, and strategic location along an escape corridor. Although both places may appear on a basic map of crime locations, the latter represents a more serious and structurally risky environment. The spatial crime risk index makes this distinction visible by showing how some sites accumulate more risk elements than others.

The pattern in Figure 4.25 also reinforces the idea that boda-boda-related crime is closely linked to mobility corridors and opportunity structures. High-risk points tend to appear where motorcycles can be used not only for legitimate transport but also for offending, surveillance of targets, movement of stolen property, or escape after crime. Such sites may include remote roads, stage points, market-linked corridors, settlement edges, nightlife areas, and border-linked routes. In these locations, offenders may benefit from speed, route flexibility, limited visibility, and reduced chances of interception. The larger points in the map therefore highlight places where the interaction between transport opportunity and weak guardianship is most pronounced.

Another important implication of the figure is that spatial risk should be interpreted as an overlapping environmental and institutional phenomenon. The sites with the highest risk values are likely to be places where weak police visibility, poor lighting, poor stage control, easy escape routes, and high target availability combine. This means that high-risk sites are not produced by geography alone. They are also shaped by failures of regulation, uneven enforcement, inadequate infrastructure, and local opportunity conditions. The map therefore bridges the quantitative spatial analysis with the broader institutional and socio-economic findings of the study.

The figure is also useful because it helps explain why some counties, routes, or localities experience more serious boda-boda-related crime patterns than others. Even when two counties both report crime locations, the severity of spatial vulnerability may differ depending on how many risk conditions overlap at those locations. Counties or local clusters characterised by border movement, remote-road exposure, heavy transport use, weak surveillance, or night-time activity are more likely to show larger high-risk points than counties where such conditions are less concentrated. In this way, the map complements the county-level analysis by showing that the geography of risk operates at the site level as well as at the county level.

From a policy perspective, Figure 4.7.11 is especially important because it shows that intervention should be prioritised according to risk intensity, not only according to the number of reported incidents. Sites with higher index values are likely to require more urgent and more integrated responses. Such responses may include increased police visibility, lighting improvement, road monitoring, stage regulation, rider identification systems, and community-based surveillance. In

contrast, sites with lower risk values may require lighter-touch preventive measures. The index therefore provides a basis for ranking and targeting spatial interventions more strategically.

Overall, Figure 4.25 demonstrates that boda-boda-related crime risk is cumulative, spatially uneven, and locally concentrated. The map confirms that high-risk sites are those where several risk conditions overlap rather than merely places where crime has been reported. It therefore deepens the analysis by showing that the spatial dimension of boda-boda crime is not only about where crime occurs, but also about how intensely vulnerable each site is. This finding supports the broader conclusion of Objective Five that boda-boda crime is shaped by the interaction between place, mobility, weak guardianship, and layered opportunity structures.

4.10.5 **Mean Spatial Crime Risk by County**

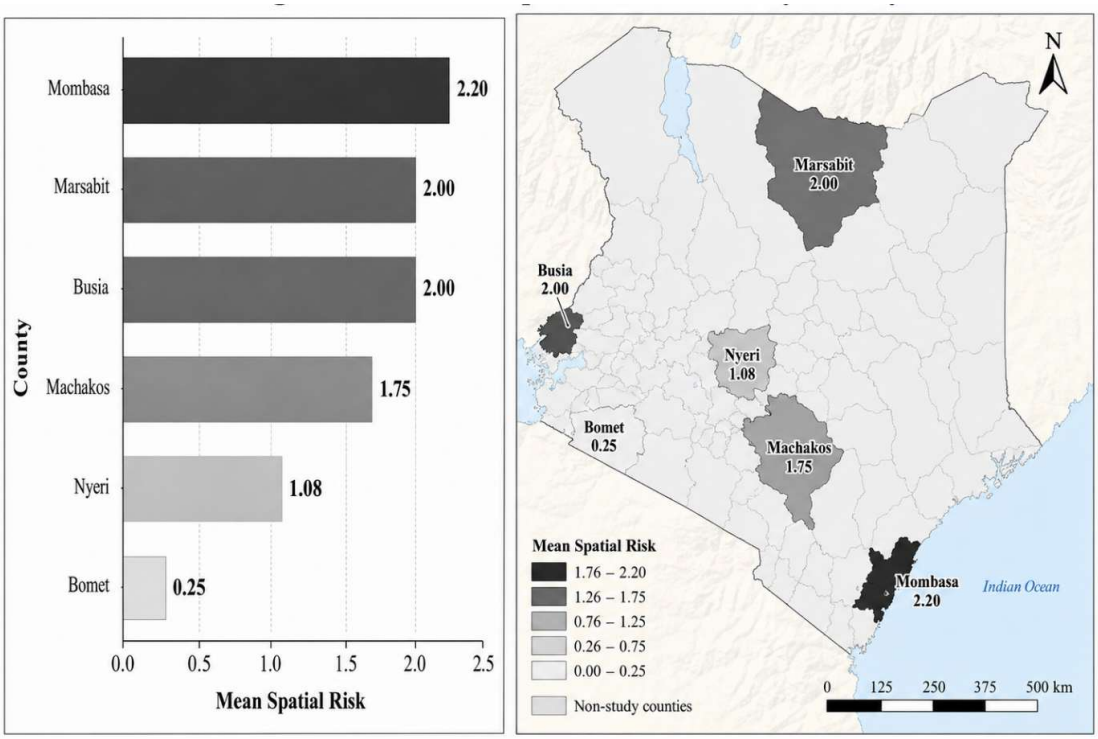


Figure 4.26: Mean Spatial Crime Risk by County

Figure 4.26 presents the mean spatial crime risk index by county. The figure summarises site-level spatial risk into county-level averages, making it possible to compare the relative intensity of boda-boda-related spatial crime risk across the study counties. Unlike the basic spatial distribution maps, which show where crime and risk sites are located, the mean spatial risk analysis shows how

intense the mapped risk conditions were within each county (Anselin *et al*., 2000; Weisburd, 2015).

The results show clear variation in mean spatial crime risk across counties. Mombasa recorded the highest mean spatial risk at 2.20, followed by Busia and Marsabit, each with a mean risk score of 2.00. Machakos recorded a mean risk of 1.75, while Nyeri recorded 1.08. Bomet had the lowest mean spatial risk at 0.25. This ranking indicates that the spatial intensity of boda-boda crime risk was not uniform across the counties. Some counties had more concentrated and layered risk conditions than others.

Mombasa's position as the county with the highest mean spatial risk is important. Although Mombasa had only ten mapped sites, the sites carried relatively high-risk values. All the mapped sites were theft-prone, and 40.0% were linked to night insecurity. This suggests that boda-boda crime risk in Mombasa was concentrated but intense. The county's urban structure, high population density, informal settlements, coastal transport routes, nightlife economy, and frequent passenger movement may explain this pattern. In Mombasa, boda-boda-related crime appears to be shaped by urban opportunity conditions, especially in spaces where riders, passengers, traders, tourists, and night-time commuters interact.

The high mean risk in Mombasa also suggests that urban boda-boda crime should not be assessed only by the number of sites. A smaller number of mapped sites may still represent serious risk if several vulnerability indicators overlap in the same locations. In this case, theft proneness and night insecurity appear to be especially important. This means that Mombasa's spatial risk is likely associated with areas such as entertainment zones, informal settlements, transport corridors, poorly lit roads, ferry-linked movement spaces, and urban access routes where offenders can identify targets and escape quickly.

Busia and Marsabit both recorded mean spatial risk scores of 2.00, but their risk profiles were different. In Busia, the risk was strongly associated with robbery-prone sites. Busia had the highest proportion of robbery at 53.3%, suggesting that its boda-boda crime environment had a stronger association with direct violent or predatory crime. This is significant because Busia is a border county with frequent movement of people, goods, traders, passengers, and transport operators. The

county's spatial risk may therefore be linked to remote roads, border-adjacent movement, market routes, and informal transport corridors where offenders can target riders, passengers, or goods.

In Marsabit, the mean spatial risk was also 2.00, but the source of risk differed from Busia. Marsabit had the highest smuggling-route proportion at 66.7%, indicating that its spatial risk was more strongly linked to frontier mobility, remote roads, long-distance movement, and border-related routes. Marsabit's large geographical size, sparse settlement pattern, limited policing coverage, and proximity to Ethiopia create a different kind of spatial vulnerability. Rather than being primarily urban or market-based, Marsabit's risk appears to be shaped by remoteness, route exposure, cross-border movement, and weak spatial control over extensive territory.

The comparison between Busia and Marsabit is analytically important because it shows that similar mean risk scores can arise from different underlying risk structures. Busia's risk appears more connected to robbery and predatory crime along border and trade-linked routes, while Marsabit's risk is more strongly associated with smuggling routes, frontier movement, and remote-road vulnerability. This means that county-level averages must be interpreted alongside the specific indicators that produce the risk score.

Machakos recorded a mean spatial risk score of 1.75, indicating moderate-to-high spatial risk. Theft-prone sites accounted for 83.3% of mapped sites in the county. This suggests that boda-boda-related crime in Machakos is strongly associated with theft risk, especially along remote roads, peri-urban corridors, feeder routes, and settlement access roads. Machakos has important links to Nairobi, Kitui, Makueni, Kajiado, and other neighbouring counties. Its road network creates opportunities for legitimate transport, but it may also create escape routes and low-surveillance environments that offenders can exploit. The mean risk score therefore reflects a route-based crime environment rather than a purely urban or border-based pattern.

Nyeri recorded a lower mean spatial risk score of 1.08, although theft-prone sites remained high at 84.6%. This indicates that theft risk was present in Nyeri, but other risk indicators such as robbery proneness, smuggling-route exposure, and night insecurity were less pronounced. Nyeri's boda-boda crime risk appears to be linked mainly to theft along residential access roads, market routes, town-centre connections, and feeder roads. The lower mean risk score suggests that the

county's spatial vulnerability was less layered compared with Mombasa, Busia, Marsabit, and Machakos. However, the high theft-prone proportion shows that boda-boda-related insecurity remains relevant, especially in areas where passengers, riders, and goods move between residential estates, markets, and less visible roads.

Bomet recorded the lowest mean spatial crime risk at 0.25, with a median risk score of 0 and a maximum risk score of 2. This indicates that the mapped GIS risk indicators captured lower spatial-risk intensity in Bomet compared with the other counties. However, this should not be interpreted to mean that boda-boda-related crime is absent in Bomet. Rather, it suggests that the specific spatial risk indicators used in the GIS risk index were less concentrated or less severe in the mapped sites. Bomet's questionnaire results still identified market centres, stage points, remote roads, poor lighting, and weak police presence as important crime-related conditions. Therefore, Bomet may have lower mapped spatial-risk intensity while still experiencing localised crime concerns around markets, stages, and transport corridors.

The county-level pattern shows that spatial risk is shaped by the interaction between local geography and the type of crime-related vulnerability present. Mombasa's high risk reflects urban and night-time vulnerability. Busia's high risk reflects robbery-prone and border-route vulnerability. Marsabit's high risk reflects frontier mobility and smuggling-route exposure. Machakos reflects theft-prone peri-urban and route-based vulnerability. Nyeri reflects theft-prone but less layered spatial risk, while Bomet reflects comparatively lower GIS-measured spatial-risk intensity.

This variation confirms that boda-boda-related crime cannot be explained through a single spatial model. Different counties generate different risk profiles depending on their settlement patterns, road networks, economic activities, policing coverage, border exposure, and urban conditions. A high mean risk score does not always mean the same type of crime problem. It may reflect theft in one county, robbery in another, smuggling-route exposure in another, or night insecurity in another. Therefore, spatial crime-risk interpretation must consider both the risk score and the specific indicators contributing to that score.

The findings also show that spatial crime risk is cumulative. Counties with higher mean risk scores are those where several risk indicators overlap more strongly across mapped sites. A site or country becomes riskier when theft proneness, robbery proneness, night insecurity, smuggling exposure, weak control, and mobility opportunities combine. This supports the broader interpretation that boda-boda crime is produced by the interaction between opportunity, weak guardianship, and place-based vulnerability.

From a policy perspective, Figure 4.26 suggests that county responses should be prioritized according to the type and intensity of spatial risk. In Mombasa, interventions should focus on theft prevention, night-time patrols, lighting, informal settlement routes, and nightlife transport zones. In Busia, attention should be given to robbery-prone routes, market corridors, border-linked roads, and remote access routes. In Marsabit, interventions should target smuggling routes, remote roads, border corridors, and long-distance movement networks. In Machakos, prevention should focus on theft-prone peri-urban corridors, feeder roads, and inter-county routes. In Nyeri, measures should address theft-prone residential and market-linked routes. In Bomet, interventions should strengthen stage management, market security, and localised surveillance around known risk spaces.

Overall, Figure 4.26 demonstrates that mean spatial crime risk differed substantially across the study counties. Mombasa, Busia, and Marsabit recorded the highest mean risk values, but the underlying causes of risk differed across the three counties. Machakos showed moderate-to-high route-based risk, Nyeri showed lower but theft-related spatial vulnerability, and Bomet showed the lowest GIS-measured spatial-risk intensity. The findings confirm that boda-boda crime risk is place-specific and county-specific, requiring targeted spatial interventions rather than uniform county-wide enforcement.

Table 4.29: County-Level Spatial Crime Risk Summary

County	**Number of sites**	**Mean risk**	**Median risk**	**Maximum risk**	**Robbery-prone**	**Theft-prone**	**Smuggling route**	**Night insecurity**
Mombasa	10	2.20	2	3	20.0%	100.0%	20.0%	40.0%
Busia	15	2.00	2	5	53.3%	80.0%	6.7%	0.0%
Marsabit	15	2.00	2	5	6.7%	86.7%	66.7%	6.7%
Machakos	12	1.75	2	4	8.3%	83.3%	0.0%	8.3%

Nyeri	13	1.08	1	3	0.0%	84.6%	7.7%	0.0%
Bomet	16	0.25	0	2	0.0%	18.8%	0.0%	0.0%

Table 4.29 summarizes the county-level spatial crime risk profile across the mapped boda-boda crime and risk sites. The table presents the number of mapped sites, mean spatial risk, median risk, maximum risk, and the proportion of sites associated with robbery proneness, theft proneness, smuggling-route exposure, and night insecurity. These indicators provide a more detailed understanding of the type and intensity of spatial risk in each county.

The results show that Mombasa recorded the highest mean spatial crime risk at 2.20, despite having only ten mapped sites. This indicates that Mombasa's risk was relatively concentrated but intense. The county had the highest theft-prone proportion, with 100.0% of mapped sites classified as theft-prone. It also recorded the highest level of night insecurity at 40.0%. This suggests that Mombasa's boda-boda crime risk is strongly associated with theft, urban mobility, nightlife areas, informal settlements, and poorly monitored night-time routes. Although the maximum risk value in Mombasa was 3, its high mean risk shows that most sites carried a consistently elevated level of vulnerability.

Busia and Marsabit both recorded mean spatial risk scores of 2.00, but their risk profiles were different. Busia had the highest robbery-prone proportion at 53.3%, indicating that more than half of the mapped sites were associated with robbery risk. This suggests that boda-boda-related crime in Busia is strongly linked to predatory or violent crime opportunities, especially along border-linked routes, market corridors, remote roads, and areas with active movement of people and goods. Busia also had a high theft-prone proportion of 80.0%, showing that theft and robbery overlap as major forms of spatial risk in the county.

Marsabit also recorded a mean risk of 2.00, but its most distinctive feature was the very high proportion of smuggling-route exposure, at 66.7%. This was the highest among all counties. The result confirms that Marsabit's spatial risk is strongly influenced by frontier mobility, remote roads, long-distance movement, and border-related routes. Although its robbery-prone proportion was relatively low at 6.7%, the high smuggling-route score suggests that boda-boda-related risk in Marsabit may be linked less to direct urban predatory crime and more to movement corridors, informal routes, transportation of goods, and weak spatial control across remote areas.

Machakos recorded a mean spatial risk of 1.75, placing it below Mombasa, Busia, and Marsabit but above Nyeri and Bomet. Theft-prone sites accounted for 83.3% of mapped sites, while robbery-prone sites accounted for 8.3% and night insecurity 8.3%. This indicates that Machakos has a moderate-to-high spatial crime risk profile, mainly driven by theft. The county's risk appears to be associated with remote roads, peri-urban corridors, feeder routes, and inter-county movement spaces. The absence of smuggling-route exposure suggests that Machakos' spatial risk is more linked to local and regional mobility than to border or frontier crime dynamics.

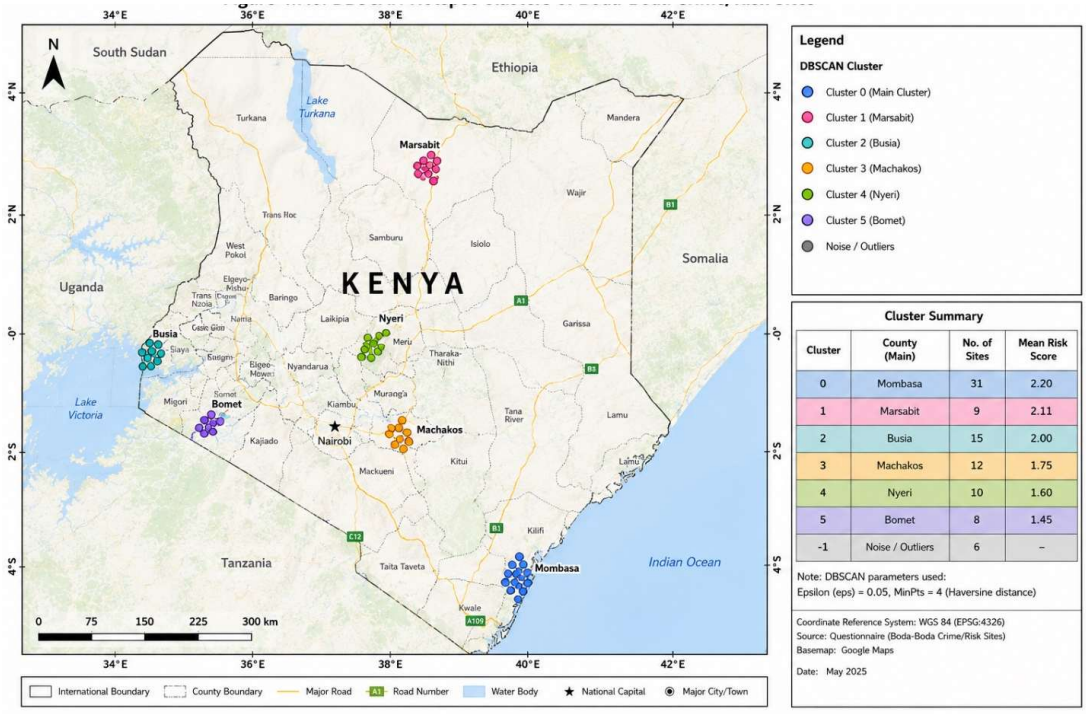
Nyeri recorded a mean spatial risk of 1.08, with a median risk of 1 and a maximum risk of 3. Although Nyeri had a high theft-prone proportion of 84.6%, it recorded no robbery-prone sites and no night-insecurity sites. This suggests that theft risk is present in Nyeri, but the risk is less layered than in counties such as Mombasa, Busia, Marsabit, and Machakos. Nyeri's spatial risk appears to be associated mainly with theft along residential access roads, market routes, town-centre connections, and feeder roads. The low mean risk indicates that fewer risk indicators overlapped at the same sites.

Bomet recorded the lowest mean spatial risk at 0.25, with a median risk of 0 and a maximum risk of 2. Only 18.8% of sites were classified as theft-prone, while robbery-prone, smuggling-route, and night-insecurity indicators were all recorded at 0.0%. This indicates that the mapped GIS risk indicators captured relatively low spatial-risk intensity in Bomet. However, this should not be interpreted to mean that boda-boda-related crime is absent in the county. Rather, it suggests that the specific spatial risk indicators used in the GIS risk index were less concentrated in Bomet compared with the other counties. Other evidence from the questionnaire still identified market centres, stage points, remote roads, poor lighting, and weak police presence as relevant crime-related conditions.

Overall, Table 4.29 shows that the counties had different spatial crime-risk profiles. Mombasa's risk was urban, theft-prone, and night-time oriented. Busia's risk was strongly robbery-prone and linked to border and route-based mobility. Marsabit's risk was frontier-based and strongly associated with smuggling-route exposure. Machakos showed theft-prone and peri-urban route-based risk. Nyeri showed lower but still important theft-related spatial vulnerability. Bomet showed the lowest GIS-measured spatial-risk intensity.

The table therefore confirms that boda-boda-related crime risk is not uniform across counties. Similar mean scores can reflect different underlying risk mechanisms, as seen in Busia and Marsabit. This reinforces the need for county-specific interventions. Mombasa requires stronger night-time patrols, theft prevention, and monitoring of urban mobility zones. Busia requires attention to robbery-prone routes, border-linked corridors, and market areas. Marsabit requires stronger monitoring of remote roads, smuggling routes, and frontier movement. Machakos requires interventions along peri-urban and inter-county transport corridors. Nyeri requires theft-prevention measures around residential and market-linked routes, while Bomet requires continued monitoring of market centres, stages, and local transport spaces.

4.10.6 **DBSCAN[1] Hotspot Clusters**



[1] *It is important to clarify that DBSCAN cluster labels are algorithmic identifiers only. They should not be interpreted as rankings of severity, importance, or policy priority. For example, cluster 0 does not mean "low risk," "priority," or "least serious." It simply identifies points that were spatially close enough to be grouped together under the selected DBSCAN parameters. Therefore, the significance of a cluster must be interpreted together with its mean risk score, maximum risk value, county context, and supporting questionnaire and qualitative evidence.*

Figure 4.27: DBSCAN Hotspot Clusters of Boda-Boda Crime/Risk Sites

Figure 4.27 presents the DBSCAN hotspot clustering results for the mapped boda-boda crime and risk sites. DBSCAN, which stands for Density-Based Spatial Clustering of Applications with Noise, was used to identify localised spatial concentrations of crime and risk sites based on the proximity and density of mapped points. Unlike simple point mapping, DBSCAN helps determine whether reported crime and risk sites form meaningful spatial clusters or whether they appear as isolated or randomly distributed points (Ester *et al*., 1996).

The DBSCAN output shows that boda-boda crime and risk sites form identifiable spatial groupings across the study counties. This confirms that crime-risk locations are spatially clustered rather than randomly dispersed. The existence of these clusters supports the broader finding that boda-boda-related crime is influenced by local spatial conditions such as transport corridors, remote roads, border-linked routes, weakly policed areas, informal settlements, urban activity zones, and places with easy escape routes.

The cluster results show that the main cluster label appeared across several counties, including Mombasa, Marsabit, Busia, Machakos, Nyeri, and Bomet. These clusters should be interpreted within their local county contexts rather than as one continuous national hotspot. In other words, similar DBSCAN labels may appear in different counties because the algorithm groups points according to distance and density in the dataset, not according to administrative boundaries or county-level meaning.

The Mombasa cluster recorded the highest mean risk score at 2.20. This indicates that the mapped Mombasa sites were not only spatially concentrated but also carried relatively high crime-risk intensity. This finding is consistent with earlier results showing that Mombasa had a high county-level spatial risk profile. The Mombasa cluster reflects an urban crime environment associated with dense mobility corridors, entertainment and nightlife areas, informal settlements, theft-prone spaces, and night-time insecurity. It is therefore analytically important because spatial concentration overlaps with relatively high risk values.

Marsabit also displayed a strong clustering pattern. Nine sites in the main Marsabit cluster recorded a mean risk score of 2.11, while a second local cluster of six sites recorded a mean risk score of

1.83. This suggests that Marsabit had more than one spatial concentration of boda-boda-related crime and risk. The two-cluster pattern is important because Marsabit is geographically large and characterised by long-distance movement, remote roads, frontier conditions, sparse policing, and border-related mobility. The presence of more than one cluster may reflect separate risk corridors or settlement-linked movement zones. Although both clusters were risk-relevant, the first Marsabit cluster had a slightly higher mean risk, suggesting that some parts of the county had more concentrated or layered spatial vulnerability than others.

Busia's cluster recorded a mean risk score of 2.00, indicating a substantial level of spatial crime risk. This is consistent with the county's wider profile as a border and trade-route environment. The Busia cluster should be interpreted in relation to market-linked movement, robbery-prone sites, remote roads, transport corridors, and cross-border mobility around Busia Town, Malaba, rural settlements, and the Kenya–Uganda border environment. The clustering of sites suggests that boda-boda-related crime risk in Busia is concentrated in places where the movement of people, goods, traders, passengers, and riders is frequent.

Machakos recorded a cluster mean risk score of 1.75, indicating moderate-to-high spatial risk. This cluster reflects the county's route-based vulnerability, especially along peri-urban roads, inter-county corridors, feeder roads, and settlement-linked transport routes. Earlier findings showed that remote roads were the dominant reported crime location in Machakos. The DBSCAN result therefore strengthens the interpretation that boda-boda-related crime in Machakos is strongly shaped by mobility corridors and low-surveillance movement environments.

Nyeri recorded a cluster mean risk score of 1.08, indicating lower spatial risk intensity compared with Mombasa, Marsabit, Busia, and Machakos. However, the presence of a DBSCAN cluster still shows that crime and risk sites in Nyeri are spatially grouped. This means that boda-boda-related crime in Nyeri is not randomly distributed, even if its average risk intensity is lower. The Nyeri cluster is likely associated with Nyeri Town, residential access routes, market-linked roads, and movement corridors toward Karatina, Othaya, and Naro Moru. The lower mean risk suggests that fewer high-risk indicators overlapped at the same sites compared with higher-risk counties.

Bomet recorded a main cluster mean risk score of 0.31, while a smaller separate cluster of three sites recorded a mean risk score of 0.00. This indicates that Bomet had spatially grouped sites, but their GIS-measured risk intensity was relatively low. The presence of a separate low-risk cluster also shows that not every spatial concentration should automatically be treated as a high-crime hotspot. Some clusters may represent locations where boda-boda activity is concentrated, but where the selected GIS risk indicators were weak or absent. This confirms the need to interpret DBSCAN results together with risk scores, questionnaire findings, and qualitative evidence.

Table 4.30: DBSCAN Cluster Summary

Cluster	County	Number of sites	Mean risk	Maximum risk
0	Mombasa	10	2.20	3
0	Marsabit	9	2.11	5
0	Busia	15	2.00	5
0	Machakos	12	1.75	4
0	Nyeri	13	1.08	3
0	Bomet	13	0.31	2
1	Bomet	3	0.00	0
2	Marsabit	6	1.83	3

Table 4.30 shows that spatial clustering and risk intensity do not always correspond in a simple way. Some counties had clusters with relatively high mean risk scores, while others had clusters with low mean risk scores. For example, Mombasa had the highest cluster mean risk despite having fewer sites than Busia and Bomet. This shows that the number of clustered sites alone does not determine hotspot severity. A smaller cluster can be more important analytically if the sites within it have higher risk values (Ester *et al*., 1996; Weisburd, 2015).

The results also show that Marsabit and Bomet had additional local clusters. In Marsabit, the second cluster had a mean risk score of 1.83, indicating that frontier-related risk may be distributed across more than one spatial corridor. In Bomet, the second cluster had a mean risk score of 0.00, suggesting that spatial concentration can exist even where measured risk indicators are low. These findings caution against treating all clusters as equivalent. A cluster becomes more policy-relevant when spatial concentration overlaps with higher risk values and substantive crime indicators.

The DBSCAN results therefore reinforce the importance of combining spatial clustering with risk-index interpretation. A spatial cluster is not automatically a high-crime or high-risk cluster. It

becomes analytically significant when the clustered sites also record high risk values or overlap with known risk conditions such as theft proneness, robbery proneness, smuggling routes, poor lighting, weak police presence, informal settlements, border movement, weak stage control, or easy escape routes. Hotspot interpretation therefore requires both spatial density and substantive crime-risk evidence.

The findings also support the broader conclusion that boda-boda-related crime is place-based and opportunity-driven. Clusters appear where movement systems, settlement patterns, weak surveillance, and local crime opportunities converge. In Mombasa, clustering reflects dense urban mobility, informal settlements, and night-time vulnerability. In Busia, it reflects border-linked movement, market activity, and robbery-prone routes. In Marsabit, it reflects frontier mobility, remote roads, and possible smuggling-route exposure. In Machakos, it reflects peri-urban and inter-county corridors. In Nyeri and Bomet, it reflects more localised movement around towns, markets, residential areas, stages, and feeder roads.

From a policy perspective, the DBSCAN results show that interventions should be geographically targeted. Counties should not only ask whether boda-boda-related crime exists, but also where it clusters and whether those clusters contain high-risk conditions. Priority should be given to clusters where high mean risk overlaps with serious crime indicators. For Mombasa, this implies targeting urban nightlife areas, informal settlements, and theft-prone corridors. For Busia, attention should focus on border-linked and robbery-prone routes. For Marsabit, interventions should prioritise remote roads, frontier movement routes, and possible smuggling corridors. For Machakos, targeted patrols should focus on peri-urban corridors, remote roads, and feeder routes. For Nyeri and Bomet, interventions should focus on localised markets, stages, residential access roads, and feeder routes where risk is concentrated.

Overall, figure 4.7.13 and Table 4.30 show that boda-boda crime and risk sites form identifiable spatial clusters. However, clustering alone does not fully explain risk. The significance of each cluster depends on its mean risk score, maximum risk value, county context, and associated questionnaire and qualitative evidence. The DBSCAN analysis strengthens Objective Five by demonstrating that boda-boda-related crime is not randomly distributed but is spatially

concentrated in identifiable hotspot environments. These hotspots should be understood as places where mobility, weak guardianship, local opportunity, and crime-specific risk indicators overlap.

4.10.7 **Qualitative Spatial Themes by County**

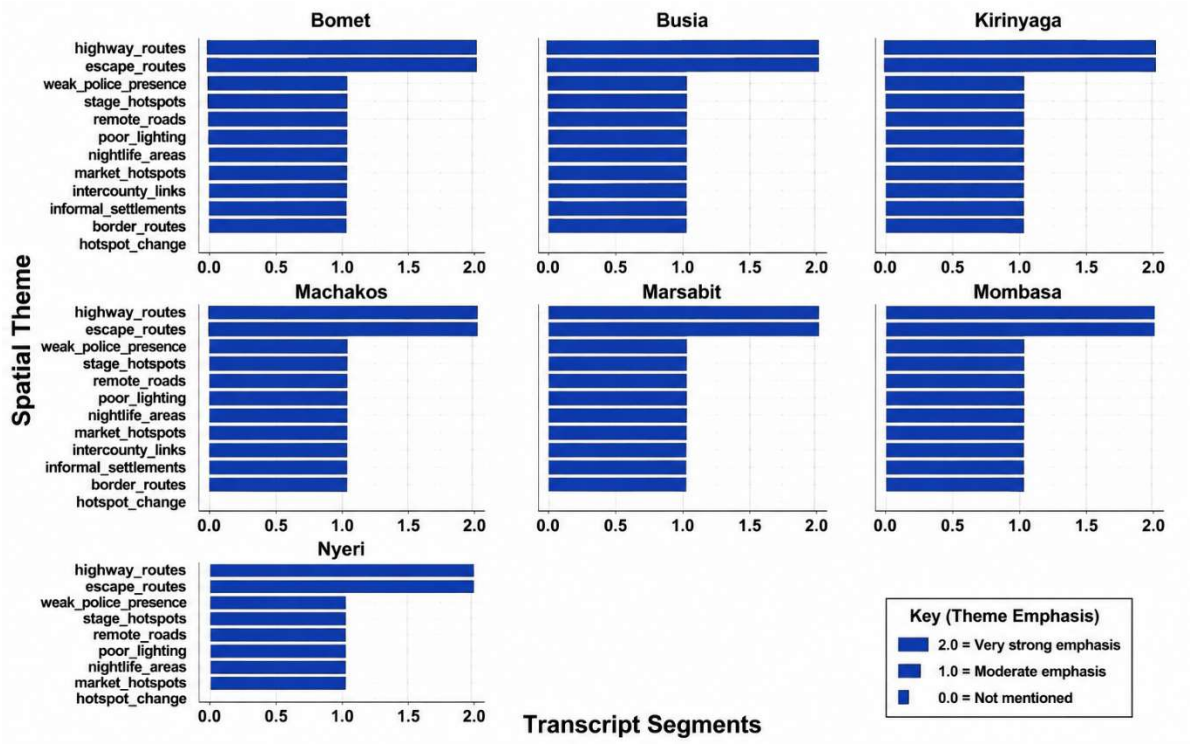


Figure 4.28: Qualitative Spatial Themes by County

The qualitative spatial findings provide an important interpretive layer to the quantitative and GIS-based results presented under Objective Five. While the mapped hotspot distributions, spatial risk scores, and DBSCAN clustering outputs show where boda-boda crime/risk sites are concentrated, the qualitative evidence helps explain why these spaces become vulnerable. Across the study counties, respondents repeatedly associated boda-boda crime hotspots with highway routes, escape routes, weak police presence, stage hotspots, remote roads, poor lighting, nightlife areas, market centres, inter-county links, informal settlements, and border routes.

A dominant theme across the counties was the role of highway routes, feeder roads, and escape routes. Respondents described main roads, highways, rural roads, side roads, lanes, and inter-county routes as spaces that facilitate quick movement before and after crime. This finding confirms that boda-boda-related crime is strongly connected to mobility. Motorcycles are flexible, fast, and able to use both formal and informal road networks. As a result, roads that allow quick

entry and exit become attractive to offenders, especially where surveillance is weak or where police response is slow. This explains why many mapped hotspots were located along transport corridors, road junctions, and routes linking residential, commercial, and peripheral spaces.

The second major theme was market and stage concentration. Respondents identified markets, trading centres, business areas, shops, transport stages, and passenger pick-up points as important hotspot environments. These locations are socially and economically active spaces where riders, passengers, traders, and pedestrians interact regularly. They also involve frequent handling of cash, mobile phones, goods, and other valuables. Such environments create opportunities for theft, robbery, fraud, extortion, assault, and intimidation. Boda-boda stages are especially important because they are both transport nodes and social spaces. Where stage management is weak, criminal actors may hide within legitimate rider populations, making it difficult to distinguish between genuine operators and offenders.

The third theme was poor lighting and weak police visibility. Across the counties, respondents linked crime hotspots to dark areas, poorly lit roads, isolated paths, limited patrols, distance from police posts, and weak law-enforcement presence. These responses support the questionnaire findings that poor lighting and weak police presence were among the leading perceived causes of boda-boda crime hotspots. Poor lighting increases vulnerability by reducing visibility, weakening public surveillance, and allowing offenders to approach or escape undetected. Weak police visibility further increases opportunity because offenders perceive a lower risk of arrest or intervention. This theme was especially important for night-time crime, attacks along remote roads, and incidents occurring in informal or peripheral settlements.

The fourth major theme was border and inter-county movement. This theme was especially relevant in counties such as Busia and Marsabit, where respondents mentioned border routes, informal crossings, smuggling routes, remote corridors, and inter-county links. These findings show that boda-boda-related crime is not always confined to local passenger transport. In some areas, it is connected to wider systems of mobility involving cross-border movement, informal trade, smuggling, livestock movement, and movement between counties. Border and frontier spaces may be more vulnerable because of porous routes, limited security presence, and the difficulty of tracking offenders who move quickly across administrative boundaries.

The fifth theme was urban nightlife, estates, and informal settlements. This was particularly visible in Mombasa and other counties with entertainment zones, dense settlements, and active night economies. Respondents associated bars, clubs, nightlife areas, estates, beach-adjacent areas, and informal settlements with increased vulnerability, especially at night. These spaces often combine alcohol use, late-night movement, cash transactions, reduced visibility, and limited formal security. In such environments, boda-boda motorcycles may be used both as normal transport and as tools for quick escape after crime. Informal settlements may also become vulnerable where roads are narrow, poorly lit, and difficult for police vehicles to access.

County-specific patterns were also evident. In Mombasa, qualitative responses highlighted urban nightlife areas, estates, markets, transport corridors, and informal settlements. These findings help explain why Mombasa recorded a high mean spatial risk score despite having relatively stronger institutional visibility in earlier objective findings. The risk in Mombasa appears to be spatially concentrated in high-activity urban locations rather than evenly spread across the county. In **Busia**, respondents placed strong emphasis on border routes, markets, stages, trading centres, and inter-county movement, reflecting the county's location along a major border and trade corridor. In Marsabit, remote roads, long-distance mobility, sparse policing, and frontier conditions were prominent. This suggests that risk in Marsabit may be shaped by isolation, weak surveillance, and long travel distances rather than only by dense urban crime opportunities.

In Machakos, respondents frequently associated risk with highway links, feeder roads, market centres, and transport stages. This reflects the county's role as a connector between Nairobi, lower eastern Kenya, and other transport corridors. In Nyeri, hotspots were linked to stages, markets, residential areas, and poorly lit roads, indicating a more localised pattern of risk around settlement and commercial spaces. In Bomet, the qualitative themes pointed to rural roads, stage points, trading centres, and areas with limited police presence, suggesting that spatial risk is shaped by both rural mobility and localised transport activity.

Overall, the qualitative evidence confirms that boda-boda crime hotspots are socially and spatially produced. They emerge where transport activity, economic exchange, weak control, environmental vulnerability, and offender opportunity overlap. The findings also show that hotspot formation is not caused by a single factor. Instead, boda-boda crime risk is produced through the interaction of

mobility routes, poorly regulated stages, weak surveillance, night-time activity, market concentration, and local governance conditions. These qualitative patterns strengthen the GIS findings by showing that mapped hotspots are not random points; they are meaningful spaces shaped by everyday movement, economic activity, and uneven security presence (Brantingham & Brantingham, 1993; Cohen & Felson, 1979).

Statistical Tests for Objective Five. Two main statistical tests were conducted to assess the spatial dimension of boda-boda-related crime under Objective Five. These tests examined whether reported crime locations varied significantly by county and whether the spatial crime risk index differed across the study counties (Anselin et al., 2000).

First, a Pearson chi-square test was conducted to assess the association between county and reported crime location. The result was statistically significant, $\chi^2 = 654.62$, df = 42, $p < 2.2e\text{-}16$. This indicates that reported boda-boda crime locations were significantly associated with county. In practical terms, the counties did not report identical spatial patterns of crime. Some counties had stronger concentrations around markets, stages, roads, border routes, or poorly lit areas than others. Therefore, the null hypothesis that crime-location patterns are independent of county was rejected.

However, the strength of this association was weak. The Cramer's V value was 0.149, indicating that although the relationship between county and reported crime location was statistically significant, its substantive strength was limited. This means that county explains some variation in reported crime locations, but it does not fully account for the spatial distribution of boda-boda crime/risk sites. The large chi-square value and very small p-value may partly reflect the size and structure of the response distribution. Substantively, this suggests that county context matters, but similar types of risky spaces recur across counties. These include remote roads, markets, stages, residential areas, poorly lit places, and areas with weak police visibility.

Second, a Kruskal-Wallis test was conducted to determine whether the spatial crime risk index differed significantly across counties. This non-parametric test was appropriate because the spatial risk scores were compared across more than two county groups. The result was statistically significant, $\chi^2 = 34.717$, df = 5, $p = 1.714e\text{-}06$. This confirms that spatial risk levels differed

significantly across the counties. The descriptive county-level mean risk scores support this result, with Mombasa, Busia, and Marsabit recording higher mean spatial risk values than Nyeri and Bomet.

The Kruskal-Wallis result is important because it confirms that spatial crime risk is not evenly distributed across the study area. Some counties have more intense spatial risk environments than others. However, the test does not by itself identify which specific county pairs differ significantly. Therefore, interpretation should be based on the overall county mean scores, GIS maps, DBSCAN clusters, and qualitative findings. Taken together, these outputs show that spatial risk is highest where mobility routes, hotspot stages, markets, nightlife areas, border movement, poor lighting, and weak police presence overlap.

The distance correlation and predictive model outputs were returned as NULL. This means that no distance-based correlation or formal predictive model was successfully estimated from the available output. Therefore, no claims are made regarding distance-decay relationships, spatial dependence, or formal prediction of spatial risk from the available model outputs. Instead, the interpretation of Objective Five relies on descriptive GIS mapping, DBSCAN clustering, questionnaire-based hotspot distributions, county-level spatial risk summaries, qualitative spatial themes, the chi-square test, and the Kruskal-Wallis test.

Overall, the statistical evidence supports the conclusion that boda-boda crime/risk sites show significant spatial variation across counties. The chi-square test confirms that reported crime locations differ by county, while the Kruskal-Wallis test confirms that spatial risk index scores also vary significantly across counties. However, the weak Cramer's V shows that county alone is not a strong explanatory factor. The spatial pattern is better understood as the result of interaction between county context and repeated hotspot conditions such as road access, stage concentration, poor lighting, limited policing, informal settlements, nightlife activity, and border or inter-county movement (Anselin et al., 2000; Weisburd, 2015).

Table 4.31: Statistical Test Results for Objective Five

Test	Purpose	Test Statistic	df	p-value	Interpretation
Pearson chi-square test	To test the association between county and reported crime location	654.62	42	< 2.2e-16	Reported crime locations differed significantly by county
Cramer's V	To measure the strength of association between county and reported crime location	0.149	—	—	The association was weak, meaning county explained only limited variation in reported crime-location patterns
Kruskal-Wallis test	To test whether the spatial crime risk index differed across counties	34.717	5	1.714e-06	Spatial risk differed significantly across counties
Distance correlation	To assess distance-based spatial relationship	NULL	—	—	Not estimated from the available output
Objective Five model	To estimate a predictive model for spatial risk	NULL	—	—	Not estimated from the available output

Source: Author's analysis of Objective Five GIS, questionnaire, and qualitative spatial data.

Note: A statistically significant p-value indicates that the observed county differences are unlikely to be due to chance. However, the weak Cramer's V value shows that the association between county and crime location, while significant, was substantively weak. DBSCAN, GIS mapping, qualitative themes, and county risk summaries were therefore used alongside the statistical tests to provide a fuller interpretation of spatial risk.

Integrated Discussion of Objective Five Findings. Objective Five sought to examine the spatial distribution of boda-boda-related crime and risk sites across the study counties. The combined findings from GIS mapping, hotspot analysis, DBSCAN clustering, questionnaire responses, qualitative spatial themes, and statistical tests demonstrate that boda-boda-related crime is spatially patterned rather than randomly distributed. Crime and risk sites were repeatedly associated with particular types of spaces, including remote roads, market centres, boda-boda stage points, residential estates, nightlife areas, border areas, informal settlements, and major transport corridors. These spatial patterns show that boda-boda-related crime is not only a behavioural or institutional issue; it is also strongly shaped by place, movement, visibility, infrastructure, and opportunity (Anselin et al., 2000; Sherman et al., 1989; Weisburd, 2015).

The most consistent spatial pattern was the importance of remote roads. Remote roads were the leading reported crime location in Busia, Kirinyaga, Machakos, Marsabit, and Nyeri. This suggests

that isolation, low public visibility, limited natural surveillance, and weak police response capacity are central to boda-boda-related crime. Remote roads provide opportunities for offenders because they reduce the likelihood of immediate detection or intervention. In such areas, offenders may attack passengers, steal motorcycles, transport stolen goods, move illicit goods, or escape after committing crimes. The importance of remote roads also shows that boda-boda-related crime is closely linked to mobility. Motorcycles can travel through narrow roads, rural paths, feeder roads, and informal routes that may be difficult for police vehicles to access quickly. This makes remote roads both operational spaces and escape spaces for offenders (Clarke, 1997; Cohen & Felson, 1979).

The second major pattern was the role of commercial and transport nodes. Bomet showed strong concentration around market centres and boda-boda stage points, while other counties also identified markets, trading centres, business areas, and stages as important crime locations. These spaces are attractive because they bring together many riders, passengers, pedestrians, traders, goods, and cash transactions. They are also places where legitimate and illegitimate activities may overlap. Offenders can blend into normal transport activity, making it difficult for victims, other riders, or law-enforcement officers to distinguish criminal actors from genuine boda-boda operators. Markets and stages therefore create both opportunity and anonymity. They also function as points of information exchange, passenger recruitment, goods movement, and possible coordination among offenders (Brantingham & Brantingham, 1993; Cohen & Felson, 1979).

The third important pattern was the role of urban nightlife and informal settlements, especially in Mombasa. Mombasa's highest reported crime location was entertainment and nightlife areas, and the county also recorded the highest mean spatial risk score. This indicates that urban boda-boda crime is shaped by night-time movement, intoxication risk, dense human activity, informal settlement vulnerability, and quick escape routes. Entertainment zones such as bars, clubs, and late-night commercial areas create conditions where passengers may be more vulnerable because of reduced alertness, alcohol use, carrying cash, or travelling at night. Informal settlements may further increase vulnerability where roads are narrow, poorly lit, congested, and difficult to patrol. In such settings, boda-boda motorcycles may serve both as legitimate transport and as tools for rapid escape after theft, assault, robbery, or harassment (Cohen & Felson, 1979; Goodfellow, 2015).

The fourth pattern was the influence of border and frontier geography. Marsabit recorded a high share of reported crime in border areas and the highest smuggling-route proportion in the spatial risk index. Busia also showed route-based vulnerability, even though formal reporting of crime at the border itself was relatively low. This finding is important because it suggests that border-related boda-boda crime may not always occur at the official border point. Instead, it may take place along feeder roads, informal crossings, rural routes, market corridors, and movement networks connected to cross-border trade or smuggling. In frontier and border counties, motorcycles can be used to move people, goods, stolen items, drugs, contraband, or information across spaces where formal surveillance is limited. Therefore, border-related risk should be understood as a corridor-based problem rather than only a border-post problem (Kumar, 2011; Opondo & Kiprop, 2018).

The fifth pattern was the importance of environmental and institutional weaknesses. Poor lighting, weak police presence, limited patrols, distance from police posts, and easy escape routes were consistently identified as major reasons why certain places became hotspots. These factors show that spatial risk is not only produced by geography but also by governance and infrastructure. A place becomes risky when it allows crime to occur with limited detection, delayed response, and easy movement away from the scene. Poorly lit roads increase vulnerability at night because victims and witnesses may not clearly identify offenders. Weak police visibility reduces deterrence. Easy escape routes allow offenders to move quickly between crime scenes, markets, estates, informal settlements, or county boundaries. These conditions create what may be described as low-guardianship environments (Clarke, 1997; Eck & Weisburd, 1995).

The DBSCAN clustering results further support the interpretation that boda-boda crime/risk sites are spatially concentrated. The clusters identified localised groupings of crime and risk sites rather than a uniform spread across space. However, DBSCAN labels should be interpreted carefully. Cluster labels such as 0, 1, or 2 are algorithmic identifiers and do not represent ranking by seriousness or priority. Risk intensity is better interpreted using mean risk scores and supporting qualitative evidence. In this respect, Mombasa, Marsabit, and Busia showed relatively high spatial risk patterns, but the reasons differed by county. Mombasa's risk was more strongly linked to urban nightlife, dense settlement, and quick escape routes. Marsabit's risk reflected frontier conditions,

remoteness, border movement, and limited surveillance. Busia's risk was shaped by border-linked mobility, trading centres, markets, and route-based vulnerability (Ester et al., 1996).

The qualitative spatial themes strengthened the GIS and statistical findings by explaining the social meaning of mapped hotspots. Respondents did not describe hotspots as random locations. Instead, they associated them with specific conditions: roads that enable escape, stages where offenders can blend in, markets where cash and goods circulate, poorly lit areas where surveillance is low, border routes where movement is difficult to monitor, and nightlife areas where victim vulnerability increases. This confirms that boda-boda-related crime hotspots are socially and spatially produced. They emerge where routine transport activity, economic exchange, weak regulation, poor environmental design, and offender opportunity overlap (Brantingham & Brantingham, 1993).

The statistical results also strengthen this interpretation. The Pearson chi-square test showed a statistically significant association between county and reported crime location, $\chi^2 = 654.62$, df = 42, $p < 2.2e\text{-}16$. This means that crime-location patterns differed significantly across counties. Counties did not report the same spatial distribution of boda-boda crime. Some counties had stronger concentrations around remote roads, others around markets and stages, while others showed stronger nightlife, border, or informal settlement patterns. The Kruskal-Wallis test also confirmed significant differences in the spatial crime risk index across counties, $\chi^2 = 34.717$, df = 5, $p = 1.714e\text{-}06$. This means that spatial risk levels were not equal across the study counties.

However, the Cramer's V value of 0.149 shows that the association between county and reported crime location was weak. This is an important finding because it prevents overinterpretation of county differences. County context matters, but it does not fully explain spatial crime patterns. Similar types of risky environments recur across counties, even though each county combines them differently. Remote roads, markets, stages, residential areas, poorly lit places, and weakly policed spaces appear across several counties. Therefore, the spatial pattern of boda-boda crime should be interpreted as both county-specific and structurally recurring (Weisburd, 2015).

The fact that the distance correlation and predictive model outputs were returned as NULL also shaped the interpretation of Objective Five. Since no distance-based correlation or formal

predictive spatial model was estimated, the findings should not be presented as evidence of distance-decay effects or formal spatial prediction. Instead, the objective is best interpreted through descriptive GIS mapping, DBSCAN clustering, hotspot distributions, qualitative themes, county-level risk summaries, and the two statistical tests that were successfully estimated. This provides a strong descriptive and interpretive spatial analysis, but not a formal predictive spatial model.

Overall, the findings show that boda-boda-related crime emerges from the interaction between mobility, opportunity, weak guardianship, and local geography. Motorcycles are essential for legitimate transport and livelihood, especially in areas with limited public transport. However, the same mobility that makes motorcycles useful also creates opportunities for crime where roads are isolated, lighting is poor, enforcement is weak, and escape routes are available. Spatial risk is therefore produced when offenders can move quickly, victims are exposed, guardianship is low, and the physical environment supports concealment or escape (Cohen & Felson, 1979; Kumar, 2011; Opondo & Kiprop, 2018).

The policy implication is that interventions should not target boda-boda riders generally. A generalised enforcement approach risks criminalising legitimate riders and weakening livelihoods. Instead, spatially targeted interventions are needed. These should focus on high-risk roads, poorly lit areas, weakly regulated stages, market hotspots, nightlife zones, informal settlements, border-linked routes, and known escape corridors. Practical interventions may include improved lighting, targeted patrols, stage registration, rider identification, community policing, surveillance around markets and nightlife areas, mapping of escape routes, and coordination between county security actors. Such interventions would address the specific spatial conditions that enable boda-boda-related crime while protecting the legitimate role of the boda-boda sector in transport and livelihoods (Clarke, 1997).

In conclusion, Objective Five demonstrates that boda-boda crime is not evenly distributed across space. It concentrates in places where movement, economic activity, weak control, and environmental vulnerability intersect. The spatial analysis therefore adds an important dimension to the study by showing that crime prevention must be place specific. Reducing boda-boda-related

crime requires not only regulating riders but also transforming the risky environments in which crime occurs (Weisburd, 2015).

Summary of Objective Five Findings. Objective Five examined the spatial distribution of boda-boda-related crime and risk sites across the study counties. The findings established that boda-boda-related crime is not randomly distributed across space. Instead, crime and risk sites are geographically patterned and tend to concentrate in particular locations where mobility, opportunity, weak surveillance, environmental vulnerability, and limited guardianship overlap (Anselin et al., 2000; Weisburd, 2015).

First, the GIS mapping and hotspot analysis showed that boda-boda crime/risk sites were spatially clustered. The mapped sites were concentrated around particular county spaces rather than being evenly spread across the study area. This confirms that boda-boda-related crime has a strong spatial dimension. Crime-risk environments were repeatedly associated with remote roads, market centres, boda-boda stages, residential estates, nightlife areas, informal settlements, border routes, and transport corridors (Anselin *et al*., 2000; Sherman *et al*., 1989).

Second, remote roads emerged as the most consistent reported crime location across counties. Remote roads were especially important in Busia, Kirinyaga, Machakos, Marsabit, and Nyeri. This finding suggests that isolation, low visibility, weak public surveillance, and delayed police response are central to boda-boda-related crime. Remote roads provide offenders with opportunities to attack passengers, steal motorcycles, transport stolen or illegal goods, and escape after committing crimes. The importance of remote roads also shows that boda-boda-related crime is closely linked to movement and route access (Clarke, 1997; Cohen & Felson, 1979).

Third, the findings showed that counties had different spatial risk profiles. Mombasa displayed a distinctive urban-nightlife risk pattern, with entertainment areas, dense settlement spaces, and night-time mobility contributing to vulnerability. The county also recorded the highest mean spatial risk score, suggesting that its crime risk was concentrated in active urban spaces where people, money, transport, and nightlife intersect. Marsabit, by contrast, reflected a frontier and smuggling-route pattern. Its spatial risk was associated with remoteness, border-related movement, long-distance routes, sparse policing, and weak surveillance. Busia also showed route-based

vulnerability linked to border mobility, markets, and trading corridors (Brantingham & Brantingham, 1993; Goodfellow, 2015).

Fourth, poor lighting, weak police presence, and easy escape routes were the most common explanations for hotspot formation. Respondents repeatedly linked crime hotspots to dark areas, poorly lit roads, limited patrols, long distances from police posts, and routes that allow offenders to flee quickly. This means that spatial risk is not only created by physical geography but also by environmental and institutional weaknesses. A place becomes vulnerable when offenders can act with low risk of detection, delayed response, and easy movement away from the scene (Clarke, 1997; Eck & Weisburd, 1995).

Fifth, the spatial crime risk index differed across counties. Mombasa, Busia, and Marsabit recorded the highest mean risk levels, while Nyeri and Bomet recorded comparatively lower mean risk levels. This indicates that spatial risk intensity was unevenly distributed across the study counties. However, the meaning of risk differed by context. In Mombasa, risk was more urban and nightlife-related. In Marsabit, it was more frontier- and route-related. In Busia, it was strongly connected to border-linked mobility, markets, and transport corridors (Anselin et al., 2000; Weisburd, 2015).

Sixth, the Pearson chi-square test confirmed that reported crime locations varied significantly by county, $\chi^2 = 654.62$, df = 42, $p < 2.2e\text{-}16$. This means that the counties did not report identical patterns of crime locations. Some counties had stronger reporting around remote roads, others around markets and stages, while others showed stronger patterns around nightlife, border routes, or informal settlements. However, Cramer's V was 0.149, indicating a weak association. This means that county differences were statistically significant but not strong enough to suggest that county alone explains the spatial distribution of boda-boda crime. Similar risk environments recur across counties, although each county combines them differently.

Seventh, the Kruskal-Wallis test confirmed that spatial crime risk index scores differed significantly across counties, $\chi^2 = 34.717$, df = 5, $p = 1.714e\text{-}06$. This supports the conclusion that spatial risk was not evenly distributed across the study area. The test confirmed that county-level differences in spatial risk were statistically meaningful. However, since the available output did

not include a post-hoc test, interpretation was based on county mean risk scores, GIS maps, DBSCAN clustering, and qualitative spatial themes.

Eighth, the DBSCAN clustering output confirmed the existence of localised hotspot groupings. The clusters showed that boda-boda crime/risk sites formed identifiable spatial concentrations. However, DBSCAN cluster labels were treated as algorithmic identifiers rather than risk rankings. Therefore, cluster labels such as 0, 1, or 2 should not be interpreted as levels of seriousness. Instead, the interpretation relied on mean risk scores, mapped locations, and supporting qualitative evidence (Ester et al., 1996).

Finally, the distance correlation and *Objective Five* predictive model outputs were returned as NULL. This means that no distance-based correlation or formal predictive model was estimated from the available output. Therefore, Objective Five was interpreted using descriptive GIS mapping, hotspot analysis, DBSCAN clustering, spatial risk summaries, qualitative spatial themes, and the two statistical tests that were successfully conducted.

The overall conclusion is that boda-boda-related crime is strongly shaped by place. It occurs where mobility, weak surveillance, poor lighting, environmental vulnerability, economic activity, and offender opportunity converge. Motorcycles are essential for legitimate transport and livelihood, but the same mobility can facilitate crime where isolated routes, weak enforcement, and easy escape conditions exist. Therefore, effective prevention should not rely on generalised control of the boda-boda sector. Instead, prevention should be spatially targeted. Priority should be given to remote roads, poorly lit areas, weakly regulated stages, market hotspots, nightlife zones, informal settlements, border-linked routes, and known escape corridors. Such interventions would reduce crime opportunities while avoiding the unnecessary criminalisation of legitimate boda-boda riders (Clarke, 1997; Cohen & Felson, 1979; Weisburd, 2015).

4.11 Qualitative Evidence: The Voices of the People

The quantitative findings presented in the preceding sections establish the prevalence, classification, drivers and spatial distribution of boda-boda-related crime. However, numbers alone cannot capture the texture of insecurity as experienced by riders, passengers, community leaders and the officials who respond to crime. This section therefore carries the voices of the people themselves, drawn from key informant interviews (KIIs) and focus group discussions (FGDs) conducted across the seven study counties. The evidence is presented anonymously; only the county and the type of participant are identified, in keeping with the ethical commitments of the study. The quotations are reported verbatim and are organised around the same five themes as the quantitative objectives, so that the statistical findings and the lived experiences of respondents can be read side by side.

The qualitative evidence performs three functions in this chapter. First, it confirms the statistical patterns by showing that the same phenomena that emerged from the survey data are described independently by communities on the ground. Second, it extends the analysis by revealing mechanisms that surveys cannot capture, such as the signalling between drivers and riders during snatching operations, the role of brokers in cross-border trafficking, and the quiet influence of protection networks. Third, it humanises the problem: the same sector that carries passengers to school and work is described by respondents as a site of fear, opportunity, resistance and hope. These voices are the heart of the study, and they explain why the boda-boda sector cannot be reduced to either a criminal enterprise or a victimised trade.

4.11.1 The Nature and Forms of Boda-Boda-Related Crime as Narrated by Respondents

Across all counties, participants described a consistent repertoire of boda-boda-related offences. In Mombasa, a focus group of community leaders observed that *"the main forms of crimes associated with boda boda riders include snatching, defilement, stealing from passengers, political violence, drug trafficking, and acts of revenge or protection among colleagues whenever one of them is involved in criminal activities" (FGD participants, Mombasa County).* Snatching was repeatedly identified as the most common offence, and participants described a distinctive modus operandi that is difficult to capture in survey data. As one key informant in Mombasa explained, *"these criminal gangs are very organized and they operate in a coordinated pattern. They often*

waylay their victims, snatch valuables such as phones and handbags and immediately escape using motorcycle" (Key informant, Mombasa County).

The coordination between motorists and riders was described in striking detail. A key informant in Mombasa narrated how *"matatus deliberately slow down near bumps or congested areas, creating an opportunity for criminals to snatch phones, handbags and other valuables from passengers through the windows before quickly escaping".* This description of joint action between public transport vehicles and motorcycles confirms the quantitative finding that coordination is a defining feature of boda-boda-related crime, and it shows that the motorcycle is frequently the getaway instrument rather than the sole instrument of the offence.

In Machakos, participants emphasised the solidarity that both protects riders and shields offenders. A community member observed that *"bodabodas are very united and protect one another even in criminal activities" (FGD participant, Machakos County).* Another added that *"they also assault passengers with knives or pangas, especially and it happens with those who operate during the night" (FGD participant, Machakos County).* The association of offending with night operations and group solidarity recurred across counties, echoing the quantitative finding that night-time locations and group-based methods concentrate crime risk.

In Bomet, riders spoke of being victims as well as suspects. *"We are often robbed ourselves, especially at night" (FGD participant, Bomet County).* Theft of motorcycles and parts, robbery, assault, defilement, smuggling, drug transportation, extortion and political violence were all listed by key informants as the main forms of crime in the county. In Kirinyaga, an FGD observed that *"crime has evolved from isolated robberies to more organized theft networks" (FGD participants, Kirinyaga County),* directly echoing the study's finding that boda-boda-related crime moves along a continuum from incidental to organised forms.

In Nyeri, historical memory shaped the account of crime forms. A key informant recalled that *"historically the most serious crime was the armed hit and run attacks, where riders were assaulted and killed and their motorcycles stolen. This form of crime, associated with organized criminal groups like Mungiki, has significantly declined" (Key informant, Nyeri County).* The same informant noted that *"crime is now predominantly individual and opportunistic, particularly*

phone snatching and drug-related offenses". This county-level narrative of decline and transformation is significant because it demonstrates that the evolution of boda-boda-related crime is not uniform across counties, and that registration, organisation and policing can change the crime landscape over time.

In the border counties, the form of crime reflected the geography of the border itself. In Busia, key informants reported that *"cases frequently involve the theft of motorcycles, assault of riders, murder of riders prior to theft, and the subsequent transportation of stolen motorcycles across the border" (Key informant, Busia County).* In Marsabit, participants emphasised that *"human trafficking, drug smuggling, and organized cross-border criminal activities constitute the most serious threats" (FGD participants, Marsabit County),* with one key informant observing that *"the most serious threat is organized criminal activity that undermines state authority and border security" (Key informant, Marsabit County).* Together these narratives confirm that the forms of boda-boda-related crime vary with the local opportunity structure, from urban snatching in Mombasa and Machakos to motorcycle theft and cross-border trafficking in Busia and Marsabit.

4.11.2 **Coordination, Organisation and the Evolution of Crime**

The quantitative analysis classified boda-boda-related crime along a continuum from incidental to organised. The qualitative evidence gives this continuum a human face and reveals how organisation develops. In Mombasa, participants insisted that *"the crimes associated with boda boda riders are well coordinated, organized, and repeatedly committed within the locality",* and that *"some criminal groups operate through established networks where riders communicate and support each other in carrying out illegal activities" (FGD participants, Mombasa County).* One focus group in Mombasa went further, linking organisation to external financing: *"It's them who organized themselves, politicians come and finance them especially during elections" (FGD participant, Mombasa County).* This connection between political patronage and organised rider groups is a thread that runs through the national dialogue report as well, and it confirms the study's finding that protection by influential people is a distinctive indicator of organised criminality.

In Bomet, participants were more cautious but still identified signs of organisation. *"Sometimes you see the same group working together, using phones to plan or controlling certain routes" (FGD participant, Bomet County).* The use of fake number plates, possession of multiple

registration plates, lending of motorcycles to other operators and coordinated night operations were cited as indicators that ostensibly opportunistic crime had become deliberate and concealed. A key informant in Bomet concluded that *"crime in the boda-boda sector is driven by poverty, weak institutions, and corruption" (Key informant, Bomet County),* and that solving it *"requires everyone, the government, police and community; to work together".*

In Kirinyaga, an FGD stated plainly that *"crime has evolved from isolated robberies to more organized theft networks",* and participants described organized theft syndicates, cross-county movement of stolen motorcycles and the dismantling of stolen motorcycles for spare parts (FGD participants, Kirinyaga County). In Nyeri, a key informant explained that while organised structures had weakened, residual coordination remained visible*: "drug trafficking still retains some level of coordination, evidenced by the use of chase cars to escort drug consignments hidden on motorcycles",* and the use of GPS tracker knowledge to systematically retrieve motorcycles pointed to insider knowledge and coordinated planning *(Key informant, Nyeri County).*

In Marsabit, the organisation of crime was described as an explicit process rather than an outcome. A key informant explained that *"organized crime develops when individuals begin operating within a coordinated system with defined roles",* and that *"organized crime rarely starts as organized crime" (Key informant, Marsabit County).* Recruitment was described as targeting *"unemployed youth, school dropouts, newly arrived migrants, riders struggling financially, drug users and unregistered operators" (Key informant, Marsabit County).* The border was described as a decisive enabler: *"The border environment remains one of the key enablers of organized criminal activity" (Key informant, Marsabit County).* In Busia, key informants were unequivocal that *"criminal networks operate on both sides of the Kenya–Uganda border, facilitating the movement of stolen motorcycles, contraband goods, and offenders" (Key informant, Busia County),* and that motorcycle theft operates as a cartel-like enterprise *"involving local coordinators, buyers and cross-border receivers" (Key informant, Busia County).*

These narratives confirm the quantitative finding that organisation is unevenly distributed across counties and is shaped by local conditions. They also add an important nuance: the same indicators of organisation are read differently in different places. In Bomet, organisation was territorial and structural; in Busia and Marsabit, it was logistical and cross-border; in Mombasa, it was selective,

protected and concealed; in Nyeri, it was residual and drug-related. The voices of respondents therefore explain why a single indicator, such as coordination among riders, can reflect very different criminal realities in different counties.

4.11.3 **Socio-Economic Drivers in the Words of Respondents**

The quantitative analysis identified youth unemployment, poverty and low income as the most consistent socio-economic drivers of boda-boda-related crime. The qualitative evidence places these statistics in the daily struggles of riders. In Machakos, a community leader stated simply that *"poverty is inevitable in the community and struggles for daily bread are real" (FGD participant, Machakos County).* In Bomet, a rider described the pressure of the work: *"We start early in the morning and ride until late at night. The stage leader keeps order, but everyone hustles for survival" (FGD participant, Bomet County).* Another added, *"We don't have a SACCO here, so the stage leader is everything—he admits riders, keeps registers, and enforces discipline" (FGD participant, Bomet County).*

Drug and substance abuse featured prominently as both a driver and a consequence of criminal involvement. In Bomet, participants reported that *"many riders spending a substantial proportion of their income on alcohol and drugs, behavior linked to increased involvement in crime and susceptibility to manipulation by criminal groups and political actors" (FGD participants, Bomet County).* In Nyeri, a key informant observed that *"drug addiction is rampant among youth in the county and the emergence and spread of a substance locally known as Kete has created a new criminal driver",* with drug-dependent youth resorting to phone snatching to fund the habit *(Key informant, Nyeri County).* In Marsabit, key informants identified among the drivers *"youth unemployment, poverty, limited livelihood opportunities, drug and substance abuse, family economic pressures, school dropout rates, easy entry into the boda-boda sector, informal survival economies, and porous border dynamics" (Key informants, Marsabit County).*

The voices of respondents clarify the causal chain that the statistics could only imply: poverty and unemployment push youth into the sector; the sector's easy entry absorbs them; low and unstable earnings, combined with drug dependency and weak family support, make some riders vulnerable to criminal recruitment; and the same economic pressure explains why legitimate riders are reluctant to report crime or to challenge offenders. As one key informant in Bomet concluded,

poverty, weak institutions and corruption together drive crime in the sector (Key informant, Bomet County).

4.11.4 **Institutions, Reporting and the Administration of Justice**

The quantitative findings indicated moderate overall institutional effectiveness, with significant weaknesses in reporting, follow-up and justice outcomes. The qualitative evidence explains why respondents distrust the system. In Mombasa, participants reported that *"corruption remains a major impediment to effective law enforcement, with some police officers allegedly coordinating with criminal groups" (Key informant, Mombasa County).* A key informant described the fate of reports: *"in many cases, community leaders give out information but no action is taken by police or an individual get arrested and released within few hours under unclear circumstances, undermining public trust in the justice system" (Key informant, Mombasa County).* Another described the pressure on police*: "The police are forced to release the suspect because of a call from powerful offices" (Key informant, Mombasa County).*

The administration of justice itself was described as a source of frustration. In Mombasa, a key informant narrated the bond process as follows*: "When an individual is arrested for serious offence such as defilement, he is prosecuted and may initially be asked to pay a high bond amount of say shillings three hundred thousand; they negotiate to be given a lower bond and the court can allow, which the accused can easily afford and get released" (Key informant, Mombasa County).* In Kirinyaga, institutions were described as *"very ineffective – no justice in court, lack of strategy, policy or legal framework" (Key informant, Kirinyaga County),* and an FGD reported that *"police response is often slow and that riders frequently organize their own investigations" (FGD participants, Kirinyaga County).*

In Machakos, community members were blunt about institutional performance: *"Police are not effective, they do not pursue criminals, and they are corrupt" (FGD participant, Machakos County),* and *"stage leadership is not effective; they are not disciplined. They don't discipline the riders in their stages" (FGD participant, Machakos County).* In Bomet, the absence of organisational infrastructure was the defining institutional weakness: *"We don't have a SACCO here, so discipline is left to stage leaders" (Key informant, Bomet County),* leaving *"no effective stage leadership to enforce these measures".* In Busia, witnesses were described as unwilling to

testify*: "Members of the public are often unwilling to testify in court due to concerns about personal safety and potential repercussions" (Key informant, Busia County),* and informants themselves *"become targets of threats and victimization" (Key informant, Busia County).*

Yet the qualitative evidence also documented institutional successes. In Nyeri, a key informant reported that *"all stage chairmen have his contact and that of other senior police officers in the county with whom they have open and direct communication" (Key informant, Nyeri County*), and that riders assist in tracking suspects once a report is received. In Mombasa, participants acknowledged that the registration system *"has also strengthened discipline within the sector and reduced the infiltration of unregistered and suspicious individuals into boda boda operations" (FGD participants, Mombasa County),* and that *"about 70% of the public currently have confidence in genuine and registered boda boda operators due to improved regulation, registration systems, and increased public awareness" (Key informant, Mombasa County).* In Busia, the most effective interventions were described as *"strong stage leadership, collaboration with chiefs, intelligence-sharing mechanisms, and the inclusion of boda boda representatives in local security committees" (Key informant, Busia County).* These successes matter because they show that the institutional weaknesses identified in the survey are not inevitable; where registration, leadership and police–community cooperation work, crime declines.

4.11.5 **Places, Hotspots and Border Spaces**

The spatial findings of the survey identified remote roads, transport nodes, nightlife zones and border corridors as the main locations of boda-boda-related crime. Respondents on the ground named these places with precision. In Mombasa, participants revealed that *"there are particular hotspot routes where boda-boda related crimes are common, especially in the Kisauni area" (FGD participants, Mombasa County),* and that *"there are major roads where the criminals waylay the victims and snatch from them" (Key informant, Mombasa County).* In Marsabit, key informants identified a long list of recurring hotspots, including Somare, Manyatta, Biashara Street, the Hellu–Ginnisa corridor, the border belt area, informal crossing points, the Moyale–Odda–Wajir route and the Moyale–Borri–Isiolo route, describing these locations as attractive to criminals due to *"border proximity, heavy movement of people and goods, weak surveillance, informal crossing routes,*

congested urban settings, remote terrain, and limited policing presence" (Key informants, Marsabit County).

In Busia, hotspots were anchored to the border: participants identified the bridge between Nasira and Bukalama and other border-adjacent areas, and explained that *"proximity to border crossing points enables offenders to move stolen motorcycles"* and escape across the jurisdiction *(Key informants, Busia County).* In Nyeri, a key informant distinguished two hotspot typologies: *"Mathira West as a hotspot for livestock theft facilitated by boda boda, and Wetemere and Majengo in Nyeri town as hotspots for drug-related crimes and phone snatching" (Key informant, Nyeri County).* In Kirinyaga, respondents mapped crime onto transport geography: *"major highways: rider robbery and motorcycle theft through deception; county border routes: stolen motorcycles disappear across county borders; transport nodes: high rider concentration creates opportunities for criminal activity" (Key informant, Kirinyaga County).*

Several respondents described how hotspots shift in response to policing. A key informant in Marsabit observed that *"criminal activities have increasingly shifted from major roads and urban centres toward remote feeder and bush roads and informal border crossings as security operations intensify" (Key informant, Marsabit County).* A key informant in Busia noted that *"crime hotspots shift over time in response to police operations, security interventions, and evolving criminal tactics" (Key informant, Busia County).* And in Mombasa, respondents observed that hotspot areas *"have remained largely unchanged over time due to the absence of clear and effective structures to address the problem" (Key informant, Mombasa County).* These accounts show that spatial risk is dynamic and responsive to enforcement, which has direct implications for the monitoring systems recommended in the study.

4.11.6 **Interventions that Work, as Reported by Respondents**

The qualitative evidence closes with what communities believe works. Registration and identification stood out across counties. In Nyeri, a key informant summarised the logic: *"If riders are organized, they become easier to manage and easier to monitor" (Key informant, Nyeri County),* and estimated that security in the sector had improved to approximately seventy per cent better than before*, "attributing this to improved association governance and enhanced engagement with the National Police Service and National Government Administrative Officers*

within the county" (Key informant, Nyeri County). In Mombasa, registration was credited with restoring public confidence, while in Busia, *"strong stage leadership, collaboration with chiefs, intelligence-sharing mechanisms, and the inclusion of boda boda representatives in local security committees"* were identified as the most effective interventions *(Key informant, Busia County).*

Participants also proposed remedies that align closely with the recommendations of this study. In Bomet, riders recommended *"adopting a regulatory framework similar to the Michuki Rules that transformed the matatu sector, including mandatory rider identification systems, SACCO registration, training and certification requirements, and stronger enforcement mechanisms" (FGD participants, Bomet County).* In Mombasa, participants proposed *"stricter measures in the acquisition and registration of motorcycles, including higher taxation, in order to reduce easy access to motorcycles that may later be used for criminal activities" (FGD participants, Mombasa County),* as well as *"use of unique identification codes for every boda boda stage in order to improve monitoring, accountability, and easy identification of riders and their areas of operation".* In Kirinyaga, an informant proposed restorative discipline over exclusion: *"Instead of kufukuza mtu kwa stage, why don't you think of conducting a session, you suspend the person for a period of time, and by the time he finishes the suspension period he will return to work with discipline" (Key informant, Kirinyaga County).* In Marsabit, key informants called for *"mandatory registration of all riders, biometric rider databases, digital rider identification systems, comprehensive rider vetting, and continuous updating of rider records" (Key informants, Marsabit County).*

The national dialogue report reinforced these findings from a policy perspective. A key informant noted that *"many riders who become involved in such activities are not formally registered with SACCOs or organized boda-boda stages" (Key informant, national dialogue),* and participants supported a body with *"proper registration and identification of all riders, putting mechanisms to differentiate the commercial from the private riders, amongst other policies, together with the empowerment of riders through the formation of SACCOs"*. These voices demonstrate that the recommendations of this study are not imposed from above; they are the solutions that communities, riders and officials are already demanding.

4.11.7 **Archival Evidence: Police, Court and Health Facility Records**

In addition to the survey and the qualitative interviews, the study drew on archival records from official institutions in four of the seven study counties: police crime registers, law court case registers and hospital admission records. These records provide an independent, documentary check on the perceptions reported in the survey and interviews. Three caveats apply. First, archival records capture reported and recorded crime rather than actual crime, and they are therefore affected by reporting behaviour, which the study has shown is itself a problem. Second, the records were accessed in physical form and in some cases were handwritten; figures presented here reflect the entries as they appear in the registers. Third, because the records are official documents, they are cited generically by county and institution type without identifying individual officers, courts or stations, in keeping with the confidentiality commitments of the study.

4.11.8 **Police Records**

Police crime registers in Mombasa covering the thirteen years from 2013 to 2025 record offences involving boda-boda across the county. The annual totals in the register fluctuate, ranging from single-digit lows to a peak of twenty-five recorded offences in 2013, with other years recording between ten and seventeen cases, including twelve in 2016, fifteen in 2021 and seventeen in 2024. Read alongside the court data below, these police figures indicate that the recorded volume of boda-boda-related offending has not followed a simple upward or downward path; it has fluctuated with enforcement activity, reporting behaviour and the shifting methods of offenders.

In Marsabit, police crime statistics prepared for the years 2021 to 2026 list the principal crime types associated with the sector, including assault, grievous harm, theft of motorcycles, stealing, burglary, robbery with violence, defilement, threatening to kill, trafficking in narcotic drugs and human trafficking. The registers show that theft of motorcycles featured prominently, with twenty-six cases recorded in 2024, while assault and defilement cases recurred throughout the period. The registers also document the spatial concentration of crime: the most common places of occurrence are recorded as township, Manyatta, Somare, Biashara and Sessi, with common times recorded as day and night, and the nature of the offences frequently marked as cross-border. Traffic cases involving boda-boda operators were recorded separately, with slight injuries ranging between ten and twenty-five cases and fatal injuries ranging between three and ten cases in a single year. The

police data therefore corroborate the survey finding that boda-boda-related crime in Marsabit is concentrated in identifiable nodes and carries a strong cross-border dimension.

4.11.9 **Court Records**

Case registers at the Mombasa Law Courts document boda-boda-related cases filed between 2022 and 2026. The recorded cases rose steadily from 189 in 2022 to 207 in 2023, 286 in 2024 and 321 in 2025, before easing to 304 in 2026. This steady increase over four years is consistent with the survey finding that boda-boda-related crime is a persistent and growing burden on the justice system, and it underscores the institutional cost of the problem. The upward trend also reflects improved reporting and investigation, but it equally suggests that the underlying volume of offending has not declined.

Court records in Marsabit, prepared at the law courts serving the county for the period 2016 to 2026, tell a longer story of the evolution of boda-boda-related cases. Between 2016 and 2019, the register is dominated by theft of a motorcycle cases, with multiple entries each year occurring in Moyale township, Manyatta Lami, Sessi, Butiye and Hellu sub-locations. From 2020 onwards, the character of the register changes: entries for unlawful presence in Kenya increase sharply, concentrated in Sololo and its sub-locations, and by 2023 the register includes human smuggling, while 2025 entries include trafficking in persons and an offence under the Immigration Act. Theft of motorcycles continues, but it is increasingly accompanied by immigration-related offending in the border area. This documentary record captures, in the most formal register of all, the shift from property crime to mobility crime that the qualitative evidence in Marsabit described: as the corridor economy expanded, the motorcycle and the border combined into a single opportunity structure.

4.11.10 **Health Facility Records**

Hospital records from a Level 5 health facility in Machakos County for January 2026 document boda-boda crime-related patients treated at the facility. The register records fifteen assault and rape cases and a total of thirty-nine assault, rape and theft-related cases, of which twelve patients were treated and discharged. These records provide a rare health-system view of the human cost of boda-boda-related crime: beyond the police file and the court file, there is a hospital file. The facility data show that victims of boda-boda-related violence, including sexual violence, are a routine

presence in the health system, and that the burden falls on public health facilities in the affected counties.

4.11.11 What the Archival Records Show

Taken together, the archival records confirm the study's central findings from an independent documentary angle. First, boda-boda-related crime is real, recorded and persistent: it appears in police registers, court registers and hospital registers, not only in survey responses. Second, the records confirm the county-specific character of the problem: snatching and assault dominate the urban Mombasa registers; theft of motorcycles dominates the Marsabit registers; immigration and trafficking offences accumulate in the Sololo court records; and violent victimisation shows up in the Machakos hospital register. Third, the records document evolution over time: the Mombasa court series rises between 2022 and 2026, while the Marsabit court register shifts from motorcycle theft to unlawful presence and trafficking offences across the decade. These documentary patterns reinforce the argument that boda-boda-related crime is a dynamic, locally embedded phenomenon that requires county-specific and time-sensitive responses.

4.12 Summary of Chapter Four

This chapter presented the findings of the study. The quantitative sections documented the patterns, forms and classification of boda-boda-related crime; the socio-economic drivers of offending; the institutional conditions that shape reporting, regulation and response; and the spatial distribution of risk across the seven counties. The qualitative sections carried the voices of the people, confirming the statistical patterns, revealing the mechanisms behind them, and documenting what communities believe works. The archival sections added the documentary record of police, courts and hospitals. Read together, the three bodies of evidence agree: boda-boda-related crime is prevalent, unevenly distributed, partly organised and partly incidental, driven by socio-economic pressure and institutional weakness, and concentrated in identifiable places. The next chapter discusses these findings in relation to theory and previous research.

CHAPTER FIVE

DISCUSSION OF FINDINGS

5.0 Introduction

This chapter discusses the findings presented in Chapter Four by triangulating the quantitative survey results, the qualitative voices of key informants and focus group participants and the archival records of police, courts and health facilities. The discussion is organised around the five objectives of the study: patterns and forms of boda-boda-related crime; the classification of crime as incidental or organised; socio-economic drivers; institutional and contextual conditions; and spatial distribution and hotspot patterns. For each objective, the chapter asks three questions. What do the findings mean? How do they relate to criminological theory and previous research? And what do they imply for policy and practice in Kenya? A final section draws the findings together into a comparative county synthesis and reflects on the national security implications of the study.

Three interpretive commitments guide the discussion. First, the chapter treats the three bodies of evidence as mutually corrective. Where survey, qualitative and archival evidence agree, confidence in the finding is high. Where they diverge, the divergence itself is informative, as in the case of Mombasa, where survey data suggested limited visible coordination while respondents and court records pointed to protected and concealed organisation. Second, the discussion takes seriously the voices of respondents as evidence in their own right, not merely as illustrations of statistical results. Third, the discussion is anchored in the theories that framed the study, particularly routine activity theory (Cohen & Felson, 1979), crime pattern theory (Brantingham & Brantingham, 1993) and the literature on organised crime (Paoli & Vander Beken, 2014; von Lampe, 2016; United Nations, 2000).

5.1 Patterns and Forms of Boda-Boda-Related Crime

The findings on Objective One established that boda-boda-related crime is prevalent across all seven counties, with snatching, theft of motorcycles and assault identified as the dominant forms, and with statistically significant county-level differences in witnessed crime (Kruskal-Wallis test, $p < 0.001$). The qualitative evidence not only confirmed these forms but revealed the mechanics behind them, that is the coordinated signalling between matatus and riders in Mombasa, the group

solidarity that shields offenders in Machakos, the night-time robberies in Bomet, and the cross-border forms of crime in Busia and Marsabit. The archival records independently document the same pattern, with police and court registers dominated by snatching, assault and theft of motorcycles, and with hospital records showing the physical toll on victims.

Interpreted through routine activity theory, the boda-boda sector is a concentrated supply of the three elements that generate crime inclidng; motivated offenders, suitable targets and the absence of capable guardianship (Cohen & Felson, 1979). Riders operate where people, goods, cash and phones converge; motorcycles provide speed and escape; and the unregulated margins of the sector, such as unregistered stages and night operations, remove guardianship. This interpretation explains why the same sector generates such different crime portfolios across counties: the routine activities of riders, passengers and criminals vary with local economies, border locations and settlement patterns. The finding also supports crime pattern theory, which holds that crime concentrates at nodes, paths and edges where routine movement converges (Brantingham & Brantingham, 1993). Boda-boda stages, markets, highway junctions, border crossings and nightlife zones are precisely such places, and the spatial findings of the study confirm that risk is not uniformly distributed.

The form of crime also reflects the evolution of the sector itself. The historical account from Nyeri, where armed hit-and-run attacks linked to Mungiki-era organised violence declined after registration and strong association governance, shows that the crime landscape responds to regulation. This is consistent with previous Kenyan research on motorcycle-related crime, which found robbery with violence, assault, theft and group-based operations concentrated in urban settings (Kiplagat et al., 2024). It also echoes the National Crime Research Centre's characterisation of boda-boda-related crime as a multidimensional security problem shaped by weak regulation and rider identification (National Crime Research Centre, 2018). The present study extends these accounts by showing that the forms of crime are county-specific and that they evolve over time in response to enforcement, registration and changing opportunity structures.

The policy implication is that responses must be tailored to the dominant forms of crime in each county. Where snatching is dominant, as in Mombasa and Machakos, interventions should target the coordination between motorists and riders, improve guardianship at transport nodes, and

address the market for stolen phones and valuables. Where motorcycle theft is dominant, as in Marsabit, Busia and Kirinyaga, the priority is registration, tracking and the disruption of theft and resale networks. Where crime is drug-facilitated, as in Nyeri and parts of Bomet, prevention must engage with substance abuse and the financing of habits. A national policy that treats boda-boda-related crime as a single undifferentiated problem will miss these local realities.

5.2 Incidental Versus Organised Criminality: Decoding the Continuum

Objective Two found that boda-boda-related crime lies on a continuum, with a dominant incidental or weakly organised pattern, a smaller but significant organised pattern, and strong county variation (Kruskal-Wallis test, $\chi^2 = 265.76$, $p < 0.001$; chi-square test, $\chi^2 = 306.66$, $p < 0.001$; Cramer's $V = 0.241$). The most important statistical finding was the logistic regression result showing that criminal control over stages and routes more than doubled the odds of organised criminal activity ($\beta = 0.8315$, $p < 0.001$; $OR \approx 2.30$). The qualitative evidence gives this continuum a concrete content: respondents described networks in which riders communicate, plan and protect one another; cartel-like motorcycle theft operations in Busia; border-based trafficking structures in Marsabit; and the financing of rider groups by political actors. The archival record supports the same reading, with the Marsabit court register documenting a decade-long shift from motorcycle theft to immigration and trafficking offences.

The finding that organisation is unevenly distributed across counties is theoretically significant. It supports the view that organised crime is not a monolith but a continuum of enterprise structures that are locally embedded (von Lampe, 2016; Paoli & Vander Beken, 2014). The United Nations Convention against Transnational Organised Crime defines an organised criminal group as a structured group acting together to commit serious crime for material benefit, without requiring formal roles or permanent membership (United Nations, 2000). Measured against this definition, the coordination, territorial control and shared proceeds documented in this study qualify as organised criminality even where no visible gang exists. This matters for policy because it means the absence of identifiable criminal organisations in a county does not imply the absence of organised misuse of the sector.

The logistic regression result on stage and route control deserves particular emphasis. Stages are the organisational heart of the sector, they are where riders gather, where passengers seek transport,

where leaders exercise authority and where informal rules are enforced. When criminal actors capture these spaces, they gain surveillance, recruitment, concealment and intimidation capacities. The qualitative evidence confirms this: in Mombasa, unregistered riders who commit crime operate outside recognised stages; in Bomet, territorial control by certain groups of riders signals emerging organisation; in Kirinyaga, criminals masquerading as riders operate at transport nodes. Stage and route control is therefore not merely a governance problem; it is a criminogenic mechanism in its own right, and the study's recommendation to regulate stages and routes as security spaces is directly supported by the evidence.

At the same time, the findings caution against the criminalisation of the sector as a whole. The dominant pattern is incidental, and the qualitative evidence repeatedly distinguished between the minority of offenders and the majority of legitimate riders, who suffer reputational damage, police scrutiny and reduced income because of the actions of the minority. This is consistent with the continuum interpretation advanced in the study and with the recommendation that interventions target specific organised, semi-organised and protected criminal elements rather than the sector as a whole (National Crime Research Centre, 2018). The protection of legitimate riders is not a secondary concern; it is a precondition for the cooperation and information-sharing on which effective policing depends.

The cross-border dimension documented in Busia and Marsabit also deserves theoretical attention. In both counties, respondents described networks operating across international boundaries, with stolen motorcycles, contraband and persons moving through porous borders and informal crossing points. This finding aligns with scholarship on borderland economies and the historical association between boda-boda transport and cross-border mobility (Nyachieo, 2015; Goodfellow & Titeca, 2014). It also supports the argument that motorcycles are versatile assets for organised criminal actors because they combine speed, access and concealment (Okumu, 2022). The policy implication is that responses in border counties cannot be purely domestic: they require joint Kenya-Uganda and Kenya-Ethiopia security cooperation, cross-border information-sharing and attention to the informal crossing points that enable escape (Goodfellow & Titeca, 2014).

5.3 **Socio-Economic Drivers in Context**

Objective Three identified youth unemployment, poverty and low income as the most consistent socio-economic drivers of boda-boda-related crime, with the socio-economic vulnerability index achieving acceptable reliability (Cronbach's alpha above 0.60). The qualitative evidence gave these drivers human texture: the Machakos community leader for whom *"struggles for daily bread are real";* the Bomet rider who *"hustles for survival"* from early morning to late night; the Marsabit informants who listed unemployment, school dropout and family economic pressure among the recruitment factors; and the Nyeri account of drug-dependent youth snatching phones to fund addiction. The archival record adds its own confirmation: the hospital registers in Machakos and the traffic registers in Marsabit document the physical and economic costs of the sector's vulnerability.

These findings are consistent with strain theory, which argues that crime arises when legitimate means of achieving economic goals are blocked (Merton, 1938; Agnew, 1992). For youth in the study counties, the boda-boda sector is often the only accessible livelihood; when earnings are unstable, debts accumulate and drug habits develop, the strain between aspirations and legitimate means intensifies, and offending becomes a coping strategy. The findings also support routine activity theory's premise that socio-economic change concentrates suitable targets and reduces guardianship: the growth of the sector expanded the number of riders, motorcycles and night-time movements, increasing the opportunities for crime (Cohen & Felson, 1979).

The drug dimension of the socio-economic findings deserves separate attention. Substance abuse emerged as both a driver and a consequence of crime: riders spend income on alcohol and drugs, drug-dependent youth steal to fund habits, and drugs weaken judgement and increase susceptibility to manipulation by criminal groups and political actors. In Nyeri, the emergence of a novel substance locally known as *'Kete'* illustrates how drug markets adapt and create new criminal drivers. These findings imply that interventions in the sector cannot succeed on security measures alone; they require drug-abuse prevention, treatment and youth-employment programming as integral components (National Crime Research Centre, 2018).

The policy implication of the socio-economic findings is that prevention must address the opportunity structure of the sector. The study's recommendations for specialised and commercial

rider training, job opportunities, and the protection of the sector from political patronage respond directly to the evidence: if the sector is to be defended as a livelihood, it must be governed as one. Income stability, debt relief through SACCOs, and alternatives to drug-facilitated coping are not peripheral welfare measures; they are crime-prevention investments.

5.4 Institutional Effectiveness, Reporting and the Rule of Law

Objective Four found moderate overall institutional effectiveness, with significant weaknesses in reporting, follow-up and justice outcomes, and with institutional conditions significantly related to organised criminality. The qualitative evidence explains the mechanisms of institutional failure: corruption in law enforcement, the release of suspects through influential calls, bond terms that suspects can afford, slow court processes, witness intimidation, and the fear of retaliation that silences communities. The archival record is consistent with this picture: the rising volume of boda-boda cases in the Mombasa court register between 2022 and 2026 indicates both the burden on the justice system and the persistent gap between recorded crime and conviction outcomes.

These findings resonate with legitimacy-based accounts of compliance and policing. Tyler's work shows that people comply with the law when they perceive institutions as legitimate and procedurally fair (Tyler, 2006). The qualitative evidence documents the erosion of this legitimacy: community leaders who report crime but see no action, witnesses who fear testifying, and riders who organise their own investigations because police response is slow. Where legitimacy is lost, reporting declines, offenders remain undetected, and crime is absorbed into informal and sometimes violent resolution mechanisms. The study's finding that the qualitative spatial themes included weak police visibility and poor lighting is part of the same story while guardianship is absent where institutions are absent.

The successes documented in the qualitative evidence are equally instructive. In Nyeri, direct communication between stage chairmen and senior police officers, rider assistance in tracking suspects and strong association governance were credited with a seventy per cent improvement in sector security. In Mombasa, registration and stage-based identification restored public confidence. In Busia, the inclusion of boda-boda representatives in local security committees was identified as a most effective intervention. These examples show that the institutional weaknesses are not

structural inevitabilities; they are governance choices. Where institutions engage the sector as a partner rather than a suspect, trust, reporting and compliance improve (Tyler, 2006).

The corruption findings warrant specific policy attention because they connect the institutional and organised-crime dimensions of the study. The qualitative evidence documented the release of suspects through calls from powerful offices, police officers allegedly coordinating with criminal groups, and the protection of criminal networks by corrupt officials in Marsabit and Busia. The logistic regression finding that protection systems and stage and route control predict organised criminality suggests that institutional capture is not incidental to organised crime but a condition of it. This supports the study's recommendation to strengthen anti-corruption measures and accountability in the governance of stages and routes, and it echoes the emphasis of the national dialogue on registration, identification and the differentiation of commercial from private riders.

5.5 Spatial Distribution, Hotspots and the Geography of Risk

Objective Five found out that boda-boda-related crime is spatially concentrated, with remote roads the most consistent reported location, significant variation across counties (Kruskal-Wallis test, $p < 0.001$), and DBSCAN clustering confirming localised hotspots with the highest mean risk scores in Mombasa, Marsabit and Busia. The qualitative evidence named the hotspots with precision: Kisauni and its environs in Mombasa; Somare, Manyatta, Biashara and the Hellu–Ginnisa corridor in Marsabit; the border-adjacent areas of Busia; Mathira West and the town zones of Nyeri; and the highway, border-route and transport-node geography of Kirinyaga. The archival record located the same geography in official registers: the Marsabit police statistics name township, Manyatta, Somare, Biashara and Sessi as the most common places of occurrence, and the court registers document offences across Moyale township, Sololo, Manyatta Lami, Sessi, Butiye and Hellu.

This convergence between perception-based survey data, respondent narratives and official records is a strong methodological finding in its own right. It validates the hotspot approach to boda-boda-related crime and supports the argument that spatial analysis should be a routine component of sector security management. The finding also extends crime pattern theory: the nodes and paths of the boda-boda sector, including stages, highways, markets, nightlife zones and border crossings, are the places where motivated offenders, suitable targets and absent guardianship converge (Brantingham & Brantingham, 1993; Anselin et al., 2000). The remote-

road finding is particularly important because it reveals the mobility logic of the sector: offences move to places where surveillance is weak and escape is easy, and where the motorcycle's comparative advantage over other transport is greatest.

The dynamic quality of hotspots emerged strongly from the qualitative evidence. Respondents in Marsabit described crime shifting from major roads and urban centres to remote feeder and bush roads and informal border crossings as security operations intensified; respondents in Busia observed hotspots shifting in response to police operations; and respondents in Mombasa noted that some hotspots remained unchanged for lack of intervention. This combination of persistence and displacement has important implications. On one hand, it cautions against the assumption that hotspot policing alone will solve the problem, since displacement is possible (Weisburd, 2015). On the other hand, it shows that risk is responsive to intervention, which is precisely the premise of the GIS-based hotspot monitoring system recommended in this study. The finding that clustering and risk intensity do not always coincide, as shown by the DBSCAN results, reinforces the need for intelligence-led, place-based approaches that combine spatial data with local knowledge.

5.6 **Comparative Synthesis and National Security Implications**

Bringing the five objectives together, the study's central message is that boda-boda-related crime is a locally embedded phenomenon with national security consequences. The comparative evidence reveals three distinct county profiles. The first profile is urban and opportunistic-cum-protected, exemplified by Mombasa and Machakos, where snatching, assault and coordination dominate, organisation is selective and concealed, and protection by influential people and fake registration are notable indicators. The second profile is border-based and organised, exemplified by Busia and Marsabit, where motorcycle theft, smuggling, trafficking and human mobility offences are driven by cross-border opportunity structures and porous boundaries. The third profile is territorial and transitional, exemplified by Bomet, Nyeri and Kirinyaga, where organisation is structured around stages and routes, territorial control is significant, and the crime landscape has evolved in response to governance and enforcement. These profiles are not exhaustive categories but heuristic patterns; the quantitative analysis showed that county explains only part of the variation (Cramer's V = 0.241), with socio-economic, institutional and spatial conditions interacting with place.

The national security implications follow directly from the evidence. The boda-boda sector is not itself a security threat; it is a critical livelihood and transport service that criminal actors exploit. But the exploitation carries national security costs: the sector provides mobility, logistics, concealment and recruitment for criminal networks that operate across county and national boundaries; it can be mobilised for political violence, as reported in Mombasa, Busia, Nyeri and Kirinyaga; it transports drugs, contraband, stolen goods and persons; and in border counties it connects Kenyan crime to regional trafficking and smuggling economies (Abrahamsen & Williams, 2011; Shelley, 2010). The Marsabit court register's shift from motorcycle theft to immigration and trafficking offences is a documentary illustration of this escalation.

The security implications are therefore both internal and external. Internally, the risk is that ungoverned spaces within the sector, including unregistered stages, undocumented riders and unprotected routes, become safe havens for criminal activity and recruitment, and that the erosion of trust documented in the qualitative evidence weakens the information flows on which community policing depends. Externally, the risk is that the boda-boda sector becomes a transmission belt for regional organised crime, linking Kenyan markets to cross-border smuggling, trafficking and illegal migration networks. Addressing these risks requires the differentiated, county-specific approach recommended in this study: registration and identification systems, stage and route governance, intelligence-led and proportionate policing, anti-corruption measures, cross-border cooperation, and the protection and empowerment of legitimate riders (National Crime Research Centre, 2018; United Nations, 2000).

5.7 **Chapter Summary**

This chapter discussed the findings of the study in relation to theory and previous research. It showed that the patterns and forms of boda-boda-related crime are consistent with routine activity theory and crime pattern theory; that the incidental-organised continuum is locally embedded and driven by stage and route control, protection systems and cross-border opportunity structures; that socio-economic strain and drug abuse are powerful drivers requiring non-security responses; that institutional effectiveness, legitimacy and the rule of law are decisive for reporting, compliance and prevention; and that the spatial concentration of risk validates place-based, intelligence-led approaches. The comparative synthesis identified three county profiles and drew out the national

security implications of the findings. The next chapter presents the summary, conclusions and recommendations of the study.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

This chapter presents the summary, conclusions and recommendations of the study. It draws directly from the integrated findings presented in Chapter Four and links them to the study objectives, research questions and hypotheses. The chapter is organised into seven main sections: summary of the study, summary of key findings, conclusions, hypotheses decisions, recommendations, contribution to knowledge, and suggestions for further research.

The chapter maintains the central argument developed across the thesis that, the boda-boda informal transport sector is a legitimate and important livelihood system, but its flexibility, informality, mobility and uneven regulation create opportunities for criminal exploitation under particular socio-economic, institutional and spatial conditions. Therefore, the appropriate policy response is not a general criminalisation of the sector but a differentiated, evidence-based, and county-sensitive security and governance approach.

6.1 Summary of the Study

The general objective of the study was to comparatively examine the evolution of security threats within the boda-boda informal transport sector across selected counties in Kenya. The study focused on the forms and patterns of boda-boda-related crime, indicators distinguishing incidental criminal use from organised criminal activity, socio-economic factors associated with crime, institutional and contextual conditions that facilitate organised criminal evolution, and the spatial distribution, concentration and hotspot patterns of crime.

The study adopted a mixed-methods comparative design. Quantitative data were collected through questionnaires administered to boda-boda riders and related respondents across Bomet, Busia, Kirinyaga, Machakos, Marsabit, Mombasa and Nyeri counties. A total of 2,631 questionnaires were retained for analysis after data cleaning. Qualitative evidence was obtained through Key Informant Interviews, Focus Group Discussions, open-ended responses, observation, document review, and GIS-based spatial data. The pilot study conducted before the main fieldwork helped

refine the instruments, strengthen question clarity, improve ethical sensitivity, and enhance spatial-data collection procedures.

The analysis combined descriptive statistics, cross-tabulations, composite indices, reliability tests, chi-square tests, Kruskal-Wallis tests, Spearman correlation, logistic regression, thematic analysis, GIS mapping, and hotspot interpretation. This integration enabled the study to examine boda-boda-related crime as a multidimensional phenomenon shaped by individual behaviour, livelihood conditions, governance structures, transport spaces, county context and local opportunity structures.

6.2 Summary of Major Findings

Findings on the Manifestations and Patterns of Boda-Boda-Related Crime. Objective One analysed the manifestations and patterns of boda-boda-related crime across the selected counties. The findings showed that boda-boda-related crime was not uniformly distributed. It varied by county, crime type, crime frequency, location, timing and victim profile. Theft of motorcycles emerged as the dominant crime form across counties, confirming that riders are not only potential offenders or facilitators but also major victims of crime. Other reported forms included robbery with violence, theft from passengers, assault, bribery and corruption, drug transport and distribution, smuggling, political violence or intimidation, extortion, kidnapping or abduction, facilitation of escape after crime, and sexual harassment or violence.

Marsabit, Busia and Nyeri recorded high levels of witnessed crime, indicating strong public visibility of boda-boda-related crime. Marsabit recorded the highest crime frequency score, while Busia recorded the highest mean crime pattern index. Machakos was strongly characterised by motorcycle theft, Mombasa showed lower general exposure but a spatially concentrated urban and nightlife-related risk pattern, Bomet showed crime around market centres and stage points, and Kirinyaga occupied an intermediate position with evidence of remote-road, residential-estate, and night-time risks.

The inferential results confirmed statistically significant county-level differences in crime type, frequency, location, timing, victim profile and the overall crime pattern index. The chi-square and Kruskal-Wallis results therefore supported the conclusion that boda-boda-related crime is county-specific, spatially patterned, temporally structured, and shaped by multiple interacting factors.

However, the modest Cramer's V values indicated that county context alone does not fully explain crime variation. Crime patterns are also shaped by policing capacity, socio-economic pressure, road networks, night-time mobility, stage organisation, border dynamics and local guardianship.

Findings on Incidental and Organised Criminal Activity. Objective Two examined the indicators that distinguish incidental criminal use of boda-boda transport from organised criminal activity. The findings showed that boda-boda-related crime exists along a continuum. At one end are isolated, opportunistic and individual offences. At the middle are semi-organised crimes involving repeated methods, coordination, temporary cooperation and informal group action. At the most serious end are organised criminal activities involving role specialisation, territorial control, leadership, protection systems, fake registration, illicit-market links and sharing of proceeds.

Busia recorded the strongest direct perception of organized and repeated crime, with 52.7% of respondents classifying boda-boda-related crime as organised and repeated. Bomet recorded the highest organized-criminality index and the strongest evidence of structured criminal arrangements, including leadership, role specialization, coordination, and territorial control. Nyeri displayed a repetitive and coordinated pattern, while Marsabit showed repetition and coordination but weaker evidence of advanced organization. These findings demonstrate that organized criminality does not appear in the same form across all counties.

Repeated similar crimes and coordination among riders were the most common indicators of organization, reported by 57.2% and 32.7% of respondents respectively. Advanced indicators such as territorial control, role specialization, fake registration, protection by influential people, links to smugglers, and sharing of proceeds were less common but highly significant because they signal more developed criminal organization. Territorial control was especially important because respondents who reported criminal control of stages and routes had more than twice the odds of being associated with organized criminal activity. The overall finding is that not all boda-boda-related crime is organized, but organized and semi-organized patterns are clearly present in specific counties and operational spaces.

Findings on Socio-Economic Drivers of Boda-Boda-Related Crime. Objective Three evaluated the socio-economic factors associated with boda-boda-related crime. The findings showed that socio-economic vulnerability is present across all the study counties, though its intensity varies. Marsabit and Busia recorded the highest levels of socio-economic vulnerability, and these counties also

displayed higher crime-frequency patterns. This suggests that economic vulnerability contributes to crime risk more strongly when it interacts with enabling county conditions.

Youth unemployment and poverty or low income emerged as the most consistent and dominant economic drivers. These factors explain why many young people enter the boda-boda sector as a livelihood strategy, but they also reveal the pressures that may expose riders to criminal recruitment, risky behaviour, debt dependency, or illicit survival strategies. Additional factors such as debt pressure, family financial obligations, lack of alternative livelihoods, substance abuse and peer influence reinforced the vulnerability environment.

The socio-economic vulnerability index had acceptable reliability, with Cronbach's alpha of 0.788. The relationship between socio-economic vulnerability and crime frequency was positive but weak, while logistic regression showed that a one-unit increase in the vulnerability index increased the odds of crime exposure by approximately 22.9%, holding county constant. These results show that socio-economic vulnerability is significant, but it does not independently explain boda-boda-related crime. Crime emerges where economic pressure intersects with local governance weakness, limited livelihood alternatives, peer influence, substance abuse, mobility patterns, and opportunity structures.

Findings on Institutional and Contextual Conditions. Objective Four assessed the institutional and contextual conditions that facilitate the evolution of organised criminal activity within the boda-boda sector. The findings showed that boda-boda-related crime is also a governance problem. Institutional effectiveness was moderate overall, with a mean score of 2.87 and acceptable reliability. Mombasa recorded the strongest perceived institutional effectiveness, followed by Nyeri, Machakos, and Kirinyaga. Marsabit recorded the lowest institutional effectiveness, while Busia and Bomet also recorded lower scores.

Institutional and contextual risk was also moderate overall, but it was more clearly concentrated in particular counties. The institutional-risk index had good reliability, with Cronbach's alpha of 0.814. Marsabit recorded the highest institutional risk, followed by Bomet and Busia. Mombasa recorded the lowest institutional risk and the highest institutional effectiveness, while Marsabit presented the reverse profile. The major institutional risk factors were weak registration, corruption and collusion, political interference, poor coordination, weak stage discipline, low reporting, and weak prosecution.

The relationship between institutional conditions and organised criminality was complex. Simple bivariate correlations were weak and statistically non-significant, but regression models showed stronger effects after county context was considered. Institutional risk significantly predicted organised criminality, and a one-unit increase in institutional risk increased the odds of organised-crime exposure by approximately 53.6%. Political interference was a significant specific predictor, while institutional effectiveness became protective in the expanded model. These findings show that institutions reduce organised criminality only when they actively address the conditions that make crime possible: anonymity, weak registration, corruption, selective enforcement, weak reporting, weak prosecution, and political interference.

Findings on Spatial Distribution, Concentration, and Hotspot Patterns. Objective Five examined the spatial distribution, concentration, and hotspot patterns of boda-boda-related crime. The findings established that crime and risk sites were not randomly distributed. Instead, they were geographically patterned and clustered around spaces where mobility, weak surveillance, environmental vulnerability, limited guardianship, and offender opportunity converged.

Remote roads emerged as the most consistent reported crime location across counties, especially in Busia, Kirinyaga, Machakos, Marsabit and Nyeri. Poor lighting, weak police presence, and easy escape routes were the most common explanations for hotspot formation. Mombasa showed a distinctive urban-nightlife pattern involving entertainment areas, dense settlements, transport nodes, and night-time mobility. Marsabit reflected a frontier and smuggling-route pattern linked to remoteness, border movement, long-distance routes, and sparse policing. Busia showed a border-mobility and market-corridor pattern.

The statistical tests confirmed significant spatial variation. Reported crime locations varied significantly by county, while spatial crime risk index scores also differed significantly across counties. Mombasa, Busia, and Marsabit recorded the highest mean spatial risk levels, whereas Nyeri and Bomet recorded comparatively lower spatial risk scores. DBSCAN clustering confirmed the existence of localised hotspot groupings, although cluster labels were treated only as algorithmic identifiers and not as risk rankings. Since the distance correlation and formal predictive model outputs were returned as NULL, the spatial interpretation relied on GIS mapping, hotspot analysis, DBSCAN clustering, spatial-risk summaries, qualitative spatial themes, and the successfully conducted statistical tests.

6.3 Conclusions

Conclusion on Crime Manifestations and Patterns. The study concludes that boda-boda-related crime in Kenya is a differentiated, county-specific and multi-form security problem. It cannot be understood as a single uniform category of crime. The dominant offence is theft of motorcycles, which shows that riders are central victims as well as possible actors within the crime environment. The broader crime pattern includes robbery, theft from passengers, assault, bribery, smuggling, drug transport, extortion, kidnapping, political intimidation and other offences that vary across county contexts.

The first conclusion is therefore that boda-boda-related crime is both a public security issue and a livelihood-protection issue. Policies that focus only on punishing riders will miss the fact that many riders are victims of motorcycle theft, violent robbery, extortion, and attacks on isolated routes. Effective responses should distinguish between legitimate riders, vulnerable riders, opportunistic offenders, and organised criminal actors.

Conclusion on Incidental and Organised Criminal Activity. The study concludes that boda-boda-related crime exists along a continuum from incidental offending to semi-organised and organised criminal activity. Most crime within the sector should not be treated as fully organised crime. However, repeated similar offences, coordination among riders, territorial control, fake registration, role specialisation, protection systems and illicit-market links show that some county contexts contain more structured forms of criminal exploitation.

This conclusion is important for national security analysis because it shows that the threat does not arise from the boda-boda livelihood system as a whole. Rather, the threat emerges when particular actors exploit the sector's mobility, informality, anonymity, stage structures, and route networks for sustained criminal purposes.

Conclusion on Socio-Economic Drivers. The study concludes that socio-economic vulnerability is a significant but moderate driver of boda-boda-related crime. Youth unemployment, poverty, debt pressure, family obligations, limited livelihood alternatives, substance abuse, and peer influence increase vulnerability within the sector. However, economic hardship alone does not explain crime. Many riders are economically vulnerable but remain law-abiding livelihood actors.

The implication is that socio-economic pressure becomes criminogenic when it intersects with weak regulation, poor enforcement, criminal opportunity, peer networks and limited alternative

livelihoods. Therefore, crime prevention must combine security interventions with livelihood protection, youth empowerment, financial literacy and social support.

Conclusion on Institutional and Contextual Conditions. The study concludes that institutional weakness facilitates the evolution of boda-boda-related crime by creating spaces of anonymity, impunity, and weak accountability. Weak registration, corruption, selective enforcement, political interference, low reporting, weak prosecution, and poor stage discipline enable offenders to hide within the legitimate rider population and continue operating.

However, institutional weakness does not produce the same crime outcome everywhere. In some counties it appears as underreporting, unregulated mobility, and opportunistic offending; in others it supports repeated, coordinated, semi-organized, or organized criminal activity. This means that institutional reform must be nationally coherent but locally tailored.

Conclusion on Spatial Distribution and Hotspot Patterns. The study concludes that boda-boda-related crime is strongly shaped by place. Crime concentrates in spaces where transport mobility, economic activity, poor lighting, weak surveillance, isolation, weak police response, and easy escape routes converge. Remote roads, stages, market centres, border routes, informal settlements, nightlife zones, residential estates, and transport corridors are therefore critical security spaces.

This conclusion reinforces the need for spatially targeted prevention. Generalized enforcement across the whole boda-boda sector is inefficient and may harm legitimate livelihoods. Hotspot-based policing, route surveillance, lighting, stage management and geo-coded incident monitoring are more appropriate because they target risk places rather than the entire sector.

Overall Conclusion. The overall conclusion of the study is that boda-boda-related insecurity in Kenya evolves through the interaction of livelihood vulnerability, informal mobility, weak regulation, institutional risk, criminal opportunity and spatial concentration. The sector itself is not inherently criminal. It is an essential transport and livelihood system that becomes vulnerable to criminal exploitation when governance, socio-economic and spatial conditions create opportunities for offenders.

The study therefore supports a balanced national security approach. The state should protect communities from crime while also protecting legitimate boda-boda livelihoods. The most effective response is differentiated, intelligence-led, county-sensitive, and hotspot-based. Such a

response should target criminal networks, weak stages, high-risk routes, fake registration, border-linked illicit markets, and politically protected offenders while strengthening rider welfare, legal compliance, and public trust.

6.4 Decisions on the Study Hypotheses

The study tested four null hypotheses. The integrated quantitative, qualitative, and spatial evidence supported rejection of all four null hypotheses, although the interpretation of each decision was qualified by effect sizes, county context, and the multi-causal nature of boda-boda-related crime.

Table 6.1: Summary of Hypotheses Decisions

Hypothesis	Main Evidence	Decision	Implication
H01: There is no significant difference in the manifestations and patterns of boda-boda-related crime across the selected counties.	Crime type, crime frequency, crime location, crime timing, victim profile, and the crime pattern index differed significantly across counties.	Rejected	Boda-boda-related crime is county-specific and cannot be addressed through a uniform response.
H02: There is no significant relationship between socio-economic factors and boda-boda-related crime in the selected counties.	Socio-economic vulnerability was positively associated with crime frequency and significantly increased the odds of crime exposure by about 22.9%.	Rejected	Economic vulnerability matters, but it interacts with governance, mobility, and opportunity structures.
H03: Institutional and contextual conditions do not significantly influence the evolution of organised criminal activity within the boda-boda sector.	Institutional risk significantly predicted organised criminality and increased the odds of organised-crime exposure by about 53.6%; political interference was also significant.	Rejected	Weak registration, corruption, political interference, low reporting, and weak prosecution facilitate criminal evolution.
H04: There is no significant spatial variation in the distribution and concentration of boda-boda-related crime across the selected counties.	Reported crime locations and spatial crime risk index scores differed significantly across counties; GIS and DBSCAN outputs showed localised hotspot groupings.	Rejected	Boda-boda-related crime is spatially patterned and requires hotspot-based prevention.

Source: Author's synthesis of field data analysis, 2026.

6.5 Recommendations

The recommendations are organised around legal, security, institutional strengthening, socio-economic support and spatial prevention. They are designed to protect legitimate boda-boda livelihoods while closing the governance and opportunity gaps that allow criminal actors to exploit the sector. Each recommendation is grounded in the quantitative, qualitative and archival evidence presented in Chapter Four and discussed in Chapter Five, and reflects both the statistical patterns identified by the study and the lived experiences of riders, passengers, community leaders, security officials and justice-sector actors across the seven study counties.

1. **Securitize Boda-boda Informal Transport Sector:** Enact the legal framework bill on the Boda-boda transport that is at the floor of the National Assembly to securitize the sector by instituting reforms to explicitly provide for their operational framework, including registration and licensing processes, and explicitly define and criminalize crimes and offences emanating from the sector. The urgency of this legal intervention is underscored by the archival evidence presented in section 4.11.7: court records in Mombasa show boda-boda-related cases rising from 189 in 2022 to 321 in 2025, while Marsabit court registers document a decade-long shift from motorcycle theft to human trafficking and immigration offences. The qualitative evidence in section 4.11 further demonstrates that unregistered riders are disproportionately implicated in criminal activity: key informants across all seven counties repeatedly associated criminal misuse of motorcycles with operators who were not registered with any recognised stage or association. Most sections of the bills should be strengthened by these empirical findings.

2. **Develop an Integrated National Registration and Information Management System**. National and county authorities should establish a harmonised and verifiable boda-boda registration and management information system covering riders, motorcycles, owners, stages, routes and operating associations. The Boda-boda Registration and Information Management System (BRIMS) should reduce anonymity by linking rider identity, motorcycle registration, stage affiliation, licence status and contact information. Digital verification tools should be accessible to police, county enforcement officers, stage leaders and relevant transport regulators under clear data-protection safeguards. The effectiveness of registration is not hypothetical: in Nyeri County, the qualitative evidence reported in section 4.11 documented that structured registration and direct communication between stage chairmen and senior police officers were credited with an estimated seventy per cent improvement in sector security. Similarly, key informants in Mombasa reported

that approximately seventy per cent of the public expressed confidence in registered riders due to improved regulation, registration systems and public awareness. In Busia, strong stage registration and rider identification through registration numbers were identified by key informants as among the most effective interventions in the county. Registration should not be used only as a control mechanism. It should also protect legitimate riders by helping recover stolen motorcycles, identify fake riders, reduce wrongful arrests and support access to insurance, credit, training and social protection.

3. **Regulate Boda-boda Stages and Routes as Security Spaces**. County governments, security agencies and boda-boda associations and SACCOs should treat stages and routes as critical governance points. Each stage should have recognised leadership, a rider register, clear operating rules, complaint channels and mechanisms for disciplining non-compliant riders. This recommendation is directly grounded in the statistical evidence presented in section 4.4: the logistic regression analysis established that criminal control over stages and routes more than doubled the odds of organised criminal activity (odds ratio approximately 2.30, $p < 0.001$). The qualitative evidence in section 4.8 independently confirmed this finding: respondents in Mombasa described how unregistered riders operate outside recognised stages; in Bomet, territorial control by certain groups of riders was identified as a sign of emerging organised criminality; and in Marsabit, key informants reported that criminal actors control specific stages and routes that function as nodes in trafficking networks. The discussion in Chapter Five further argued that stage and route control is not merely a governance problem but a criminogenic mechanism in its own right. Stages with repeated crime reports should be reviewed through joint security meetings involving stage leaders, local administrators, police and community representatives. Where there is evidence of territorial control, role specialisation, intimidation or protection systems, the response should be intelligence-led and targeted at the controlling actors rather than the entire rider population.

4. **Adopt Intelligence-Led and Proportionate Security Responses**. Indiscriminate security operations often alienate legitimate boda-boda transport riders while allowing organised criminal groups to adapt and continue operating. Security agencies should therefore strengthen intelligence-led policing through crime analysis, offender profiling, surveillance, hotspot mapping and inter-agency intelligence sharing. The archival records in section 4.11.7 demonstrate the value of such an approach: the Marsabit court register reveals that criminal methods shifted from motorcycle

theft to immigration and human-trafficking offences over the course of a decade, while the Mombasa court register records a steady increase in case filings from 189 to 321 between 2022 and 2025. Both trends suggest that criminal activity evolves in response to enforcement, requiring adaptive intelligence rather than static responses. The percentage analysis in section 4.3.3 further showed that crime frequency and pattern intensity vary substantially by county, ranging from a frequency score of 53.0 per cent to 70.2 per cent and a pattern index of 2.0 per cent to 96.0 per cent, confirming that responses must be differentiated rather than uniform. Priority should be given to dismantling organised criminal networks involved in robbery, motorcycle theft, extortion, smuggling, drug trafficking and other transnational criminal activities linked to the boda-boda sector. Community policing initiatives should equally be strengthened to encourage confidential reporting and improve public confidence in law enforcement.

5. **Introduce Specialised and Commercial Boda-boda Rider Training and Job Opportunities to Address Socio-Economic Vulnerability in the Sector.** Crime prevention should include livelihood-oriented interventions through specialised boda-boda rider training to instil national values, ethical and moral standards. The quantitative analysis in sections 4.3 and 4.5 identified youth unemployment, poverty and low income as the most consistent socio-economic drivers of boda-boda-related crime, with Marsabit recording a crime frequency score of 70.2 per cent and the socio-economic vulnerability index correlating significantly with crime exposure. The qualitative evidence in section 4.11 gave these statistics a human face: FGD participants in Machakos stated that poverty is inevitable in the community and struggles for daily bread are real; riders in Bomet described hustling for survival from early morning until late at night; and key informants in Nyeri identified drug addiction and the emergence of a substance known as Kete as new criminal drivers, with drug-dependent youth resorting to phone snatching to fund the habit. The hospital records from Machakos, which documented 39 assault, rape and theft-related boda-boda crime patients in January 2026 alone (section 4.11.10), further illustrate the human cost of the sector's socio-economic vulnerability. County governments, youth agencies, financial institutions and boda-boda associations should support rider training, road safety education, financial literacy, savings groups, affordable insurance, debt-management support, alternative livelihood skills and structured pathways into jobs and formal employment or enterprise. Substance-abuse prevention and peer-mentorship programmes should be introduced at stage level,

particularly in counties where peer influence, drugs or alcohol were identified as reinforcing crime vulnerability.

6. **Protect the Boda-boda Sector from Political Patronage and Influential Persons' Exploitation, Misuse and Corruption.** The political misuse of youth in the boda-boda informal transport sector is very prevalent. It is commonly referred to as 'political goonism' in Kenya, while in Nigeria it is called 'political thuggery.' However, goons or thugs are easily transformed into organised criminal networks. If the networks are not checked they could mutate to armed groups capable of controlling neighbourhoods and regions, as was the case with Mungiki in Kirinyaga County between 2015 and 2022. The qualitative evidence in section 4.11 confirmed that this risk is not theoretical: FGD participants in Mombasa reported that it's them who organized themselves, politicians come and finance them especially during elections, while key informants in Marsabit alleged that some criminal networks benefit from protection by corrupt officials and politically connected actors. The discussion in Chapter Five argued that the connection between political patronage and organised rider groups is a recurrent finding across counties and represents a pathway through which incidental criminal involvement evolves into structured criminal organisation. But history has shown that political violence, unemployment and weak institutions can combine to produce insecurity on a scale that later becomes difficult to reverse. The common thread between the boda-boda transporters and political goons is the failure to create dignified economic opportunities for the youth. The result has been a country that produces millions of educated youth who are left to choose between unsafe boda-boda transport jobs, political thuggery, petty crimes or migration in search of survival. Jobs must be treated not as a mere economic policy goal but as a national security imperative. Additionally, security enforcement against political and national leaders' patronage should be key, notwithstanding combating criminal riders. County security committees should monitor politicians' and other national leaders' use of boda-boda groups during campaigns, demonstrations and public events.

7. **Strengthen Governance of Boda-boda Stages to Foster Anti-Corruption Measures.** Poorly regulated stages provide opportunities for criminal networks to operate with minimal oversight. The qualitative evidence in **section 4.11** documented the mechanisms through which corruption undermines security: key informants in Mombasa reported that suspects are released because of phone calls from powerful offices, while community leaders stated that information is given to police but no action is taken and individuals are arrested and released within few hours

under unclear circumstances, undermining public trust in the justice system. In Kirinyaga, a key informant described the justice system as very ineffective with no justice in court, lack of strategy, policy or legal framework. The archival records in section 4.11.7 provide documentary support for these perceptions: the rising case burden at the Mombasa Law Courts (from 189 cases in 2022 to 321 in 2025) without evidence of corresponding conviction rates suggests a gap between reporting and effective justice outcomes. County governments should therefore formally recognise boda-boda stages as local governance units with accountable leadership structures, verified rider registers, operational guidelines and transparent disciplinary procedures. Regular security forums involving stage officials, SACCO leadership, security agencies, National Government Administration Officers (NGAO) and community representatives should continuously assess security risks and coordinate interventions. Where organised criminal control is identified, enforcement should focus on those responsible rather than targeting compliant riders.

8. **Introduce GIS and Hotspot-Based Monitoring System.** Security and transport agencies at the county level should maintain updated GIS maps of boda-boda crime hotspots, high-risk routes, stages, market centres, border corridors, nightlife areas, informal settlements and escape routes. The spatial analysis in sections 4.10 demonstrated that boda-boda-related crime is not randomly distributed but concentrated in identifiable locations, with the DBSCAN clustering algorithm confirming localised hotspot clusters and the spatial crime risk index differing significantly across counties. The percentage analysis in section 4.3.3 showed that crime pattern intensity ranged from 2.0 per cent to 96.0 per cent by county, with Busia recording the most structurally pronounced crime patterns. The qualitative evidence in section 4.8 confirmed these spatial patterns from the ground: respondents in Mombasa identified Kisauni area as a hotspot; key informants in Marsabit listed Somare, Manyatta, Biashara Street, the Hellu–Ginnisa corridor and informal border crossing points as recurring crime locations; and respondents in Busia identified the bridge between Nasira and Bukalama and other border-adjacent areas. Both the qualitative and archival evidence showed that hotspots shift in response to enforcement, underscoring the need for dynamic monitoring. Hotspot maps should guide patrol deployment, lighting improvements, stage audits, surveillance points and community safety interventions. Priority should be given to remote roads, poorly lit areas, weakly regulated stages, border-linked routes, transport corridors, informal settlements, market hotspots and night-time activity zones—the spaces where the study found crime opportunities to be most concentrated.

9. **Strengthen Boda-boda Crime and Offences Investigation, Prosecution and Victim Support.** The criminal justice response should be strengthened beyond arrest. Cases involving motorcycle theft, robbery, assault, extortion, smuggling and organised criminal activity should be tracked from reporting to prosecution. The qualitative evidence in section 4.11 documented the consequences of weak prosecution: key informants in Mombasa described how suspects negotiate lower bond amounts in court and are released with amounts they can easily afford, while FGD participants in Kirinyaga reported that police response is often slow and that riders frequently organize their own investigations. Key informants in Busia noted that members of the public are often unwilling to testify in court due to concerns about personal safety and potential repercussions, and that individuals who report criminal activities often become targets of threats and victimization. The archival records in section 4.11 lend weight to these accounts: the Mombasa court register demonstrates the volume of cases entering the system, but without corresponding conviction data the numbers also raise questions about throughput and outcome. Weak prosecution undermines deterrence and encourages repeat offending. Victim support should include assistance to riders whose motorcycles are stolen, passengers who are attacked, traders who lose goods and residents affected by intimidation or violence. The hospital records from Machakos Level 5 (section 4.11.10), which documented 15 assault and rape cases and 39 total crime-related attendances in a single month, highlight the need for referral pathways between law enforcement and health services. Support systems should include reporting guidance, referral to services, follow-up information and protection from retaliation where necessary.

Table 6.2: County-Specific Intervention Priorities

County	Priority Areas for Intervention
Bomet	Stage and route governance, leadership accountability, territorial control, market-centre safety, and disruption of structured local criminal arrangements.
Busia	Border mobility control, fake registration checks, smuggling-route surveillance, market and corridor security, and targeting of proceeds-sharing networks.
Kirinyaga	Early prevention, remote-road surveillance, residential-estate safety, rider identification, and public reporting systems.
Machakos	Motorcycle theft prevention, ownership verification, recovery tracking, night patrols on isolated routes, and rider asset-protection mechanisms.
Marsabit	Remote-route patrols, frontier and long-distance corridor surveillance, improved police reach, reporting confidence, and opportunity reduction in sparsely monitored areas.

County	Priority Areas for Intervention
Mombasa	Urban hotspot policing, nightlife-zone safety, informal-settlement patrols, bribery and corruption control, and fake-registration detection.
Nyeri	Monitoring of repeated and coordinated offences, rider-victim protection, residential-estate safety, night-time mobility controls, and stage-level intelligence sharing.

Source: Author's synthesis of Objective One to Objective Five quantitative, qualitative and archival findings, 2026.

Table 6.3: Implementation Matrix for Key Recommendations

Recommendation Area	Responsible Actors	Key Actions	Expected Outcome
Securitize Boda-boda Informal Transport Sector	•Attorney General •National Assembly	• Fast-track the legal framework bill on the Boda-boda transport that is on the floor of the National Assembly	•Boda-boda legal framework
Develop an Integrated National Boda-boda Registration and Information Management System (BRIMS).	• Ministry of Transport & Trade • National Transport & Safety Authority (NTSA) • County Governments	• Formulate a policy on BRIMS • Installation of Digital verification tools	•National Policy on BRIMS •Digital Identification of Boda-bodas
Regulate Boda-boda Stages and Routes as Security Spaces.	•County transport departments in collaboration with Boda-boda Associations •NGAO, •County Police Commandant,	• Management of Stage registers. • Stage Operating Rules. • Discipline mechanisms. • Reporting structures. • Joint stage-security reviews.	•Improved accountability at transport nodes. •Curp territorial control by criminal actors •Curtail emergence of criminal gangs. •Control 'goonism' behaviour
Adopt Intelligence-Led & Proportionate Security Responses	•National Police Service •Director of Criminal Investigations •County Security Committees	Focus on: • Theft of Motorcycles • Repeat offenders, • Smugglers cross-boder routes, • protection networks, hotspot patterns.	Targeted disruption of criminal networks and arresting criminals without criminalising legitimate riders.
Introduce Specialised/Commercial Boda-boda rider trainings and Job opportunities to Address Socio-Economic Vulnerability in the Sector	•Ministry of Youth Affairs Sports and the Arts •National Youth Service (NYS). •County Governments, •Youth Agencies, •NGOs' •Financial Institutions •Boda-boda associations	• Crime prevention • Job and enterprise creation • Debt management • Substance-abuse • Instilling of national core values • Riders ethical and moral standards	•Reduced vulnerability to criminal recruitment •Patriotic citizens •Financial discipline •Moral uprightness •Relatively self-engaged citizen
Protect the Sector from Political Patronage and Influential persons Exploitation, Misuse and Corruption	•Ministry of Interior and Coordination of National Government •Ministry of Youth Affairs Sports and the Arts •County Security Committees	• Job and enterprise creation • Monitor political and influential leaders' activities in the counties • Fast track the Enactment of Boda-boda bill into law	•A free and secure environment for the boda-boda transport •Reduction of criminal activities •Well engaged youth in enterprises

Recommendation Area	Responsible Actors	Key Actions	Expected Outcome
	•Attorney General	• Enforcement of the law	•Unexploitable and morally upright youths
Strengthen Governance of Boda-Boda Stages to Forster Anti-Corruption Measures.	•NPS •County Security Committees •NGAO •Boda-boda associations	• Regulated boda-boda stages • Recognition of boda-boda stages • Boda-boda stages leadership structures • Security agency monitoring	•Improved deterrence against infiltration and exploitation •Governance regimes in the sector •Secure boda-boda operation environment
Introduce GIS and Hotspot-Based Monitoring System	•Ministry of Information Communication and Digital Economy (MICE) •County Security Committees •NPS	• Digitization of Counties transport network • Updated County GIS maps • Boda-boda crime hot spot mapping	•Secured remote routes •Well-lit stages & informal settlements •Border linked routes •Surveillance systems installations and monitoring
Strengthen Boda-boda Crime and Offences Investigation, Prosecution and Victim Support	•Criminal Justice System •NPS	• Criminal justice system strengthened beyond arrest • Fast tracked reporting and prosecution • Victim support • Reporting guidance	•Trust in justice system •Trust in enforcement agencies •Free and secure nation

Source: Authors' synthesis of quantitative, qualitative and archival evidence, 2026.

6.6 Contribution to Knowledge

The study contributes to knowledge by developing a comparative county-based understanding of boda-boda-related insecurity in Kenya. It shows that the security risks are not uniform but vary according to crime type, county context, institutional environment, socio-economic vulnerability, and spatial opportunity structures.

The study also contributes conceptually by distinguishing incidental criminal use from semi-organised and organised criminal activity within the boda-boda sector. This distinction is important because it prevents both underestimation of organised threats and over-criminalisation of legitimate riders.

Methodologically, the study demonstrates the value of integrating survey data, qualitative evidence, observation, document review, composite indices, inferential statistics, and GIS-based

spatial analysis. This integrated approach provides a fuller explanation of how boda-boda-related crime is experienced, structured, facilitated, and spatially distributed.

The study further contributes to national security scholarship by showing how informal transport systems can become security-relevant when mobility, weak regulation, livelihood pressure, institutional risk, and spatial vulnerability interact. It therefore expands the understanding of national security beyond conventional state-centred threats to include localised, livelihood-linked, and spatially concentrated forms of insecurity.

6.7 Suggestions for Further Research

A longitudinal study should be conducted to examine how boda-boda-related crime evolves over time and whether county-level interventions reduce crime, improve registration, and strengthen trust between riders and security agencies.

Further research should integrate police crime records, court data, insurance reports, motorcycle theft recovery records, GPS traces, and rider association databases to validate and enrich self-reported survey data.

A dedicated study on border counties should examine the relationship between boda-boda mobility, informal trade, smuggling routes, counterfeit goods, stolen motorcycles, and cross-border security governance.

Future studies should apply social network analysis to examine the structure of rider groups, stage leadership, criminal intermediaries, protection networks, and illicit-market connections.

Further research should examine the gendered dimensions of boda-boda-related insecurity, including women passengers, female riders, sexual harassment, night-time mobility, and reporting barriers.

Impact-evaluation research should be conducted on interventions such as digital registration, stage regulation, lighting, route patrols, community policing, and rider welfare programmes to determine which strategies work best in different county contexts.

6.8 Chapter Summary

This chapter summarized the study, presented the major findings, drawn conclusions, stated the hypotheses decisions, and proposed recommendations. The chapter has shown that boda-boda-related crime is a complex and differentiated phenomenon. It is shaped by crime opportunities,

livelihood vulnerability, weak institutions, county context, stage governance, route systems, and spatial concentration.

The central message of the chapter is that the boda-boda sector should not be treated as uniformly criminal. It is a legitimate livelihood system that requires protection, regulation, and partnership. At the same time, the sector contains vulnerabilities that organised and opportunistic criminal actors can exploit. Effective policy should therefore be targeted, intelligence-led, spatially informed, institutionally credible, and sensitive to the livelihoods of legitimate riders.

The recommendations proposed in this chapter provide a framework for strengthening boda-boda governance while protecting communities, riders, passengers, and local economies from crime. They also provide a basis for national and county actors to design proportionate interventions that address the specific forms, drivers, institutional weaknesses, and hotspot patterns identified in the study.

References

Abrahamsen, R., & Williams, M. C. (2011). *Security beyond the state: Private security in international politics*. Cambridge University Press.

Abrahamsen, R., & Williams, M. C. (2019). *Security beyond the state: Global security assemblages in international politics*. Cambridge University Press.

Adele, A., & Mensah, K. (2020). Electoral violence and the instrumentalization of informal youth networks in West and East Africa. African Conflict and Peacebuilding Review, 10(1), 55–76.

Agaba, J. T., & Ambe, I. M. (2018). Innovation and financial performance of boda boda operators in Kampala, Uganda. International Journal of Innovation and Technology Management, 15(4), 1850015.

Agbiboa, D. E. (2022). They eat our sweat: Transport labor, corruption, and everyday survival in urban Nigeria. Oxford University Press.

Agnew, R. (1992). Foundation for a general strain theory of crime and delinquency. *Criminology, 30*(1), 47–87. https://doi.org/10.1111/j.1745-9125.1992.tb01093.x

Akers, R. L. (1998). *Social learning and social structure: A general theory of crime and deviance*. Northeastern University Press.

Anselin, L., Cohen, J., Cook, D., Gorr, W., & Tita, G. (2000). Spatial analyses of crime. In D. Duffee (Ed.), *Criminal justice 2000: Measurement and analysis of crime and justice* (Vol. 4, pp. 213–262). National Institute of Justice.

Automobile Club d'Italia. (2026). Article 86 – Servizio di piazza con autovetture, motocicli e velocipedi con conducente o taxi [Taxi services with cars, motorcycles and bicycles]. Automobile Club d'Italia.

Brantingham, P. J., & Brantingham, P. L. (1993). Nodes, paths and edges: Considerations on the complexity of crime and the physical environment. *Journal of Environmental Psychology, 13*(1), 3–28. https://doi.org/10.1016/S0272-4944(05)80212-9

Brantingham, P. J., Brantingham, P. L., & Andresen, M. A. (2017). The geometry of crime and crime pattern theory. In R. Wortley & M. Townsley (Eds.), *Environmental criminology and crime analysis* (2nd ed., pp. 98–115). Routledge.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101.

Bryceson, D. F., Mbara, T. C., & Maunder, D. (2003). Livelihoods, daily mobility and poverty in sub-Saharan Africa. *Transport Reviews, 23*(2), 177–196. https://doi.org/10.1080/01441640309891

Ceccato, V., & Uittenbogaard, A. (2014). Space–time dynamics of crime in transport nodes. Annals of the Association of American Geographers, 104(1), 131–150.

Cervero, R., & Golub, A. (2007). Informal transport: A global perspective. *Transport Policy, 14*(6), 445–457. https://doi.org/10.1016/j.tranpol.2007.04.011

Chen, M. A. (2012). The informal economy: Definitions, theories and policies (WIEGO Working Paper No. 1). Women in Informal Employment: Globalizing and Organizing.

Clarke, R. V. (Ed.). (1997). *Situational crime prevention: Successful case studies* (2nd ed.). Harrow and Heston.

Cochran, W. G. (1977). *Sampling techniques* (3rd ed.). Wiley.

Cohen, L. E., & Felson, M. (1979). Social change and crime rate trends: A routine activity approach. *American Sociological Review, 44*(4), 588–608. https://doi.org/10.2307/2094589

Constitution of Kenya, 2010. (2010). Government of Kenya.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE.

Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*, 297–334. https://doi.org/10.1007/BF02310555

Department of Land Transport, Thailand. (2017). Ministerial Regulation on Provincial Committees and Conditions for Registration of Public Motorcycles (No. 2), B.E. 2560 (2017).

Department of Land Transport, Thailand. (2021). Regulation on Registration of Public Motorcycles (No. 3), B.E. 2564 (2021).

Doherty, J. (2017). Life (and limb) in the fast lane: Disposable people as infrastructure in Kampala's boda-boda industry. *Critical African Studies, 9*(2), 192–209. https://doi.org/10.1080/21681392.2017.1317457

Eck, J. E., & Weisburd, D. (1995). Crime places in crime theory. In J. E. Eck & D. Weisburd (Eds.), *Crime and place* (Crime Prevention Studies, Vol. 4, pp. 1–33). Criminal Justice Press.

Editorial. (2026, February 1). Boda-boda crisis turns livelihood into lawlessness. *The Standard*.

Ester, M., Kriegel, H.-P., Sander, J., & Xu, X. (1996). A density-based algorithm for discovering clusters in large spatial databases with noise. In E. Simoudis, J. Han, & U. M. Fayyad (Eds.), *Proceedings of the Second International Conference on Knowledge Discovery and Data Mining (KDD-96)* (pp. 226–231). AAAI Press.

European Union Agency for Asylum. (2026). Nigeria: Security situation—Banditry and kidnappings. EUAA.

Ezeibe, C. C., Nzeadibe, T. C., Ali, A. N., Udeogu, C. U., Nwankwo, C. F., & Ogbodo, C. (2017). Work on wheels: Collective organising of motorcycle taxis in Nigerian cities. International Development Planning Review, 39(3), 249–273.

Farrall, S., Jackson, J., & Gray, E. (2009). Social order and the fear of crime in contemporary times. Oxford University Press.

Felson, M., & Boba, R. (2010). Crime and everyday life (4th ed.). Thousand Oaks, CA: SAGE.

Felson, M., & Clarke, R. V. (1998). *Opportunity makes the thief: Practical theory for crime prevention* (Police Research Series Paper No. 98). Home Office, Policing and Reducing Crime Unit.

Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). SAGE.

Goodfellow, T. (2015). Taming the "rogue" sector: Studying state effectiveness in Africa through informal transport politics. *Comparative Politics, 47*(2), 127–147. https://doi.org/10.5129/001041515814224462

Goodfellow, T., & Mukwaya, P. (2021). Boda-boda transport and urban mobility in Kampala. Kampala: Makerere University, Department of Geography.

Goodfellow, T., & Titeca, K. (2012). Presidential intervention and the changing "politics of survival" in Kampala's informal economy. *Cities, 29*(4), 264–270. https://doi.org/10.1016/j.cities.2012.02.004

Hale, C. (1996). Fear of crime: A review of the literature. *International Review of Victimology, 4*(2), 79–150. https://doi.org/10.1177/026975809600400201

House of Representatives of the Philippines. (2026). Dy-led House vows to pass MC Taxi Law in 20th Congress. Manila: House of Representatives.

Institute for Security Studies. (2022). Organised motorcycle theft and cross-border trafficking in Kenya. Pretoria: ISS.

International Labour Organization. (2021). The informal economy in Kenya. Geneva: ILO.

International Labour Organization. (2024). Platform work in Uganda: Promoting decent work for all. Geneva: ILO.

Ivankova, N. V., Creswell, J. W., & Stick, S. L. (2006). Using mixed-methods sequential explanatory design: From theory to practice. *Field Methods, 18*(1), 3–20.

Jackson, J., & Gray, E. (2010). Functional fear and public insecurities about crime. British Journal of Criminology, 50(1), 1–22.

Kamara, T. (2023). Challenges faced by boda boda riders in Kampala (Master's thesis). Makerere University.

Kenya Institute for Public Policy Research and Analysis. (2022, August 23). *Five strategies to regulate the boda-boda transport subsector in Kenya*. KIPPRA.

Kibwana, J., & Mnyanyi, S. P. (2023). Biometric registration and the reduction of organized motorcycle crime: The case of Dar es Salaam. Tanzanian Journal of Development Studies.

Kiplagat, O. K., Ngetich, K., & Auya, S. (2024). Nature and types of motorcycle-related crimes in Nakuru East Sub-County, Nakuru County, Kenya. *European Journal of Humanities and Social Sciences, 4*(1), 24–33. https://doi.org/10.24018/ejsocial.2024.4.1.496

Kothari, C. R. (2004). *Research methodology: Methods and techniques* (2nd ed.). New Age International.

Kumar, A. (2011). *Understanding the emerging role of motorcycles in African cities: A political economy perspective* (SSATP Discussion Paper No. 13). World Bank/Sub-Saharan Africa Transport Policy Program.

Lee, Y., & Peltier-Thiberge, N. (2026). E-bodas are reshaping Kenya's transport labour market. Washington, DC: World Bank.

Loukaitou-Sideris, A., Liggett, R., & Iseki, H. (2002). The geography of transit crime: Documentation and evaluation of crime incidence on and around the Green Line stations in Los Angeles. Journal of Planning Education and Research, 22(2), 135–151.

Marsabit County Government. (2023). *County integrated development plan 2023–2027*.

Mawejje, J., Munyambonera, E., & Bategeka, L. (2016). Social networks and the informal economy: The boda-boda transport sector in Uganda (EPRC Research Series No. 126). Kampala: Economic Policy Research Centre.

Merton, R. K. (1938). Social structure and anomie. *American Sociological Review, 3*(5), 672–682. https://doi.org/10.2307/2084686

Ministry of Transportation, Indonesia. (2019). Minister of Transportation Regulation No. PM 12 of 2019 on safety protection for users of motorcycles used for public purposes. Jakarta: Ministry of Transportation.

Ministère de l'Intérieur. (2010). Un décret réglemente le transport de personnes à moto [A decree regulating motorcycle passenger transport]. Paris: République française.

Ministère de la Transition écologique. (2026). Taxi, VTC, VMDTR et CPA : réglementation des transports publics particuliers de personnes [Taxi, VTC, VMDTR and CPA: Regulation of public passenger transport]. Paris: République française.

Mombasa County Government. (2023). *Third county integrated development plan 2023–2027*.

Mugambi, E. M. (2021). *Motorcycle transport in Kenya and its security implications: A case of North Imenti Meru Sub-County* (Doctoral dissertation, Daystar University).

Mugenda, O. M., & Mugenda, A. G. (2003). *Research methods: Quantitative and qualitative approaches*. ACTS Press.

National Crime Research Centre. (2018). *Boda-boda motorcycle transport and security challenges in Kenya*. National Crime Research Centre.

National Crime Research Centre. (2025). Motorcycle-enabled insurgency and criminal mobility: Lessons from Nigeria's north-east. Nairobi: NCRC.

Newton, A., Partridge, H., & Gill, A. (2013). Crime and the bus network: A practical analysis of risk. Security Journal, 26(2), 128–150.

Oketch, C. (2018). Boda-boda operators, social organisation and regulation in Kampala (Master's thesis). Makerere University.

Okoye, C., & Oladipo, O. (2020). Transport unions and organised crime in Nigeria. African Security Review, 29(2), 175–193.

Olukoju, A. (2024). Motorcycle taxis and urban mobility in Nigeria: Historical perspectives on okada operations. Lagos Historical Review, 24, 1–20.

Oucho, J. O., & Bosco, J. (2020). Youth unemployment and informal livelihoods in African cities. Africa Development, 45(2), 1–18.

Pain, R. (2000). Place, social relations and the fear of crime: A review. Progress in Human Geography, 24(3), 365–387.

Paoli, L., & Vander Beken, T. (2014). Organised crime: A contested concept. In L. Paoli (Ed.), *The Oxford handbook of organised crime* (pp. 13–31). Oxford University Press.

Philippine Competition Commission. (2020). Motorcycles (MCs) as public transport and multi-homing approach. Manila: PCC.

Porter, G. (2014). Transport services and their impact on poverty and growth in rural sub-Saharan Africa: A review of recent research and future research needs. *Transport Reviews, 34*(1), 25–45. https://doi.org/10.1080/01441647.2013.865148

Prevention of Organised Crimes Act, No. 6 of 2010 (Kenya). (2010). Kenya Law.

Riisgaard, L., et al. (2024). Challenging the formality bias: The organization of informal work, working relations, and collective agency in Kenya and Tanzania. Development Policy Review.

Rwanda National Police. (2019). Road safety: Police launch operations against errant motorcyclists. Kigali: Rwanda National Police.

Rwanda National Police. (2022). Taxi-moto operators warned against concealing plate numbers. Kigali: Rwanda National Police.

Sampson, R. J., & Groves, W. B. (1989). Community structure and crime: Testing social-disorganization theory. *American Journal of Sociology, 94*(4), 774–802. https://doi.org/10.1086/229068

Sampson, R. J., Raudenbush, S. W., & Earls, F. (1997). Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science, 277*(5328), 918–924. https://doi.org/10.1126/science.277.5328.918

Shelley, L. I. (2014). *Dirty entanglements: Corruption, crime, and terrorism*. Cambridge University Press.

Sherman, L. W., Gartin, P. R., & Buerger, M. E. (1989). Hot spots of predatory crime: Routine activities and the criminology of place. *Criminology, 27*(1), 27–56. https://doi.org/10.1111/j.1745-9125.1989.tb00862.x

Skogan, W. G. (1990). Disorder and decline: Crime and the spiral of decay in American neighborhoods. University of California Press.

Sutherland, E. H. (1947). *Principles of criminology* (4th ed.). J. B. Lippincott.

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education, 2*, 53–55. https://doi.org/10.5116/ijme.4dfb.8dfd

Tyler, T. R. (2006). *Why people obey the law*. Princeton University Press.

Uganda Bureau of Statistics. (2023). Statistical abstract. Kampala: Author.

UN-Habitat. (2013). Informal transport in the developing world. Nairobi: UN-Habitat.

United Nations Office on Drugs and Crime. (2004). United Nations Convention against Transnational Organized Crime and the Protocols Thereto. New York: United Nations.

United Nations Office on Drugs and Crime. (2012). Transnational organized crime: The globalized illegal economy. Vienna: UNODC.

United Nations Office on Drugs and Crime. (2013). Transnational organized crime in Eastern Africa: A threat assessment. Vienna: UNODC.

United Nations. (2000). *United Nations Convention against Transnational Organised Crime and the Protocols Thereto*. United Nations.

United Nations Office on Drugs and Crime. (2024, November 14). *Explainer: How corruption facilitates organised crime*. United Nations Office on Drugs and Crime.

von Lampe, K. (2016). *Organised crime: Analysing illegal activities, criminal structures, and extra-legal governance*. SAGE.

Weisburd, D. (2015). The law of crime concentration and the criminology of place. *Criminology, 53*(2), 133–157. https://doi.org/10.1111/1745-9125.12070

Woodcock, J., & Graham, M. (2020). The gig economy: A critical introduction. Polity Press.

World Bank. (2012). Motorcycle taxis in Sub-Saharan Africa: The development challenge. Washington, DC: World Bank.

World Bank. (2020). Gender in urban transport in Nairobi, Kenya: Employment. Washington, DC: World Bank.

World Bank. (2022). Rural mobility and motorcycle taxis in Africa. Washington, DC: World Bank.

Appendices

Appendix I: Questionnaire

Introduction

Dear Respondent,

The National Defence University-Kenya is carrying out a study on the boda-boda informal transport sector and national security in Kenya. You have been selected to take part in this study because you are involved in the boda-boda sector. The purpose of this questionnaire is to gather information for academic use.

Your participation is voluntary. The information you provide will be treated with confidentiality and anonymity. Please do not write your name on this questionnaire.

Kindly answer all questions as honestly as possible by ticking the appropriate response or writing in the space provided.

Consent

1. Do you agree to participate in this study? ☐ Yes
   ☐ No

If **No**, stop the interview.

Interview Identification

2. Questionnaire No.: _____
3. Date of Interview: ____ / ____ / _____
4. County: _____
5. Sub-county: _____
6. Ward/Location: _____
7. Stage/Market/Node Code: _____
8. Interviewer Code: _____

SECTION A: DEMOGRAPHIC INFORMATION

9. Sex
   - ☐ Male
   - ☐ Female
   - ☐ Prefer not to say

10. Age group
    - ☐ 18–24 years
    - ☐ 25–34 years
    - ☐ 35–44 years
    - ☐ 45–54 years
    - ☐ 55 years and above

11. Marital status
    - ☐ Single
    - ☐ Married
    - ☐ Separated/Divorced
    - ☐ Widowed

12. Highest level of education completed
    - ☐ No formal education
    - ☐ Primary
    - ☐ Secondary
    - ☐ College/TVET
    - ☐ University
    - ☐ Other (specify) _____

13. For how long have you worked in the boda-boda sector? ☐ Less than 1 year
    - ☐ 1–3 years
    - ☐ 4–6 years
    - ☐ 7–10 years
    - ☐ More than 10 years

14. What is your position in the boda-boda sector? ☐ Rider/operator
    - ☐ Rider and owner
    - ☐ Hired rider
    - ☐ Stage official who also rides
    - ☐ Other (specify) _____

15. What is your average monthly income from boda-boda work? ☐ Below KSh 10,000
    ☐ KSh 10,001–20,000
    ☐ KSh 20,001–30,000
    ☐ KSh 30,001–40,000
    ☐ Above KSh 40,000

16. Do you have any other source of income? ☐ Yes
    ☐ No
    If yes, specify _____

SECTION B: OPERATIONAL CHARACTERISTICS OF BODA-BODA WORK

17. Are you attached to a registered boda-boda stage? ☐ Yes
    ☐ No

18. Are you a member of a boda-boda SACCO/association/group? ☐ Yes
    ☐ No

19. What type of work arrangement do you have? ☐ I own the motorcycle
    ☐ Hire-purchase
    ☐ Daily rental
    ☐ Employed rider
    ☐ Shared/borrowed motorcycle
    ☐ Other (specify) _____

20. On average, how many hours do you work per day? ☐ Less than 6 hours
    ☐ 6–8 hours
    ☐ 9–12 hours
    ☐ More than 12 hours

21. Which area do you mainly operate in? ☐ Urban centre
    ☐ Peri-urban area
    ☐ Rural area
    ☐ Highway corridor
    ☐ Border area
    ☐ Mixed routes

22. What do you mainly transport? ☐ Passengers only
    ☐ Goods only
    ☐ Both passengers and goods

23. At what time do you mostly operate? ☐ Morning
    ☐ Afternoon
    ☐ Evening
    ☐ Night
    ☐ Throughout the day

24. Does your stage/group maintain a register of riders and motorcycles? ☐ Yes
    ☐ No
    ☐ Not sure

25. How reliable is rider identification at your stage? ☐ Very reliable
    ☐ Reliable
    ☐ Moderate
    ☐ Unreliable
    ☐ Very unreliable

SECTION C: MANIFESTATIONS AND PATTERNS OF BODA-BODA-RELATED CRIME

26. Have you personally experienced any boda-boda-related crime in the last 12 months? ☐ Yes
    ☐ No

27. Have you witnessed boda-boda-related crime in the last 12 months? ☐ Yes
    ☐ No

28. Which forms of boda-boda-related crime are common in your area? (Tick all that apply)
    ☐ Theft of motorcycle
    ☐ Theft from passengers
    ☐ Robbery with violence
    ☐ Assault
    ☐ Kidnapping/abduction
    ☐ Smuggling
    ☐ Drug transport/distribution
    ☐ Extortion
    ☐ Bribery/corruption
    ☐ Political violence/intimidation
    ☐ Facilitation of escape after crime
    ☐ Sexual harassment/violence
    ☐ Other (specify) _____

29. How often do boda-boda-related crimes occur in your area? ☐ Never
    ☐ Rarely
    ☐ Sometimes
    ☐ Often
    ☐ Very often

30. Where do these crimes mostly occur? (Tick all that apply)
    ☐ Stage points
    ☐ Market centres
    ☐ Residential estates
    ☐ Remote roads
    ☐ Highways/main roads
    ☐ Border areas

☐ Informal settlements

☐ Entertainment centres

☐ Other (specify) _____

31. At what time do such crimes mostly occur? ☐ Early morning

☐ Daytime

☐ Evening

☐ Night

☐ Late night/very early morning

32. In your opinion, boda-boda-related crime in your area has:

☐ Increased significantly

☐ Increased slightly

☐ Remained the same

☐ Decreased slightly

☐ Decreased significantly

33. Who are the most common victims of boda-boda-related crime in your area? ☐ Riders

☐ Passengers

☐ Traders/business people

☐ Residents

☐ Women/girls

☐ Youth

☐ Other (specify) _____

34. How serious is boda-boda-related crime in your area? ☐ Not serious

☐ Slightly serious

☐ Moderately serious

☐ Serious

☐ Very serious

SECTION D: PERCEPTIONS OF SAFETY AND INSECURITY

35. How safe do you feel when operating in the following places?

Location	Very safe	Safe	Neutral	Unsafe	Very unsafe
Urban centres	☐	☐	☐	☐	☐
Market centres	☐	☐	☐	☐	☐
Remote roads	☐	☐	☐	☐	☐
Highway corridors	☐	☐	☐	☐	☐
Border areas	☐	☐	☐	☐	☐
Informal settlements	☐	☐	☐	☐	☐
Night operations	☐	☐	☐	☐	☐

36. Which situations expose riders to the greatest insecurity? (Tick all that apply)

☐ Carrying unknown passengers

☐ Operating at night

☐ Remote pickup/drop-off points

☐ Carrying goods for unknown clients

☐ Border-area operations

☐ Lack of police patrols

☐ Disputes among riders

☐ Election/political periods

☐ Other (specify) _____

37. Have you ever avoided certain routes or areas because of insecurity? ☐ Yes

☐ No

38. If yes, which routes/areas do you avoid most?

SECTION E: INDICATORS OF ORGANIZED CRIMINAL ACTIVITY

39. In your view, boda-boda-related crime in your area is mostly:
    ☐ Individual and spontaneous
    ☐ Group-based but irregular
    ☐ Organised and repeated
    ☐ Not sure

40. Which of the following signs suggest organised criminal activity in the boda-boda sector? (Tick all that apply)
    ☐ Same crimes happening repeatedly in similar ways
    ☐ Coordination among several riders
    ☐ Use of phones/digital communication for planning
    ☐ Presence of leaders/controllers
    ☐ Specific roles for different people
    ☐ Territorial control of stages/routes
    ☐ Protection by influential people
    ☐ Links to smugglers/drug traders/other criminal groups
    ☐ Sharing of proceeds
    ☐ Fake registration/identity concealment
    ☐ Other (specify) _____

41. Do you think some boda-boda operators in your area are connected to organised criminal groups? ☐ Yes
    ☐ No
    ☐ Not sure

42. How common is organised criminal involvement in the boda-boda sector in your area? ☐ Very rare
    ☐ Rare
    ☐ Moderate
    ☐ Common
    ☐ Very common

43. How often do you hear of repeated collaboration among the same offenders? ☐ Never
    ☐ Rarely
    ☐ Sometimes

☐ Often

☐ Very often

44. Are there stages/routes in your area that appear to be controlled by criminal actors? ☐ Yes

☐ No

☐ Not sure

45. Have you heard of boda-boda operators being used to support larger criminal activities?

☐ Yes

☐ No

If yes, specify _____

SECTION F: SOCIO-ECONOMIC FACTORS ASSOCIATED WITH BODA-BODA-RELATED CRIME

46. To what extent do the following factors contribute to boda-boda-related crime in your area?

Factor	Not at all	Low extent	Moderate extent	High extent	Very high extent
Youth unemployment					
Poverty/low income					
Debt pressure					
Lack of alternative jobs					
Substance abuse					
Peer influence					
Low education levels					
Family pressure/responsibility					

47. In your opinion, what is the single most important socio-economic factor behind boda-boda-related crime?

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48. Have financial pressures ever pushed riders in your area toward unlawful activities? ☐ Yes ☐ No ☐ Not sure

49. Are young riders more vulnerable to criminal recruitment than older riders? ☐ Yes ☐ No ☐ Not sure

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SECTION G: INSTITUTIONAL AND CONTEXTUAL CONDITIONS

50. How would you rate the effectiveness of the following in controlling boda-boda-related crime?

Institution/Structure	Very ineffective	Ineffective	Moderate	Effective	Very effective
Police					
NGAO/Chiefs/Assistant Chiefs					
County transport officers					
SACCOs/associations					
Stage leadership					
Community policing structures					

51. How common are the following conditions in your area?

Condition	Not common	Slightly common	Moderately common	Common	Very common
Weak rider registration					
Corruption in enforcement					
Political interference					
Poor coordination among agencies					
Weak stage discipline					
Low reporting of crime					

52. If you experience or witness crime, do you report it? ☐ Always
    ☐ Sometimes
    ☐ Rarely
    ☐ Never

53. If you do not report, what are the main reasons? (Tick all that apply)
    ☐ Fear of retaliation
    ☐ Lack of trust in police
    ☐ Corruption
    ☐ Case will not be followed up
    ☐ Time/cost of reporting
    ☐ Crime is seen as normal/minor
    ☐ Other (specify) _____

54. Do you believe corruption enables criminal activity in the boda-boda sector? ☐ Yes
☐ No
☐ Not sure

55. Do political actors sometimes use boda-boda operators for unlawful purposes? ☐ Yes
☐ No
☐ Not sure

SECTION H: SPATIAL DISTRIBUTION AND HOTSPOT PATTERNS

56. Are there specific routes, stages, or centres in your area where boda-boda-related crime is concentrated? ☐ Yes
    ☐ No

57. If yes, name them.

58. Which types of places are most likely to become crime hotspots? (Tick all that apply)
    ☐ Busy stages
    ☐ Market centres
    ☐ Border points
    ☐ Major junctions
    ☐ Remote feeder roads
    ☐ Informal settlements
    ☐ Entertainment/nightlife areas
    ☐ Bus parks/terminals
    ☐ Other (specify) _____

59. Why do you think these places become hotspots? (Tick all that apply)
    ☐ High traffic of people/goods
    ☐ Weak police presence
    ☐ Easy escape routes
    ☐ Poor lighting
    ☐ Presence of criminal groups
    ☐ Cross-border movement
    ☐ Weak stage control
    ☐ Other (specify) _____

60. Have crime hotspots in your area:
    ☐ Expanded
    ☐ Shifted to new areas
    ☐ Remained the same
    ☐ Reduced
    ☐ Not sure

SECTION I: NATIONAL SECURITY IMPLICATIONS

61. In your opinion, does boda-boda-related crime pose:
    ☐ Only a local crime problem
    ☐ Both a local crime and wider security threat
    ☐ A major national security threat
    ☐ Not sure

62. Which wider security concerns are linked to boda-boda-related crime? (Tick all that apply)
    ☐ Threat to public safety
    ☐ Disruption of trade/business
    ☐ Smuggling across borders
    ☐ Spread of illicit drugs
    ☐ Political violence
    ☐ Weakening trust in institutions
    ☐ Cross-county criminal movement
    ☐ Other (specify) _____

63. In your opinion, the boda-boda sector is:
    ☐ Mostly lawful but sometimes misused by criminals
    ☐ Equally divided between lawful work and crime
    ☐ Heavily infiltrated by criminals
    ☐ Not sure

SECTION J: RECOMMENDATIONS

64. Which measures would best reduce boda-boda-related crime in your area? (Tick all that apply)
    - ☐ Better rider registration and identification
    - ☐ Stronger SACCO/stage regulation
    - ☐ More police patrols
    - ☐ Better intelligence gathering
    - ☐ Youth employment programmes
    - ☐ Anti-drug interventions
    - ☐ Better lighting/CCTV
    - ☐ Community policing
    - ☐ Border control measures
    - ☐ Tougher penalties for offenders
    - ☐ Political accountability
    - ☐ Other (specify) _____
65. Which one of the above is the most important?

66. Please provide any additional comments on boda-boda transport and insecurity in your area.

Thank You

Thank you for taking part in this study.

Appendix II: Key Informant Interview Guide

National Defence University-Kenya

Study Title: Boda-Boda Informal Transport and National Security in Kenya: A Comparative Analysis of Security Threat Evolution Across Selected Counties in Kenya

1. Introduction

Dear Respondent,

The National Defence University-Kenya is carrying out a study on the boda-boda informal transport sector and national security in Kenya. You have been selected to participate because your role places you in a position to provide useful information on boda-boda operations, regulation, security, and crime-related issues.

The purpose of this interview is to gather information for academic purposes only. Your participation is voluntary. The information you provide will be treated with confidentiality, and your identity will not be disclosed in the final report. You may decline to answer any question or stop the interview at any time without any negative consequences.

With your permission, I would like to take notes and, where allowed, audio-record the interview to ensure accuracy.

2. Interview Identification Details

- Interview code: _____
- Date: ____ / ____ / _____
- County: _____
- Sub-county/Location: _____
- Venue: _____
- Name of interviewer: _____
- Start time: _____
- End time: _____

3. Respondent Profile

- Name of institution/organisation: _____
- Position/title of respondent: _____
- Category of respondent:
    - Stage leader

- SACCO/association official
- County transport officer
- NGAO officer
- Police officer
- Prosecutor
- Border/security officer
- Community leader
- CSO/NGO representative
- Other: _____

- Years in current role: _____
- Years working on boda-boda/security/community issues: _____

4. Consent

1. Do you agree to participate in this interview? ☐ Yes
   ☐ No
2. Do you consent to audio recording? ☐ Yes
   ☐ No

MAIN INTERVIEW QUESTIONS

SECTION A: Role of the Respondent and Institutional Context

1. Please briefly explain your current role and your main responsibilities.
2. How does your work relate to boda-boda operations in this area/county?
3. For how long have you been involved in issues related to transport, regulation, community administration, or security?
4. What kinds of boda-boda-related issues do you commonly deal with in your role?
5. Which institutions or actors do you normally work with on boda-boda-related matters?

Possible probes

- Stage leadership
- SACCOs/associations
- County government
- Police/NGAO
- Border agencies
- Local administrators
- Community groups
- Civil society organisations

SECTION B: Nature and Manifestations of Boda-Boda-Related Crime

6. In your view, what are the main forms of crime associated with the boda-boda sector in this county or locality?
7. Which of these crimes are most common, and which are most serious?
8. Who are the main victims of boda-boda-related crime in this area?
9. Are these crimes committed by riders themselves, outsiders using boda-boda transport, or a mix of both?
10. Have the forms of boda-boda-related crime changed over time? If yes, how?
11. Are there particular periods, seasons, or situations when these crimes tend to increase?

Possible probes

- Theft of motorcycles or parts
- Robbery and assault
- Smuggling
- Drug transportation
- Extortion
- Bribery/corruption
- Political violence
- Use of boda-boda for escape after crime
- Violence around stages or market centres

SECTION C: Patterns, Coordination, and Evolution of Crime

12. In your experience, are boda-boda-related crimes here mostly isolated incidents, or do they show signs of coordination and repetition?
13. What makes you say that?
14. Are there cases where the same people or groups appear repeatedly in these crimes?
15. Have you observed any form of planning, coordination, leadership, or division of roles in these activities?
16. Are there specific routes, stages, or territories that seem controlled or influenced by certain groups?
17. Do boda-boda-related crimes in this area suggest the presence of wider criminal networks?
18. In your opinion, how does crime in the boda-boda sector move from ordinary opportunistic offending to more organised criminal activity?

Possible probes

- Repeated collaboration
- Use of phones or digital communication
- Territorial influence
- Protection systems
- Links to smugglers, drug dealers, gangs, or political actors
- Continuity over time
- Role specialization

SECTION D: Indicators of Organised Criminal Activity

19. In your view, what signs would show that boda-boda-related crime has become organised rather than incidental?
20. Are there identifiable structures, leaders, brokers, financiers, or protectors behind some criminal activities?
21. Are there cases where riders are recruited, directed, or used by more powerful actors?
22. How do such groups avoid detection or accountability?
23. Are there indications of collusion with officials, community actors, or other institutions?
24. Do you think these criminal activities have expanded beyond one stage, one route, or one county?

Possible probes

- Concealment methods
- False registration/identity masking
- Corrupt protection
- Inter-county coordination
- Use of intimidation
- Repeat offending patterns
- Links to illicit markets

SECTION E: Socio-Economic Factors Associated with Boda-Boda-Related Crime

25. What social or economic conditions make the boda-boda sector vulnerable to crime in this area?
26. To what extent do youth unemployment, poverty, and livelihood pressures contribute to criminal involvement?
27. Are debt, daily remittance pressures, unemployment, or low incomes important in pushing some riders toward unlawful activities?
28. Does substance abuse play any role?
29. Are there certain categories of riders who seem more vulnerable to recruitment into criminal activity?
30. How do peer influence, social networks, or local group culture affect crime patterns in the sector?
31. Do you think lack of education or limited economic alternatives matters? How?

Possible probes

- Young riders
- Unregistered riders
- Newly arrived riders
- Hired vs owner-riders
- Drug/alcohol use
- Family pressure
- Informal survival economy

SECTION F: Institutional and Contextual Conditions

32. How effective are the current systems for regulating the boda-boda sector in this county?
33. Are rider registration, stage management, and membership systems strong enough to ensure accountability?
34. What institutional weaknesses make the sector vulnerable to criminal misuse?
35. How effective is coordination among police, county officials, NGAO, stage leaders, and SACCOs?
36. Are there corruption issues that affect enforcement or accountability?
37. Does political interference affect regulation or enforcement in the boda-boda sector?
38. How do local governance structures help reduce or, in some cases, enable boda-boda-related crime?
39. What challenges do institutions face when responding to boda-boda-related crime?

Possible probes

- Weak registration systems
- Incomplete records
- Poor monitoring
- Enforcement gaps
- Limited resources
- Fear of retaliation
- Poor case follow-up
- Weak discipline at stage level
- Conflicts between formal and informal control systems

SECTION G: Crime Reporting, Justice, and Response Mechanisms

40. How are boda-boda-related crimes usually reported in this area?
41. Do victims and witnesses generally report such crimes? Why or why not?
42. What happens after a report is made?
43. What are the main barriers to investigation, arrest, prosecution, or resolution of these cases?
44. Are there many repeat offenders?
45. How are disputes or minor offences handled at stage or community level?
46. In your experience, are formal justice systems or informal local mechanisms more influential in handling these cases?

Possible probes

- Police response
- Community silence
- Witness intimidation
- Weak evidence
- Out-of-court settlements
- Stage discipline
- Role of chiefs/elders/community leaders
- Prosecution difficulties

SECTION H: Spatial Distribution, Routes, and Hotspot Patterns

47. Are there particular places where boda-boda-related crime is concentrated?
48. Which routes, stages, markets, border points, settlements, or corridors are most affected?
49. Why do you think these areas become hotspots?
50. Are there differences between urban, rural, and border settings in how boda-boda-related crime occurs?
51. Are there routes that facilitate escape, concealment, or movement of illicit goods or offenders?
52. Have hotspots changed over time? Have they expanded, shifted, or intensified?
53. Are there linkages between this county and neighbouring counties or border areas in relation to boda-boda-related crime?

Possible probes

- Major roads and feeder roads
- Market centres
- Border crossing points
- Poorly monitored areas
- Congested urban spaces
- Remote or sparsely policed areas
- Transport terminals
- Inter-county movement

SECTION I: Community Perceptions and National Security Implications

54. How do local communities view the boda-boda sector in this area?
55. Do communities see the sector mainly as a livelihood system, a crime risk, or both?
56. In your view, when does boda-boda-related crime become a wider security issue rather than just a local law-and-order problem?
57. Are there cases where boda-boda-related crime affects trade, mobility, local governance, public trust, or inter-community relations?
58. Do you think some forms of boda-boda-related crime pose a threat to county security or national security? Please explain.
59. How does insecurity in the boda-boda sector affect ordinary riders who are not involved in crime?

Possible probes

- Fear and mistrust
- Damage to livelihoods
- Stigmatization of riders
- Cross-border or inter-county criminal movement
- Illicit markets
- Governance legitimacy
- Public safety

SECTION J: Existing Interventions and What Works

60. What measures are currently in place to manage the boda-boda sector and reduce crime?
61. Which of these measures seem to work well?
62. Which ones are not working well, and why?
63. Are there local innovations, community-based approaches, or stage-level controls that have been effective?
64. What role do technology, rider registration, digital records, or identification systems play in improving accountability?
65. What support do institutions need in order to respond more effectively?

Possible probes

- Stage registers
- SACCO discipline
- Vetting systems
- Licensing
- Patrols
- Surveillance/CCTV
- Public awareness
- Rider training
- Multi-agency coordination

SECTION K: Recommendations and Closing Reflections

66. What practical measures would you recommend reducing criminal misuse of the boda-boda sector?
67. What should county governments do?
68. What should national security and law-enforcement agencies do?
69. What should SACCOs, stage leaders, and rider associations do?
70. What should communities do?
71. What should be done differently in urban, rural, and border counties?
72. Is there anything else you would like to add that may help this study understand boda-boda-related crime and its evolution?

5. Interviewer Notes

General observations

Key themes emerging

Non-verbal cues/contextual issues

Follow-up issues for analysis

---

6. Suggested Category-Specific Probes

A. Stage Leaders

- How are riders admitted to the stage?

- What internal rules govern conduct and discipline?
- How are suspicious riders identified?
- What kinds of disputes are common at the stage?
- Have you observed outsiders using the stage for criminal activities?

B. SACCO/Association Officials

- How are members registered and verified?
- What accountability systems exist?
- How do you handle misconduct or criminal allegations?
- Are there weaknesses in membership control?
- Is there evidence of organised group behaviour within rider networks?

C. County Transport Officers

- What county regulations apply to boda-boda operations?
- What are the main policy and enforcement challenges?
- Are records and licensing systems adequate?
- How does the county coordinate with security agencies?

D. NGAO Officers

- What local administrative concerns arise from boda-boda operations?
- What complaints do communities raise most often?
- How are local conflicts involving riders handled?
- Are there administrative gaps that criminals exploit?

E. Police Officers

- What crime patterns involving boda-boda transport are most common?
- Are there identifiable hotspots or repeat offenders?
- Are some incidents linked to wider criminal networks?
- What are the major investigative and enforcement challenges?

F. Prosecutors

- What kinds of boda-boda-related cases reach prosecution?

- What evidentiary problems are common?
- Are there many repeat offenders or weak case files?
- Do some cases suggest organised criminal structures?

G. Border/Security Officers

- How is boda-boda transport used in border movement?
- Are there informal crossings or smuggling routes involving motorcycles?
- What kinds of goods or persons are moved?
- Are there cross-border criminal linkages involving boda-boda operators?

H. Community Leaders

- How do residents perceive boda-boda riders in this area?
- What social tensions or security complaints are common?
- How do communities distinguish lawful riders from criminal actors?
- How do local leaders respond to recurring insecurity?

I. CSO/NGO Representatives

- What kinds of governance, victim support, or reform issues do you observe?
- Are some groups more affected than others?
- What gaps exist in protection, justice, or regulation?
- What reforms would reduce harm without criminalizing the whole sector?

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7. Closing Statement

Thank you very much for your time and for sharing your views. Your responses are valuable to this study and will be used strictly for academic purposes.

……..

Appendix III: Focus Group Discussion Guide

National Defence University-Kenya
Study Title: Boda-Boda Informal Transport and National Security in Kenya: A Comparative Analysis of Security Threat Evolution Across Selected Counties in Kenya

1. Introduction

Dear Participants,

The National Defence University-Kenya is carrying out a study on the boda-boda informal transport sector and national security in Kenya. You have been invited to take part in this discussion because you belong to a group whose views and experiences are important to this study.

The purpose of this discussion is to gather information for academic purposes only. We are interested in your experiences, observations, and opinions regarding boda-boda operations, crime, insecurity, regulation, and the conditions under which criminal activities may become more organised.

Your participation is voluntary. The information shared in this discussion will be treated with confidentiality. Your names will not appear in the final report. Because this is a group discussion, we kindly ask all participants to respect one another and to keep what is shared here private.

There are no right or wrong answers. We are interested in your honest views and experiences. Please allow each participant an opportunity to speak, and feel free to agree, disagree, or build on what others say in a respectful way.

With your permission, the discussion may be audio-recorded to help ensure accuracy. Notes will also be taken during the discussion.

2. FGD Identification Details

- FGD code: _____
- Date: ____ / ____ / _____
- County: _____
- Sub-county/Location: _____
- Venue: _____
- FGD category: _____
- Number of participants: _____
- Moderator: _____
- Note-taker: _____
- Start time: _____
- End time: _____

3. Participant Category

Tick one:

☐ Boda-boda riders

☐ Stage leaders

☐ Community leaders/residents

☐ Other relevant local category: _____

Your proposal indicates that these are the main categories proposed for FGDs, with room for slight variation depending on county context and feasibility.

---

4. Consent

1. Do all participants agree to take part in this discussion? ☐ Yes
   ☐ No
2. Do participants agree to audio recording? ☐ Yes
   ☐ No

5. Moderator Opening Script

Thank you for agreeing to participate in this discussion. We are here to talk about the boda-boda sector, how it operates in this area, and how issues of crime and insecurity affect riders, stage structures, and the community.

This is a group discussion, so we would like everyone to participate. Please speak one at a time, allow others to finish, and respect different opinions. We are not asking anyone to name specific criminals or to share information that may place them at risk. We are more interested in general experiences, patterns, perceptions, and suggestions.

Before we begin, let us briefly introduce ourselves using only first names or preferred names.

6. Ground Rules

- Speak one at a time.
- Respect different opinions.
- Allow everyone a chance to contribute.
- Avoid mentioning names of suspects or sharing highly sensitive details.

- Keep the discussion confidential.
- There are no right or wrong answers.

7. Warm-Up Questions

1. Please briefly introduce yourself by telling us your first name or preferred name and your connection to the boda-boda sector or this community.
2. How important is the boda-boda sector in this area?
3. What role does boda-boda transport play in people's daily lives here?

Possible probes

- Transport and mobility
- Employment and livelihoods
- Market access
- Emergency transport
- Rural or urban access
- Border movement where applicable

MAIN DISCUSSION THEMES

SECTION A: General Nature of Boda-Boda Operations in the Area

4. How would you describe boda-boda operations in this area?
5. What are the common characteristics of riders, stages, and routes here?
6. How are riders organised in this area?
7. Are most riders attached to stages or SACCOs, or do many operate informally?
8. What kinds of relationships exist between riders, stage leaders, community members, and local authorities?

Possible probes

- Stage organisation
- SACCO membership
- Daily work arrangements
- Informal and formal rules
- Mobility patterns
- Day vs night operations
- Urban, rural, or border realities

SECTION B: Experiences and Perceptions of Crime in the Boda-Boda Sector

9. What kinds of crime or insecurity are commonly associated with the boda-boda sector in this area?
10. Which forms of crime are most common?
11. Which ones are most serious?
12. Who are usually the victims of these crimes?
13. Do these incidents involve riders themselves, outsiders using boda-boda transport, or both?
14. Compared with the past, do you think boda-boda-related crime has increased, decreased, or changed in nature?

Possible probes

- Theft of motorcycles or parts
- Robbery
- Assault
- Kidnapping/abduction
- Smuggling
- Drug movement
- Extortion
- Bribery/corruption
- Facilitation of escape after crime
- Political intimidation or violence
- Violence around stages or market centres

SECTION C: Group Norms, Rider Culture, and Collective Responses

15. How would you describe the culture or behaviour of boda-boda riders in this area?
16. Are there positive group norms that promote discipline and accountability?
17. Are there negative group norms that may encourage risky or unlawful behaviour?
18. How do riders or stage members respond when one of them is accused of misconduct or criminal involvement?
19. Are there pressures from peers that influence how riders behave?
20. In your opinion, how important is rider culture in shaping security or insecurity in this area?

Possible probes

- Loyalty among riders
- Silence or protection of colleagues
- Internal discipline
- Pressure to conform
- Competition over passengers/routes
- Acceptance of minor illegality
- Reputation of stages

SECTION D: Stage Governance and Accountability

21. How are stages managed in this area?
22. What role do stage leaders play in maintaining order and discipline?
23. Are there clear rules for admitting riders to the stage?
24. How easy or difficult is it to identify legitimate riders?
25. How are disputes handled at stage level?
26. Are there weaknesses in stage management that can be exploited by criminal actors?
27. In your view, are stage leadership structures helping to reduce crime or sometimes allowing it to continue?

Possible probes

- Rider registration
- Stage registers
- New rider verification
- Stage discipline
- Fines or sanctions
- Informal conflict resolution
- Capture of stage leadership
- Weak accountability

SECTION E: Community Perceptions and Local Safety

28. How do people in this community generally view boda-boda riders?
29. Do community members trust riders in this area? Why or why not?
30. Are there tensions between riders and residents or between riders and other actors?
31. How does boda-boda-related crime affect the wider community?
32. Are there particular groups in the community who are more affected than others?
33. How do community members respond when boda-boda-related crime becomes common?

Possible probes

- Fear and mistrust
- Stigma against riders
- Residents' complaints
- Women's safety concerns
- Business and market impacts
- Youth involvement
- Vigilantism
- Community-police relations

SECTION F: Organised Criminal Tendencies and Threat Evolution

34. In your view, are most boda-boda-related crimes here isolated and opportunistic, or do they show signs of planning and coordination?
35. What makes you think so?
36. Have you observed repeated patterns involving the same people, stages, routes, or methods?
37. Are there signs of group coordination, territorial influence, or repeated collaboration?
38. Are some riders or stages believed to be linked to wider criminal networks?
39. Do criminal activities in this sector appear to be becoming more organised over time?
40. How would you describe the process through which ordinary criminal misuse may grow into organised criminal activity?

Possible probes

- Repeated collaboration
- Use of phones/digital coordination
- Leadership or controllers
- Role differentiation
- Territorial control
- Protection networks
- Links to drug trade, smuggling, gangs, or political actors
- Expansion across routes or counties

SECTION G: Socio-Economic Factors

41. What social and economic conditions make some people vulnerable to involvement in boda-boda-related crime?
42. How important are unemployment and poverty in this area?
43. Does debt pressure or low income contribute to criminal behaviour among some riders?
44. Does substance abuse play any role?
45. Are younger riders more vulnerable to being drawn into crime?
46. How do peer influence, livelihood insecurity, or family pressure affect behaviour in the sector?

Possible probes

- Unemployment
- Poverty
- Debt
- Daily remittance pressure
- Limited alternatives
- Drug/alcohol abuse
- Education levels
- Migration and instability
- Family responsibilities

SECTION H: Institutional and Contextual Conditions

47. How effective are the institutions responsible for managing or regulating the boda-boda sector in this area?
48. What are the main weaknesses in regulation, enforcement, or coordination?
49. How effective are stage leadership, SACCOs, police, chiefs, and county authorities in responding to insecurity?
50. Are there corruption issues that affect accountability?
51. Does political interference affect the boda-boda sector here?
52. What local conditions make crime easier to commit or harder to control?

Possible probes

- Weak registration systems
- Weak enforcement
- Corruption
- Limited patrols
- Poor coordination
- Political protection
- Weak local administration
- Weak case follow-up
- Fear of retaliation

SECTION I: Spatial Distribution, Routes, and Hotspots

53. Are there particular places where boda-boda-related crime is more common?
54. Which stages, routes, market centres, settlements, or corridors are most affected?
55. Why do you think those places become hotspots?
56. Are there differences between town centres, rural roads, and border areas in the way crime occurs?
57. Are there routes commonly used for escape, concealment, or movement of illegal goods?
58. Have crime hotspots changed over time?

Possible probes

- Busy stages
- Major junctions
- Market centres
- Informal settlements
- Border points
- Remote feeder roads
- High-traffic corridors
- Poorly policed areas
- Expansion or shifting of hotspots

SECTION J: County Context and Comparative Realities

59. What is unique about this county or locality in relation to boda-boda operations and insecurity?
60. Are the problems here mainly urban, rural, border-related, or mixed?
61. How do local economic, social, and security conditions shape what happens in the boda-boda sector here?
62. Do you think the challenges in this county are different from those in other counties? In what ways?

Possible probes

- Dense commercial activity
- Agricultural transport systems
- Cross-border trade
- Frontier mobility
- Road network patterns
- Population density
- Local governance

SECTION K: Practical Solutions and Recommendations

63. What measures would help reduce crime in the boda-boda sector in this area?
64. What should riders themselves do?
65. What should stage leaders and SACCOs do?
66. What should the community do?
67. What should county government and national government agencies do?
68. What should security and law-enforcement agencies do differently?
69. What practical changes would improve accountability without unfairly targeting all riders?
70. Is there any other recommendation you would like to make?

Possible probes

- Better rider registration
- Stronger stage discipline
- Stronger SACCO systems
- Community policing
- Better lighting and surveillance
- Youth employment support
- Anti-drug programmes
- Border controls
- Intelligence-led policing
- Multi-agency coordination

8. Category-Specific Probes

A. For Boda-Boda Riders

- What everyday risks do riders face in this area?
- Are some riders unfairly associated with crime because of the behaviour of a few?
- How do riders identify suspicious passengers or jobs?
- What kind of pressure do riders face from peers, customers, or criminal actors?

- What internal rider practices help prevent crime?

B. For Stage Leaders

- How are riders verified before joining a stage?
- What mechanisms exist for discipline and accountability?
- How are disputes and complaints handled?
- Are there stages that are more vulnerable to criminal infiltration?
- What support do stage leaders need to manage security better?

C. For Community Leaders/Residents

- How has boda-boda transport changed local safety in this area?
- Do people fear some routes, stages, or time periods more than others?
- How does the community distinguish between lawful riders and criminal actors?
- What role can the community play in prevention and accountability?

These group categories are directly reflected in Table 3.21 of your proposal.

9. Moderator Closing Questions

71. Of everything discussed today, what do you think is the most important issue affecting the boda-boda sector in this area?
72. What is the one message you would want policymakers or security agencies to hear from this group?
73. Is there anything important that we have not asked about?

10. Moderator Notes

General atmosphere of discussion

Main areas of agreement

Main areas of disagreement

Strong quotes/themes to follow up

Group dynamics and notable observations

11. Closing Statement

Thank you very much for your time and for sharing your views. Your contributions are valuable and will help improve understanding of boda-boda operations, insecurity, and the conditions under which criminal activity may evolve within the sector.

Appendix IV: GIS/Spatial Data Collection Tool

(This was computer generated based on guidance to specific Team Leader per County)

Appendix V: Pilot Study Summary

A pilot study was conducted in Nairobi and Migori counties to test the suitability, clarity, reliability, validity, logistical feasibility, ethical appropriateness, and spatial-data readiness of the research instruments before the main study. The pilot was designed to assess whether the tools could adequately capture boda-boda-related crime manifestations, indicators of organised criminal activity, socio-economic drivers, institutional and contextual conditions, and spatial hotspot patterns.

Nairobi and Migori were selected because they represented contrasting transport-security environments. Nairobi provided a dense urban and metropolitan setting characterised by high commuter movement, informal settlements, market nodes, transport corridors, and complex enforcement interactions. Migori provided a rural, peri-urban, lakeside, and border-influenced setting characterised by feeder roads, market-day mobility, remote routes, cross-border movement, and dispersed policing conditions. This contrast enabled the study to test whether the same instruments could be applied across different operational contexts while still generating comparable data.

The pilot adopted a mixed-methods approach. Data were obtained from structured questionnaires, key informant interviews, focus group discussions, observation records, GIS/spatial records, node registers, pathway registers, and county road and boundary shapefiles. A total of 646 usable questionnaire records were reviewed, comprising 374 records from Nairobi and 272 records from Migori. The qualitative and spatial datasets included KII records, FGD summaries, GIS site records, node records, and pathway information. These data sources enabled triangulation between quantitative responses, stakeholder narratives, community perspectives, field observations, and mapped spatial evidence.

The pilot confirmed that the instruments were broadly suitable for the main study. Respondents were generally able to understand and respond to questions on crime exposure, types of boda-boda-related crime, perceptions of organised criminal activity, socio-economic pressures, institutional weaknesses, and hotspot locations. The findings also confirmed the usefulness of distinguishing between incidental criminal use of boda-bodas and more organised or repeated

criminal activity involving coordination, planning, protection, territorial control, or links to wider criminal networks.

In Nairobi, the pilot demonstrated that the instruments could capture a complex urban security environment. Respondents reported high levels of witnessed boda-boda-related crime, concerns about motorcycle theft, theft from passengers, robbery, corruption, drug transport, political misuse, and organised criminal activity. Spatial evidence pointed to clustering around high-mobility areas such as central business and bus-station zones, markets, informal settlements, dense residential estates, and major commuter corridors. Nairobi therefore confirmed the relevance of questions on stage governance, SACCO membership, enforcement, corruption, market activity, and urban hotspots.

In Migori, the pilot showed that the instruments were also applicable in rural, peri-urban, lakeside, and border-related settings. Respondents highlighted motorcycle theft, parcel theft, robbery, night operations, remote feeder roads, informal routes, and cross-border movement as important security concerns. Spatial evidence identified important nodes and routes around Migori Town, Nyatike, Muhuru/lakeside areas, Awendo–Rongo corridor, Kuria/Kehancha areas, Kakrao/Uriri, and Isebania/Makerero border points. The Migori pilot therefore confirmed the need for the main study to pay attention to border mobility, rural roads, market nodes, night-time operations, and unregistered operators.

The pilot also generated important lessons on data quality and instrument refinement. Some discrepancies were observed between dashboard totals and direct questionnaire row counts, indicating the need for automated respondent-ID-based record tracking. Categorical responses also showed inconsistencies in spelling, capitalization, and formatting, confirming the need for dropdown validation lists linked to a codebook. Income categories required clearer coding to avoid spreadsheet distortion, while GIS coordinate fields required stronger controls, including separate latitude and longitude fields, coordinate-range validation, node codes, route codes, and coordinate-verification checks.

The qualitative tools were found to be useful but required refinement. Some key informant interview questions were long or multi-part and needed to be shortened for clarity. Questions

dealing with corruption, criminal groups, political misuse, and organised crime required careful wording, privacy safeguards, skip options, and interviewer training to protect both respondents and field researchers. The pilot therefore reinforced the importance of ethical sensitivity when collecting security-related data.

Overall, the pilot study strengthened the methodological foundation of the main study. It confirmed that the research instruments could generate relevant quantitative, qualitative, and spatial data across contrasting county contexts. It also showed that the study's main constructs were understandable and analytically useful. However, before full deployment, the tools required refinement in question wording, response standardization, data-entry validation, GIS coding, sensitive-question protocols, and fieldwork supervision. The pilot therefore provided both substantive insight into boda-boda-related security patterns and practical guidance for improving the reliability, validity, and safety of the main study.

Appendix VI: R Scripts for Data Management, Statistical Analysis and Spatial Analysis

This appendix presents the R scripts used to manage, clean, analyse and visualize the quantitative, qualitative and spatial datasets for the study. The scripts were developed and executed in RStudio using a structured project directory to ensure transparency, reproducibility and consistency across all stages of analysis. The R workflow followed the objectives of the study and was organised into separate scripts for project setup, data import, data cleaning, descriptive analysis, inferential statistical testing, qualitative theme summarisation and spatial hotspot analysis.

The analysis was based on three main quantitative datasets: the merged questionnaire dataset, the merged observation dataset and the merged GIS/spatial dataset. In addition, qualitative transcript files were incorporated to support mixed-methods interpretation for each study objective. All datasets were stored in the project data folder, while generated tables, figures, cleaned datasets and spatial outputs were saved in designated output folders.

The R scripts were arranged as follows:

Project Setup and Helper Functions.
This script set the working directory, loaded the required R packages, defined the main data file paths, created output folders and prepared helper functions used across the analysis. These helper functions supported data import, variable cleaning, recoding, frequency tabulation, index construction and export of results.

R Script for Objective One Analysis
This script analysed the forms, frequency, locations, time patterns and victim profiles of boda-boda-related crime. It generated descriptive summaries, county-level comparisons, crime exposure indices, frequency tables, statistical tests and qualitative theme summaries related to crime patterns.

R Script for Objective Two Analysis
This script examined whether boda-boda-related crime was incidental, semi-organised or organised. It constructed an organised criminality index, classified cases into criminality categories, compared patterns across counties and produced statistical outputs and qualitative summaries related to criminal organisation, coordination and repeat offending.

R Script for Objective Three Analysis
This script assessed the socio-economic factors associated with boda-boda-related crime. It analysed variables related to unemployment, income, debt, education, livelihood pressure, substance use, peer influence and other socio-economic conditions. The script produced descriptive statistics, county-level summaries, correlation tests, regression models and qualitative theme summaries.

R Script for Objective Four Analysis
This script assessed institutional and contextual factors influencing boda-boda-related crime. It examined variables related to policing, licensing, regulation, registration, coordination, corruption, enforcement, association leadership and reporting mechanisms. The analysis

generated institutional risk and effectiveness indices, statistical tests, regression models and qualitative summaries.

R Script for Objective Five Spatial Analysis

This script analysed the spatial distribution and hotspot patterns of boda-boda-related crime. It cleaned and processed latitude and longitude values, converted records into spatial objects, generated spatial risk indices, mapped the distribution of risk sites and applied clustering procedures to identify possible hotspot patterns. The script also produced spatial summaries by county and qualitative summaries related to crime locations, routes, stages, corridors and hotspots.

The use of R enhanced the reproducibility of the study by allowing all analytical procedures to be documented, reviewed and repeated. The scripts also ensured that data cleaning, transformation, statistical testing and visualization were carried out systematically across the five study objectives. Outputs generated from the R analysis were used to support the presentation of findings in the main chapters of the study.

Appendix VII: The NDU-K Research Team

Brig (Dr) David Ngochi Ngari, PhD (Seat)	-	Principal Investigator and Overall coordinator

Migori & Marsabit (Moyale) County Research Team

Col (Dr) Emmanuel P Kondortiony, PhD (Seat)	-	Researcher/ Team Leader.
Maj Christopher Lokale (Seat)	-	Assistant Researcher.
Capt Keren Chepchirchir (DCHS)	-	Assistant Researcher.
Cpl Tonny Emuria (Seat)	-	Research Clerk.

Migori & Busia County Research Team

Dr Edward Namusasi Masibayi, PhD (IPSTC)	-	Researcher/ Team Leader
Capt Tonny Maingi Muguna (Seat)	-	Assistant Researcher.
Ms Teresia Atieno Kochumba (Seat)	-	Assistant Researcher.
Ssgt Oliver Mujei (Seat)	-	Research Clerk.

Migori & Bomet Research Team

Dr Zedekia Sidha, PhD (IPSTC)	-	Researcher/Team leader.
Lt Col Dennnis Walobwa Ndalira (Seat)	-	Assistant Researcher.
Mr Patrick Gichubi Macharia (Seat)	-	Assistant Researcher.
Mr Denis Kinoti Mwaki (Seat)	-	Assistant Researcher.
Ms Maureen Kamau Wanjiru (Seat)	-	Assistant Researcher.

Nairobi/ Mombasa Research Team

Dr Lilian Wanjiku Macharia, PhD (IPSTC)	-	Researcher and Team leader.
Capt Calvin Kazungu Saro (Seat)	-	Assistant Researcher.
Sgt Purity Nabalayo Sitati (Seat)	-	Research Clerk

Nairobi & Machakos Research Team

Lt Col Esther Kahiri (KMA)	-	Researcher and Team leader.
Mr Cyrus Kioko (DEFTEC)	-	Assistant Researcher.
Ms Rachael Wangari Thuku (DEFTEC)	-	Assistant Researcher.
Ms Janet Mueni (Seat)	-	Research Clerk.

Nairobi & Nyeri Research Team

Ms Jacqueline Njeru (NDC)	-	Researcher/ Team Leader.
Col (Fr) George Maingi (Seat)	-	Assistant Researcher.
Maj Mourine Achieng' Marango (DIA)	-	Assistant Researcher.
Ssgt June Opiyo Ochola (Seat)	-	Research Clerk.

Kirinyaga County Team

Brig (Dr) D N Ngari (Seat)	-	Principal Investigator and Overall Coordinator
Ms Jacqueline Njeru (NDC)	-	Researcher/ Team leader.
Maj Mourine Achieng' Marango (DIA)	-	Assistant Researcher.
Capt Keren Chepchirchir (DCHS)	-	Assistant Researcher.
Mr Cyrus Kioko (DEFTEC)	-	Assistant Researcher.
Ms Rachael Wangari Thuku (DFTEC)	-	Assistant Researcher.
Ssgt June Opiyo (Seat)	-	Research Clerk.
Sgt Purity Sitati (Seat)	-	Research Clerk.

Appendix VIII: NACOSTI Research License



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Date of Issue: **11/May/2026**

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