



NATIONAL DEFENCE UNIVERSITY- KENYA

BUSINESS INTELLIGENCE AND TAX COMPLIANCE IN KENYA

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ADM ND601/0082/2023

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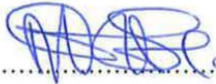
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**A RESEARCH THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENT OF MASTER OF ARTS IN NATIONAL
SECURITY AND STRATEGY, NATIONAL DEFENCE UNIVERSITY-
KENYA**

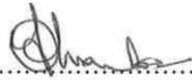
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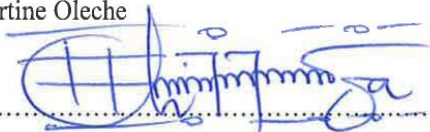
This Master's Thesis is my original work and has not been presented for a degree in any other university or for any other award.

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DEDICATION

I dedicate this thesis to my beloved family, whose unwavering love, support, and understanding have been invaluable throughout this journey. To my spouse, Evalyne Muthama, thank you for your endless patience, encouragement, and belief in me. To my wonderful daughters, Salma and Naya Nyambura, you are my greatest inspiration. This accomplishment is as much yours as it is mine

ACKNOWLEDGEMENT

I am grateful to Almighty God for granting me the opportunity to learn and advance my skills in this institution. I sincerely thank the Kenya Revenue Authority and specifically the Commissioner General for granting me the opportunity to be a participant in this prestigious institution.

I acknowledge the Vice chancellor, National Defence University, the Commandant, National Defence College, the entire faculty members and my fellow distinguished participants of course 26 of 2023/2024. I thank my supervisor's Dr Martine Oleche and Maj (Dr) Cliff Ooga Obwogi, PhD for their guidance during the whole process. In addition, I would like to extend my deepest gratitude to everyone who helped with the development of this research project. I appreciate my mentors and advisors for providing me with essential advice and assistance during this journey.

Finally, I would also like to express my gratitude to the study respondents for being so open to sharing their thoughts and experiences in my research topic. Without the combined efforts of all of these people, this research would not have been a success.

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ABBREVIATION AND ACRONYMS

AI:	Artificial Intelligence
BI:	Business Intelligence
EU:	European Union
GDP:	Gross Domestic Product
GIS:	Geographic Information System
ICT:	Information and Communication Technology
ICT:	Information and Communication Technology
ICTA:	Information and Communication Technology Authority
IFRS:	International Financial Reporting Standards
IMF:	International Monetary Fund
IRB:	Institutional Review Board
IRS:	Internal Revenue Service
IT:	Information Technology
KRA:	Kenya Revenue Authority
NGOs:	Non-Governmental Organizations
SDGs:	Sustainable Development Goals
TSOs:	Tax Service Offices
UN:	United Nations
USAID:	United States Agency for International Development

OPERATIONAL DEFINITION OF TERMS

Business Intelligence (BI): BI involves the utilization of various analytical techniques such as business information analytics, data mining, data visualization, and robust data infrastructure to gather, analyze, and interpret information about organizations or individuals. In the case of tax authorities like the Kenya Revenue Authority (KRA), BI tools and techniques are employed by officials to gain deeper insights into taxpayers' activities, transactions, and financial information. This enables tax authorities to detect potential discrepancies, inaccuracies, or instances of tax evasion, thereby ensuring compliance with tax regulations and maximizing revenue collection

Economic growth: Refers to an increase in a country's output of goods and services as measured by changes in real Gross Domestic Product

Inferential statistics: This is the process of using data analysis from a sample to infer to the population. It helps the analyst to come up with conclusions and make decisions of the population based on the sample.

Tax avoidance: involves the legitimate use of legal methods and strategies to minimize the amount of income tax that an individual or business is required to pay. Unlike tax evasion, tax avoidance relies on exploiting loopholes or taking advantage of tax incentives, deductions, credits, and exemptions provided within the framework of tax laws.

Tax compliance: refers to the degree to which taxpayers adhere to the tax laws and regulations of a country. It encompasses the full spectrum of taxpayer behaviour, ranging from complete adherence and accurate reporting to non-compliance, including underreporting income, evading taxes, or failing to fulfil tax obligations altogether. Effective tax compliance is essential for maintaining the integrity of the tax system, ensuring fairness, and generating revenue to fund public services and government operations.

Tax evasion: refers to the illegal act of intentionally avoiding payment of taxes that one is legally obligated to pay. This can involve various deceptive practices, such as underreporting income, inflating deductions, hiding assets, or engaging in other fraudulent activities to evade taxes.

ABSTRACT

The integration of Business Intelligence (BI) is the main emphasis of this research project, which explores the crucial areas of tax compliance in Kenya because BI aids in informing and improving business entities decision making. The background of this project is defined by Kenya's dynamic economy and the crucial function that taxes play in fostering national advancement. As Kenya works to increase tax compliance, the study aims to provide insights into potential problems and opportunities connected to the adoption of BI in tax administration. This study's primary objective is to investigate the role of business intelligence in improving tax compliance in Kenya. To achieve this, a mixed-approaches research strategy that blends qualitative and quantitative research methods was used. This methodological decision offers a thorough understanding of the study issue by capturing both the complexity of stakeholders' points of view and the statistical patterns within the data. The Kenya Revenue Authority "(KRA) officials and staff who are in charge of tax collection, enforcement, and policy development provided data for this project. Structured questionnaire and interview guide were the key methods for acquiring data. The full investigation of the research objectives was ensured by this multimodal approach, which also captures the intricate dynamics of tax compliance and financial security. The quantitative data obtained through structured surveys was statistically analysed using descriptive and inferential statistics to determine how successfully BI technologies have boosted compliance. From the findings, it was clear that BI is a major determinant of tax compliance whereby it was observed that a change of BI by one unit increased tax compliance by 39 percent. On descriptive statistics, 54.5 percent believed that there was a positive relationship between Business Intelligence and tax compliance. In addition, data quality and accuracy was ranked as the most influential tool in improving the effectiveness of BI. Other significant factors were staff training on BI, Support from Top Management and security of the BI infrastructure. It was also evident from the analysis that for BI to be effective it must be integrated with other existing systems. Additionally, this study attempted to offer fact-based recommendations to Kenyan Policymakers and tax officials. The data analysis for the thesis offered beneficial recommendations for using BI to improve financial security and tax compliance. These recommendations were supported by the findings of empirical research and would help tax administration decision-makers make informed decisions. Finally, this research contributed to the greater conversation on effective tax administration and economic development in Kenya.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Current corporate strategy and governance procedures are undoubtedly impacted by analytics and business intelligence (BI). The integration of BI has taken on revolutionary power in a society driven by data. The goal of this study is to examine how BI is applied in Kenya to improve fiscal stability and tax compliance. By addressing the pressing issues faced by tax authorities and examining the potential benefits of data-driven tax administration, this study seeks to establish a comprehensive framework for employing technology to support economic stability and prosperity in Kenya.

Taxation is the primary source of revenue for all governments worldwide and an essential component of any nation's fiscal policy. Effective tax collection is crucial for Kenya's economy to continue expanding and improving, as it is in many other developing countries. Gichohi (2020) found that the Kenyan government still has issues in this area, including underreporting of income, tax evasion, and the sizeable informal economy. These difficulties have hindered the government's ability to provide public services and invest in necessary infrastructure, which has led to income deficits (Ritei, 2021). Problems with tax compliance have always plagued Kenya's tax system. Therefore, there still exists a substantial gap between expected tax revenue and actual tax collections despite the government's numerous tax reforms and policies throughout the years (Gichohi, 2020). Both the government and the taxpayers, who are in charge of making sure that taxes are allocated equitably, are concerned about this shortage in tax income.

Scholars, decision-makers, and international organizations have all paid close attention to the need for better tax compliance. The World Bank highlighted the importance of an efficient and open tax system in its "Doing Business" report for promoting economic growth and enticing investment (World Bank Group, 2020). The importance of strengthening tax administration to raise fiscal sustainability has also been emphasized by the International Monetary Fund (IMF) (International Monetary Fund, 2021). Additionally, recent changes in the structure of multinational corporations have increased the need for tax compliance. The focus placed on multinational corporations in particular for their tax practices has inspired measures worldwide to combat tax avoidance and evasion (Slemrod & Wilson, 2009). These developments show how important it is to address issues related to national tax compliance.

The limited application of data-driven efforts in tax administration exacerbates the difficulties of tax compliance even further. Traditional tax collection techniques typically lack the intelligence required to recognize patterns of tax evasion, claim Slemrod & Wilson (2009). Because of this restriction, business intelligence (BI) has the potential to be transformative. Both developed and developing nations are increasing their use of BI for tax administration. These changes could drastically alter how tax authorities gather, manage, and examine information about taxpayers' financial activity (Bird, 2008). By using data analytics, tax authorities can identify anomalies, identify tax evasion, and enhance overall compliance. Additionally, BI can provide perceptions into patterns in the behavior of taxpayers, enabling the development of targeted tax policy.

International examples clearly show the value of BI in tax compliance. The efficient application of these technologies by nations like Singapore and the US to improve tax administration has resulted in greater tax revenue collection and less tax evasion (Slemrod & Wilson, 2009). These successes serve as helpful benchmarks as Kenya attempts to address its problems with tax compliance. Despite the potential benefits of BI in the administration of taxes, in-depth research on this topic in the Kenyan setting is limited. Studies that have already been published, such as those by Wanjohi et al., (2010) and Bird and Zolt (2008), give little attention to the application of BI and instead focus mostly on the broad problems with taxation or on specific tax laws. For instance, Wanjohi et al., (2010) primarily discuss the implications of tax reform in developing economies without delving into the potential technological advancements like BI that could enhance tax compliance. Similarly, Bird and Zolt (2008) emphasize the challenges of tax policy and administration in developing countries but do not explore the integration of modern technologies like BI into these systems. This research project will evaluate the feasibility and potential outcomes of integrating BI into the Kenyan tax system in order to close this gap.

1.1.1 Tax Compliance

Tax compliance is the degree to which taxpayers accurately declare their income and pay the taxes required in order to fulfill their tax obligations (Gitaru, 2017). Tax compliance has always been a problem for the Kenyan government. Tax compliance in the country is challenging for several reasons. The existence of a sizable informal economy, which frequently operates beyond the purview of formal tax regulations, is one of these difficulties. The informal economy is made up of little-known businesses and self-employed individuals who might not fully disclose their income or tax liabilities (Ndung'u, 2021). As a result, tax fraud and underreporting may be

prevalent in this sector. Kenya's complicated tax rules and frequent changes to tax regulations may also cause confusion among taxpayers. Many people and organizations can find it challenging to voluntarily comply since they are unable to fully understand their tax obligations (Wanjohi et al., 2010). Additionally, the administrative burden of tax compliance can be exorbitant, particularly for SMEs, which dominate Kenya's economic structure. Tax evasion and avoidance strategies exacerbate the difficulty of compliance. Some taxpayers engage in criminal practices to reduce their tax liabilities, including money laundering, exploiting ethical flaws, and aggressive tax planning (Wanjohi et al., 2010). These activities cost the government money while also eroding public trust in the fairness of the tax system.

The Kenyan government has recognized the necessity of fully resolving these compliance-related issues. It has put in place a number of tax policy reforms and steps to encourage compliance, including digitizing tax processes, installing Electronic Fiscal Devices (EFDs), and leveraging third-party data to cross-verify taxpayer data (Ndung'u, 2021). There is still a large gap in tax compliance notwithstanding these attempts. The integration of analytics and business intelligence (BI) into tax administration has the potential to significantly boost tax compliance. According to Gichohi (2020), tax authorities can more successfully use data analytics to find tax evasion, identify trends of non-compliance, and conduct risk-based audits.

BI technology can also decrease human error rates and increase the accuracy of tax assessments, leading to a fairer tax system. According to international research, countries that have successfully used BI in tax administration have seen significant improvements. For instance, Singapore's Inland Revenue Authority uses cutting-edge analytics to pinpoint tax evasion risk factors so they can concentrate resources on cases that pose a particularly high risk (International Monetary Fund, 2021). Similarly, the Internal Revenue Service (IRS) of the United States employs data analytics to identify false tax returns and boost compliance (IRS, 2021). BI can offer a game-changing solution to the tax compliance dilemma in Kenya. Tax authorities can better understand the factors that influence compliance by analyzing taxpayer behavior and mining huge datasets, allowing them to customize their enforcement strategies. This data-driven strategy can help to make the tax system fairer, collect more money, and improve economic security.

1.1.2 Business Intelligence

Business intelligence refers to complementary processes and technologies that are used by businesses to collect, store, analyse, and visualize data in order to support rational decision-

making (Njogu & Nteere, 2021). Businesses can gather, analyse, and present company data using business intelligence, which is a term for the systems, procedures, and tools that make this possible. BI includes the gathering, integrating, and analysis of data as well as the display of actionable insights through reports, dashboards, and visualizations. According to Gichohi (2020), organizations can use it to track key performance indicators (KPIs), identify trends, and make immediate data-driven choices. BI technologies are frequently employed for tasks including financial reporting, performance monitoring, and customer analysis. They are intended to make complex data sets more approachable for non-technical users by facilitating data exploration and reporting. BI is essential for increasing operational effectiveness, streamlining procedures, and using data-driven strategies to obtain a competitive advantage (Zedgenizova et al., 2021).

By contrast, analytics refers to the systematic analysis of data to uncover important patterns, trends, and insights. It involves using computational, mathematical, and statistical tools to reveal hidden information in sizable and complex data sets (Ritei, 2021). Analyses can be classified into various categories, including descriptive analytics (which summarizes historical data), diagnostic analytics (which identifies the causes of past events), predictive analytics (which projects future outcomes), and prescriptive analytics (which suggests actions to enhance future results).

For managing taxes and guaranteeing economic stability, business information and analytics are increasingly important instruments (Slemrod & Wilson, 2009). Vast amounts of tax-related data may be obtained, processed, and analyzed with the aid of BI, enabling tax authorities to identify tax fraud, evasion, and anomalies more swiftly. Additionally, technology makes it possible for regular procedures to be automated, lessening the administrative strain on tax officials and enhancing the precision of tax assessments (Njogu & Nteere, 2021). Analytics, on the other hand, can offer more clarity into the patterns and behaviors of taxpayers. Tax authorities can identify patterns of non-compliance and take proactive measures to address them by reviewing past tax data. Predictive analytics can also assist with income projections, enabling the government to more effectively allocate resources and prepare its budget.

BI is increasingly being recognized in Kenya as a crucial tool for enhancing decision-making in many industries. BI has the potential to significantly improve the Kenya Revenue Authority's (KRA) approach to tax management (Slemrod & Wilson, 2009). The KRA can examine taxpayer data using data analytics to search for patterns and anomalies that can point to tax evasion. Additionally, real-time information on revenue collection given by BI systems can assist tax

authorities in developing policies and enforcement plans. The implementation of BI in Kenya's tax system is also in line with the government's overarching aim for digital transformation. To enhance service delivery, openness, and efficiency, the Kenyan government has been actively supporting digital initiatives. These projects can benefit from the addition of BI, which offers data-driven insights that enable solutions based on evidence.

1.2 National policy on taxation in Kenya

The Kenya National Taxation policy has been geared towards realizing the country's dream of a fair and efficient tax system which would promote equity in tax administration and predictable tax environment for business to operate. It provides broad principles of tax administration and revenue collection in Kenya and sets parameters on tax policy and other tax related matters. Further, the policy sets out guidelines for tax reforms and forms the basis for tax legislation and review. It is an essential instrument for facilitating delivery of government's development Agenda, in an equitable manner as well as acting as a tool for revenue mobilization to finance social and economic development priorities.

The tax regime in Kenya under the new constitutional order is based on a two-tier government structure with the national government and 47 county governments. The national government imposes both direct taxes and indirect taxes namely; income taxes, value added tax, excise duty and customs or import duty. The county governments' taxes are mostly comprised of fees, levies, property taxes and licenses. Kenya's tax administration is fairly modern, including consumption taxes like VAT and Excise, a progressive income tax regime based on the graduated scale, fairly robust and harmonized common external tariff on imports and exports with her neighbours and moderate corporate tax rate adjusted for capital allowance on investments and fixed assets.

1.3 Statement of the Problem

The ideal tax system for Kenya should raise revenue in a fair and efficient manner, allowing the government to finance infrastructure projects, provide basic amenities, and promote economic security. Taxpayers should voluntarily and truthfully disclose their income, and tax authorities need to have the tools necessary to efficiently identify and deter tax evasion (Ndung'u, 2021). The level of tax compliance in Kenya today, however, is far from this ideal. Challenges including tax evasion, underreporting of income, and the sizeable informal economy still exist. These issues impair the government's ability to serve the needs of its people, reduce economic security, and cause income deficiencies. Traditional tax administration procedures are not sophisticated enough to efficiently detect tax evasion and irregularities (Vershitsky et al., 2022).

Additionally, the tax collection process makes only limited use of data-driven strategies like business intelligence (BI). This lack of technological integration causes inefficiencies that make it difficult for the government to increase tax compliance and safeguard its economic future. The seriousness of Kenya's tax compliance problem is highlighted by statistical information from a number of sources. In 2019, Kenya's tax income as a proportion of GDP was 15.4%, much less than the average for Sub-Saharan Africa, which was 17.2%, according to the World Bank (World Bank, 2021). According to the World Bank (2021) this suggests that there is unrealized potential for income collection. In addition, the Kenya Revenue Authority (KRA) claimed that only 2.4 million of the 6.2 million taxpayers who were enrolled for the fiscal year 2020–2021 filed their tax returns, indicating a significant compliance gap (KRA, 2021).

Although there is literature on tax compliance, the absence of a complete strategy that includes BI is a recurrent issue. Few research has attempted to offer a systematic, technical solution that is in line with the objectives of contemporary government, but previous studies have looked at discrete aspects of tax compliance. As a result, the issue is not over-researched; rather, this study tries to close the gap in the existing literature. This research project proposes to investigate and address this issue through an examination of the possibilities of BI to improve tax compliance in Kenya. The project seeks to equip tax authorities with the instruments and insights necessary to detect tax evasion, maximize tax collection, and eventually help create a more equitable and economically secure country through the integration of BI into tax administration.

The research aims to build a framework for the integration of BI into the Kenyan tax system, as well as to thoroughly examine the current issues with tax compliance. This research project seeks to significantly contribute to the body of knowledge in the areas of taxation, governance, and technology application in Kenya by addressing these problems through data-driven techniques. Furthermore, the study's ethical methodology makes sure that the investigation of tax compliance issues adheres to the values of openness, justice, and public welfare. The conclusions and suggestions drawn from this study enhanced tax compliance while also promoting economic security in Kenya. The study may also pave the way for more research into the expanding field of technology-driven tax administration and its effects on emerging nations.

1.4 Objectives of the Study

The general objective of the study was to investigate the role of business intelligence in improving tax compliance in Kenya.

The specific objectives of the study were:

- i) To assess the impact of business intelligence on tax compliance in Kenya.
- ii) To evaluate the key factors influencing the effectiveness of business intelligence in improving tax compliance in Kenya.
- iii) To analyze the expected economic impact of improved tax compliance through business intelligence in Kenya.

1.5 Research Questions

The research questions of the study were:

- i) What is the impact of business intelligence on tax compliance in Kenya?
- ii) What are key factors influencing the effectiveness of business intelligence in improving tax compliance in Kenya?
- iii) What is the expected economic impact of improved tax compliance through business intelligence in Kenya?

1.6 Justification of the study

1.6.1 Policy Justification

The findings of this study will add to the understanding of the role of business intelligence on tax compliance in Kenya. This provides a basis for policy makers in Kenya Revenue Authority (KRA) and other government officials to continue pursuing the area of business intelligence in order to increase tax compliance. The incorporation of business intelligence (BI) into tax administration has the potential to facilitate an effective way to address these issues. It has the potential to improve tax collection efficiency and effectiveness by giving tax authorities data-driven insights into taxpayer behaviour and compliance trends. This study examines the viability and potential benefits of BI in the Kenyan context in order to improve tax compliance and, subsequently, economic security.

Developing countries including Kenya are faced with debt crises because governments are not able to generate enough revenue to meet expenditure, hence end up borrowing externally and internally. Therefore, investigating the major factors that determine tax compliance is very key to policy makers as they will identify the most important factors to increase compliance and consequently increase government revenue.

1.6.2 Academic Justification

There are very few studies that have been done in this area of business Intelligence and tax compliance. Those that have been done focus more on other determinants of tax compliance. Business intelligence being a new phenomenon being used by tax authorities to enhance tax compliance, needs more research to be conducted. The results of the study will also trigger other researchers globally to do more studies especially on the area of business intelligence and technology.

1.7 Significance of the Study

This study will be important and pertinent to a variety of stakeholders, including the Kenyan government and tax authorities, legislators, businesses, scholars, and the general public.

1.7.1 Government and Tax Authorities

For the Kenyan government and tax authorities, especially the Kenya Revenue Authority (KRA), this study has significant implications. The government can improve tax compliance and revenue collection through BI, which would strengthen its financial situation and increase financing for crucial sectors like infrastructure development, healthcare, and education. This in turn encourages social welfare and economic stability.

1.7.2 Policymakers

Kenyan policymakers use evidence-based decision-making to design fair, effective tax policies that promote national development goals. Policymakers will be better able to create policies that promote compliance and financial stability with the aid of this research. It will also shed light on the possible uses of BI in tax administration.

1.7.3 Businesses

Small and medium-sized businesses (SMEs) in Kenya in particular frequently struggle with tax-related issues. Businesses may anticipate changes in tax legislation and alter their operations accordingly by understanding how BI can enhance the tax system. This will help them lower compliance costs and create a more favorable business environment.

1.7.4 Researchers

This study adds to the body of knowledge that is already available by examining the use of BI in a Kenyan tax setting. Based on this research, future studies into the developing field of technology-driven tax administration can be conducted by specialists in taxation, governance, and technology.

1.7.5 General public

A fair and effective tax system benefits Kenya's population. Better public services, the growth of infrastructure, and the eradication of poverty can all be brought about by increased tax compliance. Since citizens gain by having a government that can efficiently address their demands, the research's findings are of relevance to them.

1.8 Assumptions of the Study

The research project was guided by various assumptions. The research process and its findings are supported by these assumptions. They aided in the investigation, but they were also undergoing a critical evaluation during the study to guarantee their validity and dependability for the purposes of the study.

1.8.1 International Relevance

The study assumed that the Kenyan context could benefit from the insights learned from successful international applications of BI in tax compliance. The study assumed that lessons can be learned from cross-cultural experiences even though there may be contextual disparities.

1.8.2 Technological Feasibility

It was assumed that the technical feasibility of integrating BI into the Kenyan tax system and that the relevant infrastructure and skills were to be established or available as needed.

1.9 Scope and Limitations of the Study

Scope: This study focused on collecting primary data from various KRA stations and individual taxpayers within Nairobi County. Data collection occurred between January and February 2024. The primary instruments for data collection were questionnaires and scheduled interviews. While the survey was limited to Nairobi, data from KRA employees was gathered from all departments across the country. Since KRA employees are also taxpayers, this approach provided a comprehensive perspective within the Nairobi context.

Limitations: The study faced several limitations. First, due to time and financial constraints, the sample was limited to individual taxpayers and KRA employees within Nairobi, rather than across all sub-counties or the entire country. This geographic limitation may affect the generalizability of the findings to other regions. Additionally, the study's findings and recommendations are specific to Kenya's unique context, which may limit the applicability of the results to other countries with different socio-economic and technological environments. The successful implementation of business intelligence solutions as recommended by the study relies heavily on the availability of

adequate technical infrastructure and expertise, which could be a limiting factor in some areas. Lastly, technological constraints could potentially impact the feasibility of the proposed solutions.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The literature review assesses the integration of Business Intelligence (BI) to enhance tax compliance in Kenya. It covers the identified knowledge gaps, empirical studies, and conceptual framework. The evaluation aims to provide a comprehensive overview of how BI could help with tax compliance challenges and advance economic security in the Kenyan setting.

2.2 Theoretical Review

The theoretical review, which outlines the main theories supporting the use of business intelligence in enhancing tax compliance in Kenya, provides the theoretical framework for this research. These theories, which draw on tax compliance theory and deterrence theory, offer helpful insights into the actions of taxpayers, the incentives for compliance, and the possible effects of data-driven initiatives. The aim of the research is to influence taxpayer decision-making, improve compliance, and promote economic security. These ideas jointly support this focus. By examining the various theoretical frameworks, this research project seeks to build a thorough conceptual foundation for empirical inquiry and policy recommendations within the Kenyan tax system.

2.2.1 Tax Compliance Theory

Tax compliance theory is a well-established theoretical framework that aids in the comprehension of taxpayer behavior and compliance with tax obligations. The factors influencing people's and businesses' decisions to follow tax regulations have frequently been studied in the fields of behavioral sciences and economics (Devos, 2013). Since it provides relevant information on the causes of taxpayers' perceptions, actions, and motivations, the theory plays a vital role in directing research on boosting tax compliance and financial security. The idea of tax compliance theory was first presented by Allingham and Sandmo in 1972, and it has subsequently been extended and developed by scholars including Yitzhaki (1974) (Devos, 2013). These philosophers placed a strong emphasis on the logical and practical benefits of paying taxes. The idea of tax evasion was first put up by Allingham and Sandmo as a trade-off between the advantages of tax savings and the risk of detection, with sensible people choosing to lower their overall expenses.

The central claim of tax compliance theory is that individuals and organizations assess the benefits and drawbacks of complying with tax rules before making decisions (Torgler, 2007). The perceived fairness of the tax system, the obligation to contribute back to society, and the dangers of non-compliance are a few of the elements taken into account in this study.

Any potential advantages, such as lessened tax responsibilities, are balanced against the predicted costs of tax evasion, such as fines, legal repercussions, and reputational damage (Torgler, 2007). Since it provides a theoretical framework for understanding the behavior of Kenyan taxpayers, tax compliance theory is particularly applicable to this research (Farida and David, 2018). By examining the variables that influence compliance decisions, researchers can pinpoint the primary causes of non-compliance and develop solutions. For instance, if people think the tax system is unfair or overly expensive, they may be more prone to avoid paying taxes. The findings of the tax compliance theory can be used by legislators to create tax legislation that will advance equality and lessen the perceived benefits of non-compliance (Farida and David, 2018).

Numerous empirical studies have used the tax compliance hypothesis to examine trends in taxpayer behavior and compliance. Researchers have examined the connections between a variety of factors, such as tax rates and fines, using this paradigm. Harju and Matikka (2016) looked at tax evasion in Finland to determine how various forms of fines and enforcement techniques affect tax compliance. For instance, Slemrod and Yitzhaki (2002) looked into the responses of German taxpayers to a tax rate cut. Since higher compliance was found to be connected with lower tax rates, the latter may encourage taxpayers to voluntarily comply. Furthermore, their research demonstrated that higher penalty rates significantly reduced tax evasion and had a deterrent effect on fines. The core concept of tax compliance theory, which maintains that taxpayer behavior is driven by the perceived risks and costs of non-compliance, lends weight to this idea. Pomeranz (2015) also performed research to find out how Chilean tax compliance is being impacted by rising audit rates. The study discovered that higher audit rates led to better compliance, highlighting the importance of enforcement in influencing taxpayer behavior.

The idea of tax compliance holds that tough penalties discourage taxpayers from breaking the law by making it seem riskier to them. The tax authorities have benefited from these studies' informative information about the effectiveness of various policy initiatives in their efforts to improve compliance. Furthermore, tax administration uses of business intelligence (BI) are in line with the fundamental ideas of tax compliance theory. By collecting and analyzing vast volumes of

taxpayer data, BI help tax authorities identify non-compliance more precisely and focus their enforcement efforts. This data-driven approach is congruent with the rational choice model presented in tax compliance theory, according to which taxpayers base their decisions on projected costs and benefits.

Tax Compliance Theory focuses on how taxpayers weigh the benefits and risks of complying with tax regulations, emphasizing a rational choice perspective where individuals balance the perceived costs of non-compliance against the potential benefits. However, this theory's limitation lies in its narrow focus on rational decision-making processes and its potential oversight of the psychological and social factors influencing taxpayer behavior. To address these limitations, Deterrence Theory is also employed (Slemrod and Yitzhaki, 2002). Deterrence Theory extends the analysis by emphasizing the role of enforcement mechanisms and penalties in shaping taxpayer behavior. It posits that the likelihood of detection and the severity of penalties act as deterrents to tax evasion. By incorporating Deterrence Theory, the study accounts for how different levels of enforcement and penalty structures influence compliance, providing a more comprehensive view of taxpayer behavior. The combination of these theories offers a robust framework for understanding the multifaceted nature of tax compliance, integrating both rational choice and deterrence perspectives to enhance the effectiveness of tax policies and enforcement strategies.

2.2.2 Deterrence Theory

Deterrence theory is a pillar of criminology and economics that greatly contributes to understanding the behaviours of taxpayers and the efficacy of tax enforcement strategies (Tomlinson, 2016). According to this hypothesis, people are discouraged from engaging in criminal activity when they believe that their acts would likely be caught and could result in severe penalties. The Deterrence Theory states that taxpayers are less likely to engage in tax evasion when they believe that tax authorities are capable of detecting non-compliance and are prepared to impose severe fines (Tomlinson, 2016). Cesare Beccaria, a law scholar, laid the foundation for deterrence theory, which economist Gary Becker later expanded. Beccaria's fundamental work, "On Crimes and Punishments" (1764), which stressed the role of punishment in deterring crime, laid the groundwork for modern deterrence theory (Bessler, 2016). Becker's opinions led to the theory's inclusion of tax evasion and other facets of human behaviour.

According to the deterrence theory for tax compliance, taxpayer behaviour is significantly influenced by the perceived risks and consequences of noncompliance. When determining

whether to avoid paying taxes, taxpayers weigh the chances of being found with it against the severity of the penalty. People are more likely to abide by tax laws if they think there is a high chance of being discovered and that the penalties are severe.

Numerous empirical studies have examined patterns of taxpayer behaviour and compliance using the deterrence theory. Researchers have studied how tax compliance decisions are impacted by penalties and the effectiveness of enforcement actions. Alm, McClelland, and Schulze (1992), for instance, looked into how tax audits and fines affected American taxpayer compliance. The study discovered that increased fines and a higher audit rate dramatically decreased tax evasion, proving the deterrent effect of enforcement efforts. These results demonstrate that perceived risks and costs of non-compliance have an impact on taxpayer decisions, which is in line with the fundamental ideas of deterrence theory. Additionally, studies have looked at how tax amnesty policies affect the actions of taxpayers. For non-compliant taxpayers who voluntarily expose their tax evasion, tax amnesty schemes temporarily lower or waive fines. Studies evaluating the efficacy of these programs include one by Kleven and Kopczuk (2011). Their findings highlighted the continuous significance of perceived risks and penalties by showing that while tax amnesties can momentarily increase compliance, the deterrence effect declines once the program is completed.

Deterrence Theory, while valuable for understanding the impact of penalties and enforcement on tax compliance, has several limitations. One major limitation is its focus on the rational calculation of risks and rewards, which may not fully capture the complexities of taxpayer behavior influenced by psychological, social, and cultural factors. The theory assumes that increasing penalties and the likelihood of detection will uniformly deter all taxpayers, overlooking variations in individual perceptions of risk and personal attitudes towards compliance (Kleven and Kopczuk, 2011). Additionally, it may neglect the potential for diminishing returns where excessively harsh penalties could lead to negative outcomes, such as reduced cooperation or evasion through alternative means. Therefore, while Deterrence Theory provides useful insights into the role of enforcement, it may not account for the broader range of influences affecting taxpayer behavior, necessitating a more nuanced approach that considers these additional factors.

On the other hand, Deterrence Theory offers helpful insights into the creation of efficient tax enforcement techniques in Kenya within the context of this study project. Tax authorities are able to discourage non-compliance and encourage tax compliance by raising awareness of the risks and

negative effects of tax evasion through targeted enforcement actions and fines. This fits with the expectations of the theory and offers a framework for dealing with compliance issues in the Kenyan setting.

2.3 Empirical Review

This section provides a critical analysis of empirical studies related to the impact of Business Intelligence on tax compliance in Kenya. The review is motivated by the research goals of this study.

2.3.1 Business Intelligence and Tax Compliance

The effects of business intelligence on tax compliance have gained significant study interest in Kenya and beyond. The impact of BI tool adoption on tax compliance rates and revenue collection has been examined in various studies. According to a report from the Organization for Economic Co-operation and Development (OECD) in 2022, more than 50 nations have put data analytics programs into place or are testing them out to combat tax fraud and boost compliance (OECD, 2022). Due to its broad use, data analytics is now widely acknowledged as a potent instrument for streamlining tax administration. Critical analysis reveals both positive and negative outcomes of the research even though they offer insightful information.

McBarnet et al. (2019) distinguishes four types of compliance. The first type is the committed compliance which assumes that taxpayers will obey tax laws without any complaint. The second type, the so-called capitulative compliance occurs at the stage of tax reporting where taxpayers report their taxes in inappropriate ways, for example by cutting expenses or making cash savings in the operation of their business. In the third one, non-compliance where taxpayers rely on tax experts to help them in interpreting the tax laws, allowing them to manipulate their taxes. Finally, the creative compliance refers to the case where taxpayers will find weaknesses in tax laws by redefining them for their profits and recalculating their costs when they file their taxes. Likewise, the study also distinguish two other types of compliance, namely administration and accuracy of the tax returns, which are highlighted by Chow, (2004) that taxpayers are free when filing their tax returns, and that determines their ability to file their tax returns well in time each year and to pay the tax accurately.

One noteworthy study by Mararia, (2014) examined the effects of deploying a BI system at the Kenyan Revenue Authority (KRA) on tax compliance. According to the study, using BI tools significantly improved the ability to identify trends of tax evasion and identify non-compliant

taxpayers. Furthermore, it increased tax income collection significantly (Mararia, 2014). However, the study's main emphasis was on the acceptance of BI's immediate effects. Analyzing the long-term viability of compliance improvements would be beneficial. Additionally, the consequences of more tax revenue for economic security were not covered in depth by the study. As a result, further research is required to examine the wider effects of increased tax compliance on economic stability.

Another study conducted by Gudfinnsson (2019) in the context of BI adoption by tax authorities in developing countries underscored the potential advantages of data-driven initiatives. The report stressed the significance of data analytics for identifying tax evasion trends and streamlining enforcement actions. However, it also highlighted the difficulties with data quality and the requirement to increase tax officials' capabilities (Gudfinnsson, 2019). These results confirm that BI has a good effect on tax compliance, but they also highlight the need for eliminating practical barriers to its deployment. The success of data-driven policies in Kenya depends heavily on maintaining the accuracy and reliability of tax data.

In addition, a study by Chindengwike and Kira (2021)) stressed the importance of communication and transparency in the adoption of BI for tax compliance. The study showed that taxpayers' compliance behavior is greatly influenced by their faith in the tax authority's utilization of data. Therefore, the success of the adoption of BI depends on both the adoption of BI tools and the way tax authorities convey their data-driven initiatives. These important factors make it clear that while BI has the potential to improve tax compliance in Kenya, a comprehensive strategy that takes sustainability, data quality, and communication tactics into account is required. Even though the current research is insightful, it should be supplemented with new research that looks at the long-term repercussions and implications of better tax compliance for economic security.

Trivedi and Shehata (2005) concluded that some taxpayers' behaviour is a mixture of both economic and psychological considerations. This observation was the cornerstone in Lumumba et.al (2010) in their paper on taxpayer's attitude and compliance behaviour in Kenya; in their findings, they observed that majority of Kenyans view the tax regime to be unfair, complex and punitive in nature. Accountability in government expenditure also had a big role in influencing compliance behaviour with most respondents intimating that they did not comply as they were not confident their taxpayer's money was used correctly.

Impact of tax compliance on revenue has also been a critical area of interest. Besley et al. (1997) contended that the level of taxation and audit policy form the basis of policy decisions of governments. Correspondingly, high rates of noncompliance may necessitate a higher tax rate and higher levels of enforcement than otherwise necessary. Fauvelle-Aymar (1999) investigated differences in the level of tax revenue among developing countries, contending that tax revenue is negatively affected by the degree of taxpayer noncompliance. The data she collected from the developing countries (1980-89) supported the theoretical prediction that tax revenue increases with taxpayer compliance.

Maina and Sakwa (2012), carried out a survey of the tax compliance status of firms listed on the NSE using the z-score model in order to assist in suggesting the non-compliance implication. The study established that the firms listed in the NSE do not always exhibit a healthy financial position hence a possibility of tax evasion. They further argued that it is generally assumed that firms within the same sector should not differ in terms of tax compliance since they operate under the same legal framework. The findings however indicate that the compliance status of these firms differs from one company to another. They suggested that this is because the financial health of the firm is affected by various factors e.g., inflation and corruption. They therefore concluded that the compliance of these listed firms differs from one sector to another since they do not exhibit similar financial strength.

The non-economic factors are known as socio-psychological factors. Due to the critical need to ensure that the tax collected is sufficient to meet the budgeted national spending, tax compliance concerns have drawn great attention from researchers over the past few decades. This has led to comprehensive and in-depth analyses that revealed different perspectives. According to Pope and Mohdali (2010), the non-economic factors allow for a better understanding of taxpayers' behaviour. It refers to a person's intrinsic motivation and willingness to adhere to the regulations set by the authority (Torgler, 2003). According to Devos (2014), this approach views taxpayers not only as utility maximisers but also as individuals shaped by their beliefs and social conventions that influence their decisions about tax compliance. Variables that are the focus of the tax compliance literature include personal characteristics, tax literacy, tax complexity, taxpayer attitudes, ethics, compliance costs, and demographic variables such as age, gender, ethnicity, and occupation. Various disciplines have focused on tax compliance since its emergence as an area of concern to tax policymakers due to its frequent occurrences and unsolved status (Bagdad et al., 2017). The issues discussed encompass various variables such as psychology, economic, ethics,

legislation, tax administration, and demographic variables. Low tax compliance among taxpayers has been in the limelight due to the numerous cases of tax gap reported by many developing countries (Jackson and Milliron 1986).

Non-compliant behaviour cases are not necessarily intentional. According to Chardon, et al., (2016), individuals with low levels of tax literacy who completed their own tax return are more likely to unintentionally non-comply with the tax regulation. This notion is supported by the study conducted by Hassan et al., (2016), which highlighted many cases of unintentional non-compliance due to limited knowledge about tax and poor familiarity with the tax system. Uncertainty about the requirements of the tax regulation can lead to a high degree of involuntary non-compliance without any intention to evade tax.

Jackson and Milliron (1986) reviewed 46 tax compliance articles and identified eleven important factors that have been examined by researchers. Some of these are tax system complexity, level of tax information services, withholding and information reporting and tax return preparer responsibilities and penalties. Others include probability of being audited, progressively and actual level of tax rates, penalties for non-compliance, age, gender, education and income. Subsequent to Jackson and Milliron study many more studies have been carried.

2.3.2 Factors Influencing the Effectiveness of Business Intelligence in Improving Tax Compliance in Kenya

The effectiveness of Business Intelligence (BI) in enhancing tax compliance in Kenya is shaped by several crucial factors. Each of these factors plays a significant role in determining how well BI systems can improve tax administration and compliance. This section delves into these key elements, illustrating their importance with relevant research findings. Data Quality and Accuracy is a fundamental factor influencing BI effectiveness. The study by Devos (2013) emphasizes that the accuracy and reliability of the data used in BI systems are paramount for generating actionable insights. High-quality data ensures that BI tools can accurately reflect taxpayer behaviors and compliance patterns. For example, precise data enables tax authorities to effectively monitor and address issues such as compliance with tax laws and filing truthful tax returns. Inaccurate or incomplete data can lead to erroneous conclusions, undermining the BI system's ability to identify non-compliance, assess risks accurately, and make informed decisions. Thus, ensuring robust data quality is essential for the successful application of BI in improving tax compliance.

Staff Training is another critical factor impacting the success of BI systems. Research by Slemrod and Yitzhaki (2002) underscores the importance of comprehensive training programs for tax

officials in effectively utilizing BI tools. Training should encompass both the technical aspects of BI technologies and the strategic application of data insights to enhance tax administration. Effective training enables tax officials to use BI tools proficiently to improve paying tax debts and streamline processes such as obtaining PINs and declaration of tax due. Without adequate training, tax officials may struggle to leverage BI insights effectively, limiting the potential benefits of these systems. Therefore, investing in targeted and ongoing staff training is crucial for maximizing the impact of BI on tax compliance.

Integration with Existing Laws is essential for the effective operation of BI systems. According to Farida and David (2018), BI tools must be designed to align with Kenya's legal and regulatory frameworks governing tax administration. This alignment ensures that BI systems support rather than conflict with existing tax laws, facilitating smoother implementation and adherence to legal requirements. Proper integration helps ensure that BI tools can effectively address areas such as filing truthful tax returns and compliance with tax laws. If BI systems are not well-integrated with current legal standards, they may face challenges in delivering accurate and legally compliant insights, potentially hampering their effectiveness in improving tax compliance.

Adequate Funding is crucial for the successful development, implementation, and maintenance of BI systems. The study by Harju and Matikka (2016) highlights that financial resources are necessary for acquiring advanced BI technologies, conducting comprehensive staff training, and ensuring ongoing system updates and maintenance. Budget constraints can restrict the scope and capabilities of BI initiatives, affecting their effectiveness in enhancing tax compliance. Sufficient funding allows for the procurement of high-quality BI tools, investment in staff training, and regular updates to adapt to evolving tax compliance challenges. Thus, securing adequate financial resources is vital for the effective application of BI in improving paying tax debts and ensuring proper declaration of tax due.

Support from Management is another critical factor influencing BI effectiveness. Pomeranz (2015) points out that strong management support is essential for the successful adoption and implementation of BI systems. This support includes providing organizational backing, fostering a culture that values data-driven decision-making, and addressing any resistance to change. Effective management support helps ensure that BI strategies are aligned with organizational goals and that there is commitment to leveraging BI tools for improving tax compliance. Support from management is particularly important for facilitating the integration of BI systems into existing tax administration processes and enhancing their impact on compliance with tax laws and filing truthful tax returns.

In conclusion, the effectiveness of BI in improving tax compliance in Kenya is influenced by several interconnected factors, including data quality, staff training, legal integration, funding, and management support. Addressing these factors comprehensively is essential for optimizing BI systems and achieving better tax compliance outcomes, such as enhanced compliance with tax laws, filing truthful tax returns, paying tax debts, obtaining PINs, and the declaration of tax due. Understanding and addressing these influences can significantly enhance the ability of BI tools to support effective tax administration and contribute to broader economic and public service goals.

2.3.3 Economic Impact of Improved Tax Compliance Through Business Intelligence in Kenya

Research on how Business Intelligence (BI) is used in Kenya for tax compliance has shed light on the possible synergistic impacts of data-driven approaches. These studies highlight the advantages of BI integration, but it is important to critically evaluate their results and weigh their implications in the context of broader research goals. Manns (2021) conducted a significant study that looked at the comprehensive application of BI in tackling tax compliance difficulties while also enhancing economic security measures. The study concentrated on how data-driven approaches might handle compliance challenges and improve economic stability simultaneously. According to the study, a combined strategy increased tax receipts, decreased tax evasion, and increased economic stability. These results have positive implications since they are consistent with the two goals stated for this study. For both tax compliance, the integration of BI offers a holistic solution that addresses several aspects of the research problem. However, it is crucial to be aware of the difficulties and challenges involved in putting integrated plans into practice, such as resource allocation and data integration.

Another study by Dhayne and Haque (2019) focused on the significance of data integration and interoperability in creating comprehensive solutions in the context of BI adoption in the healthcare sector. According to the study, seamless data integration and exchange across healthcare systems enhanced patient care and outcomes. The discovery emphasizes the importance of data integration in achieving complete solutions across several sectors. In addition, a study by Kimani et al. (2021) investigated the application of integrated BI in resolving supply chain issues in Kenya's industrial industry Nyauncho and Chirchir (2016). The study showed how incorporating data-driven insights from diverse supply chain stages increased efficiency, decreased costs, and strengthened resilience. This study demonstrates the potential advantages of integration in creating comprehensive solutions beyond tax compliance and financial security.

Due to the conflicting results, it is important to recognize the practical difficulties with data integration, such as issues with data quality, compatibility, and privacy. To ensure the effectiveness of integrated BI solutions, careful planning, resource allocation, and data governance frameworks are required.

2.4 Conceptual Framework

The conceptual framework for this research project aims to illustrate how Business Intelligence, which is one of the study's independent variables, relates to tax compliance in Kenya, which is the project's dependent variable. Figure 2.1 shows conceptual framework of study's variables which include independent, intervening and dependent variables.

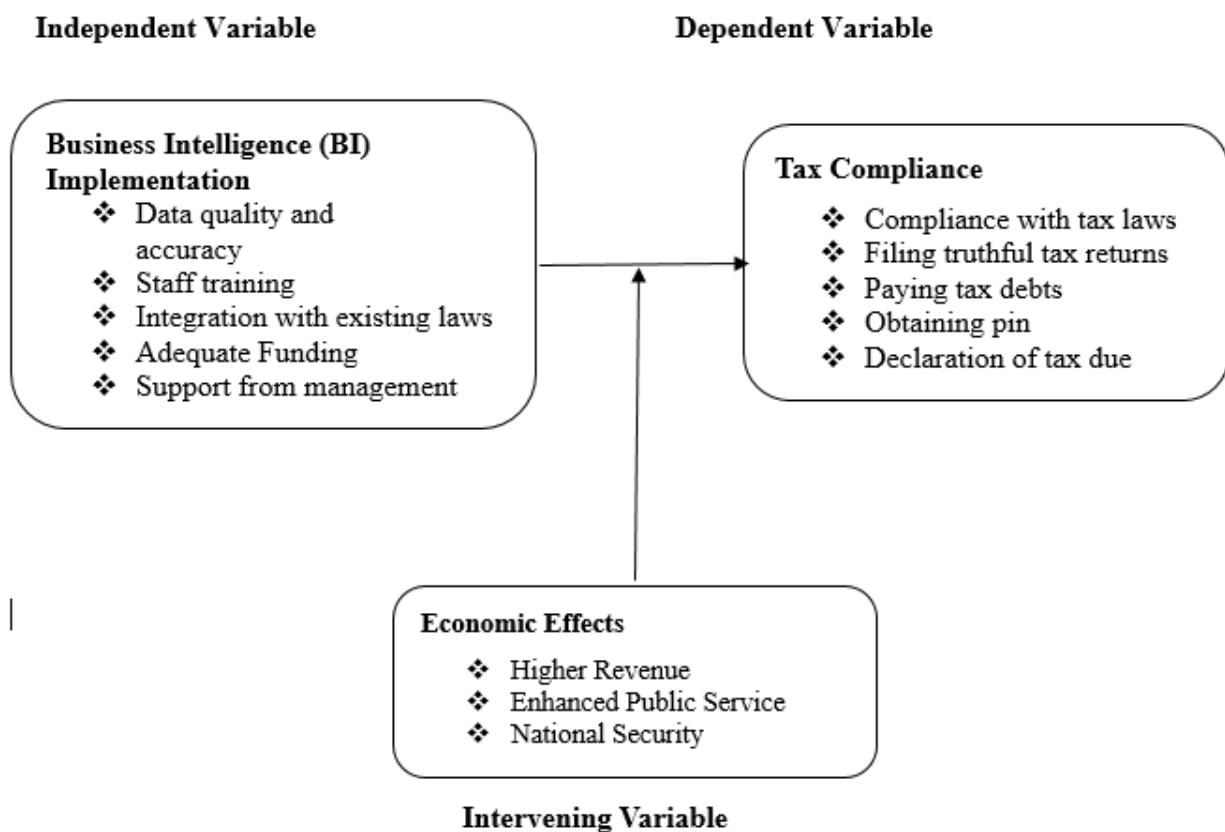


Figure 2.1: Conceptual Framework

Source: Researcher (2024)

The above figure shows the studies conceptual frame work, which illustrates the connections between different variables in the study. The dependent variable is Tax compliance. It includes the extent to which Kenyan citizens and companies comply with tax laws, file truthful tax returns, and pay their tax debts (Njogu & Nteere, 2021). It entails PIN registration when its due, declaration of correct taxes and cooperating with tax revenue auditors. Business intelligence is the main independent variable that the study is investigating and how it affects tax compliance in Kenya.

This variable includes how tax authorities use business intelligence to detect fraud and tax avoidance in Kenya. Business intelligence is affected by many factors which includes data quality, staff training and integrating with existing laws. In addition, its funding from concerned parties must be very adequate. Other factors the study is investigating that affects tax compliance include the cost of compliance, tax rate, nature of the tax and enforcement measures. All these factors affect tax compliance and act as control variables in the study. The conceptual framework from above shows that the tax compliance has economic impacts which lead to higher revenue, enhanced public services and enhanced national security. The economic variable is a result of independent variables and hence the study's intervening variable.

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2.5 Overview of Literature Review

This section delves into the existing literature on the use of business intelligence (BI) to enhance tax compliance in Kenya, framed within the conceptual framework guiding this study. The literature review focuses on how various facets of BI implementation can influence tax compliance and the broader economic outcomes. By examining the relationship between BI implementation and tax compliance, the review aims to establish a comprehensive understanding of the theoretical and empirical underpinnings of this research area.

Business Intelligence (BI) Implementation is recognized as the independent variable in this study. Key components of BI implementation include data quality and accuracy, staff training, integration with existing laws, adequate funding, and support from management. Research emphasizes that high-quality data and accurate reporting are fundamental for effective BI systems, as they ensure that tax data is reliable and actionable (Devos, 2013). Furthermore, staff training is crucial for equipping tax officials with the skills needed to utilize BI tools effectively, which in turn enhances their ability to monitor and enforce tax compliance (Slemrod & Yitzhaki, 2002). Integration with existing tax laws is another critical factor, ensuring that BI tools align with regulatory requirements and legal frameworks. Adequate funding is necessary to maintain and upgrade BI systems, while management support is essential for the successful implementation and operation of these systems (Farida & David, 2018). Collectively, these elements contribute to the effective deployment of BI in the tax administration process.

The **dependent variable** in this study is tax compliance, which encompasses several key aspects: adherence to tax laws, accurate filing of tax returns, timely payment of tax debts, obtaining a Personal Identification Number (PIN), and proper declaration of taxes due. The literature highlights that improved BI systems can significantly impact these aspects of tax compliance by providing more accurate and timely data, which facilitates better decision-making and reduces the likelihood of non-compliance (Torgler, 2007). For instance, BI tools can help identify discrepancies in tax returns, track payment histories, and ensure that taxpayers fulfill their obligations promptly. Enhanced BI capabilities lead to greater transparency and accountability, which encourages voluntary compliance and deters tax evasion (Farida & David, 2018).

The **economic effects** of improved tax compliance through BI are substantial and multifaceted. Enhanced tax compliance can lead to higher revenue, which supports increased public service provision and contributes to national security. The literature suggests that more effective tax compliance results in a larger tax base and increased government revenue, which can be invested in essential public services such as healthcare, education, and infrastructure (Harju & Matikka, 2016). Additionally, improved tax compliance strengthens national security by reducing the potential for financial misconduct and ensuring that public funds are used efficiently and transparently (Pomeranz, 2015). These economic benefits underscore the importance of adopting BI tools in tax administration to achieve broader societal and economic goals.

This literature review integrates these elements to provide a thorough understanding of the impact of BI on tax compliance and its economic implications. The conceptual framework serves as a guide for empirical investigations, highlighting the key variables and their interactions. By

analyzing these relationships, the study aims to offer valuable insights that can inform policy decisions, improve tax compliance practices, and enhance economic outcomes in Kenya.

2.6 Research Gap

Despite significant research on the effects of Business Intelligence (BI) on tax compliance, several critical gaps remain. While studies such as Mararia (2014) demonstrate the immediate benefits of BI systems in improving tax compliance and revenue collection, there is a lack of exploration into the long-term sustainability of these improvements and their broader economic impacts. Additionally, Gudfinnsson (2019) highlights the challenges related to data quality and integration, suggesting a need for more detailed investigations into how these issues affect BI effectiveness. There is also limited research on the role of communication and transparency in BI adoption, as emphasized by Chindengwike and Kira (2021), which impacts taxpayers' trust and compliance behavior. Socio-psychological factors, as discussed by Trivedi and Shehata (2005) and Lumumba et al. (2010), also influence taxpayer behavior, yet their interaction with BI systems requires further exploration. Furthermore, while BI systems have shown promise in improving various types of tax compliance, including committed, capitative, non-compliance, and creative compliance, there is limited research on how BI tools specifically target and improve these different behaviors. Finally, although studies like Manns (2021) and Dhayne and Haque (2019) suggest that BI can enhance economic stability, more research is needed to fully understand the broader economic impacts of increased tax compliance through BI. Addressing these gaps can provide a more comprehensive understanding of BI's effectiveness and its implications for tax administration and economic development.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter highlights the research methodology that was used in achieving the research problem. The section mainly includes research design, Empirical model, area of study, target population, determination of sample size, sampling techniques or procedures, data collection instruments/tools, instrument piloting, validity and reliability data analysis, data collection procedures, data processing, analysis and interpretation, and ethical considerations.

3.2 Research Design

The research approach used in this study was cross-sectional research design. This approach was chosen because it is cost-effective, time-efficient, and allows for the simultaneous analysis of multiple variables. In this study, cross-sectional design involved collecting data at a single point in time from various respondents, including KRA staff from all six departments and individual taxpayers. This method enabled the analysis of the relationships between business intelligence and tax compliance across different variables, utilizing both qualitative and quantitative data collected through questionnaires and scheduled interviews. The analysis of this data with descriptive and inferential statistics provided insights and recommendations regarding the determinants of tax compliance and their association with business intelligence.

3.3 Empirical Model

To achieve the studies objectives, the study adopted a multiple regression model, which regressed tax compliance against business intelligence and cost of compliance. The dependent variable was Tax compliance which was regressed against business intelligence and cost of compliance which were independent variables as shown in equation 3.1

$$TC = (BI, CS) \dots \dots \dots 3.1$$

Where TC is the tax compliance and CS is the compliance cost.

To avoid spurious results, other factors that affect tax compliance will also be added as independent variables to act as control variables hence, from equation 3.1. The linear regression model was expressed to show the relationship between dependent and independent variable (Greene, 2006)

$$TC = (BI, CS, TR, TN, EM,) \dots \dots \dots 3.2$$

Where TC is tax compliance, BI is business intelligence, TR, is the tax rate TN is nature of the tax, EM is enforcement measures, CS, is cost of tax compliance., equation 3.2 becomes

$$TC = \alpha_0 + \alpha_1 BI + \alpha_2 Tr + \alpha_3 Tn + \alpha_4 Em + CS + \varepsilon \dots\dots\dots 3.3$$

Where α 's represents various coefficients that will be used to test significance. ε is the error term that takes care of other variables not in the model.

3.4 Definition and Measurement of the Variable

Tax compliance (TC): This is taxpayers' decision to comply with tax laws and regulations by paying taxes timely and accurately. TC variable was measured by payment of the tax due by prescribed date. Respondents ranked it as the highest form of compliance.

Business Intelligence (BI): This is the use of business analytics, data mining, data visualization, data tools and infrastructure that used in this case by KRA officials to get more information about an organization/individual in order to detect if an organization has declared correct tax. BI was measured by the ability of KRA to detect under declared returns, as ranked by the respondents.

Tax Rate (TR): This is the percentage of income or profit that KRA taxes from the taxpayers. It was measured by perception about whether the tax rate high or low as per respondents.

Nature of tax (TN): This is the base the tax is paid on. The study used source of income the tax is based on, as a proxy for the variable. It was ranked highest by respondents for determining compliance levels.

Enforcement measures (EM): These are instruments KRA uses to enforce the taxpayers to be tax compliant. The study used the ranking of penalties and fines. It was ranked by respondents as affecting Tax Compliance level by a very great extent.

Cost of compliance (CS): This the extent to which an expense affects taxpayers tax compliance level. In this case actual expenses of payment of taxes were ranked the highest form of tax compliance

3.5 Area of study

The sample size for this study was strategically drawn from Nairobi County, including various tax departments of the Kenya Revenue Authority (KRA) and tax service stations for individual and

corporate respondents, for several important reasons. Nairobi, as Kenya's capital and economic center, represents a diverse and dynamic tax environment, encompassing a wide range of taxpayers from individuals to corporations, which offers a comprehensive view of the nation's tax landscape. This geographical focus facilitated easier access to KRA staff and streamlined data collection processes. Nairobi's significant concentration of taxpayers, both individual and corporate, provided a rich dataset reflective of broader national tax issues. Although the study is localized, the insights gained are relevant to other regions with similar economic and administrative contexts, and the recommendations can be adapted nationwide. Furthermore, focusing on Nairobi was a practical decision given the constraints of resources and time, allowing for a detailed examination of business intelligence's role in tax compliance and ensuring actionable, context-specific findings.

3.6 Target population

The target audience for this study is a wide range of participants in Kenya's tax ecosystem. This encompasses individuals and corporate taxpayers as well as KRA staff. The target population specifically consisted of 2.5 million of registered taxpayers by Kenya Revenue Authority out of 48 million (Kenya National Bureau of Statistics, 2019). The Kenya's registered voters are 19m who the study assumes can be eligible to pay taxes.

3.7 Determination of Sample Size

The purpose of this study is to find out the role of business intelligence in tax compliance. Therefore, the study focused mainly on primary data collected from KRA officials and individuals as well as corporate tax payers. The sample size to be used in a study is determined by among other factors the purpose of the study, population to be studied, risk associated with selecting a "bad" sample, and the allowable sampling error. Freidman *et al* (2000) theorized that when estimating percentages, it is the absolute size of the sample which determines accuracy, not the size relative to the population. Warwick and Lininger, (1975) argue that in considering a sample size the key issue is to ensure that its viable given the constrictions of time, finances and human resource.

To get a representative sample, the study used a formula developed by Cohran (1975).

$$n = \frac{z^2 p(1-p)}{e^2}$$

Where n is the desired sample size, z is standard normal deviate at the required confidence level which was 1.96 at 95% level of significance, p was the proportion in the target population that was estimated to have the characteristic being estimated. Only 2.5m registered taxpayers out of 19 million registered voters (Kippra. 2019), this represented a proportion of 13.2% of total registered voters.

$$n = z^2 pq / e^2$$

Hence p was assumed to be 0.13, and e , is the level of precision and for this study, it was taken to be 5 percent. Applying this formula, the desired sample size was;

$$1.96^2 * 0.13 * 0.87 / (0.05)^2 = 176$$

hence this study considered a sample size of 176 as appropriate. The study sampled 100 respondents from KRA, this was because, in addition of KRA staff being taxpayers they were also conversant with Business Intelligence as the competent practitioners in the subject matter. The remaining 76 respondents were drawn from other individual and corporate taxpayers.

3.8 Sampling Techniques or Procedures

For this study, stratified random sampling was used to select the sample, dividing the target population into distinct subgroups or strata based on predetermined attributes (Taherdoost, 2016). Each stratum, corresponding to one of six departments within the Kenya Revenue Authority (KRA)—Customs and Border Control, Domestic Taxes, Corporate Support Services, Intelligence and Strategic Operations, Legal Services and Board Coordination, and Investigations and Enforcement—was sampled independently to ensure each subgroup was adequately represented. Respondents within each department were randomly selected from different stations and regions to provide equal opportunity for participation. Data was collected using questionnaires, which were distributed to a total of 173 respondents, including individual and corporate taxpayers sampled from four Tax Service Stations (TSOs) in Nairobi (West, East, South, and North), with each station contributing 19 respondents to ensure balanced representation.

For the qualitative component, purposive sampling was utilized to select 10 key interviewees, chosen for their expertise and relevance to the study's focus on business intelligence and tax compliance. Unlike stratified sampling, which ensures representative coverage across various subgroups, purposive sampling specifically targets individuals who can offer deep insights into the topic. The semi-structured interviews were conducted in person, each lasting approximately 45

to 60 minutes, allowing for thorough exploration of the interviewees' perspectives and experiences. The entire interview process, involving a small number of participants, was completed within a few weeks, ensuring a comprehensive and focused data collection.

3.9 Reliability and Validity Tests

All data-gathering tools, including structured questionnaires and interview guides were discussed with my supervisor, they were hence reviewed and agreed. Then the final questionnaires were created which was used in the main study as attached in the appendix 1.

Validity is the degree to which the data-gathering tools measure what they are supposed to measure (Heale & Twycross, 2015). To guarantee that they cover every relevant aspect of tax compliance, BI, and economic security, the content of the questionnaires and interview guides were designed based on a thorough examination of the current literature, worldwide best practices, and the research objectives. The questions were also in line with accepted ideas and concepts associated with tax compliance, BI, analytics, and economic security, which further assured construct validity. It was also possible to perform a factor analysis to evaluate the underlying constructs being measured. To establish criterion-related validity, the instruments were also evaluated against relevant external standards or benchmarks.

Reliability refers to the consistency and stability of data-gathering tools (Heale & Twycross, 2015). The tools must consistently yield the same findings when used on the same group of participants on multiple occasions. A test-retest reliability strategy was used for the structured questionnaires, in which a portion of the participants were requested to complete the same survey again. The reliability of their responses was evaluated based on their consistency. The use of numerous interviewers to conduct interviews with the same group of participants was to assure inter-rater reliability in the case of interview guides. To determine inter-rater reliability, the degree of agreement between interviewers' ratings was evaluated. For questionnaire items, internal consistency was evaluated using metrics like Cronbach's alpha. This evaluated how well elements within the same construct measure the same underlying idea over time.

3.10 Data Collection Procedures

The data-gathering procedures for this study adhered to a systematic and ethical approach to guarantee the accuracy and integrity of the data acquired. First, a group of participants, comprising tax authorities were given structured questionnaires. Depending on the preferences

and accessibility of the participants, these questions were either delivered electronically or in person. The surveys were administered to participants, who chose to complete them individually or with the help of the research assistant after receiving explicit instructions on how to do so. Second, semi-structured interviews for from the KRA management were executed. These interviews were organized in advance, and the participants were made aware of their goals and the subjects that were covered.

3.11 Data Processing, Analysis, and Interpretation

Data processing, analysis, and interpretation were critical stages of this research that turned the gathered data into insightful knowledge based on the study's objectives.

3.11.1 Data Processing

The initial phase of data processing involved cleaning and arranging the dataset after data collection. This entailed confirming the correctness and completeness of the replies gathered, resolving any gaps in information or discrepancies, and coding the data for analysis. Thematic analysis was performed on the qualitative data from interviews, while quantitative information from structured questionnaires was entered into statistical Stata software for the analysis.

3.11.2 Data Analysis

To fully address the research objectives, the data analysis phase used both quantitative and qualitative analytical techniques. The study used descriptive and inferential statistics to analyse the data. Descriptive statistics was used to describe the general characteristic of the data. It was also used to show the various relationship between variables.

In addition, the study used multiple regression model which was analysed through Ordinary Least Square (OLS) to show the relationship between the dependent variable, which in this case was tax compliance, and independent variables e.g., Business intelligence, compliance cost, enforcement instruments, tax rate and nature of the tax. The coefficients were interpreted showing those variables that had relationship.

3.12 Ethical Considerations

The highest ethical standards were upheld during every stage of this research project. To safeguard the rights and well-being of participants as well as the validity and credibility of the research process, ethical issues are crucial (Arifin, 2018). This study was conducted under the following ethical guidelines:

First, the decision to take part in this study was fully optional. Respondents were not being forced or put under any kind of coercion to participate, and they were allowed to leave the study at any moment without suffering any repercussions. Secondly, all volunteers got thorough information about the study's objectives, methods, potential risks, and benefits before their participation. Each participant was asked to sign an informed consent form indicating that they have read the research requirements in full and are willing to participate. Thirdly, Participants' names were kept private, and no research papers, presentations, or publications were to include any information about them.

To preserve their identities, special identifiers or pseudonyms were used. No person was able to be recognized based on their responses due to this measure. Fourthly, to reduce any potential danger to participants, the study adopted safety measures. Sensitive issues, particularly those related to tax compliance and financial security, which were raised in the questionnaire were discussed and respondents were made aware of the nature of the questions and given the choice to skip or decline to answer any field they found distressing. Finally, all information gathered for the study was handled in complete confidence. The data was securely stored to avoid unwanted access and was only accessible to approved members of the research team. The data was only used for the study and would not be shared with any outside parties.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1 Introduction

This study sought to investigate the role of business Intelligence in tax compliance in Kenya. This was done through three specific objectives, which includes assessing the impact of business intelligence in Kenya; evaluating the key factors influencing the effectiveness of business intelligence in improving tax compliance in Kenya and finally analyzing the expected economic impact of improved tax compliance through business intelligence in Kenya. To respond to the above objectives, the study used both Descriptive and Inferential statistics. The chapter begins by giving descriptive statistics for various variables used in the study. The results of the investigation are reported in this chapter with their discussion.

4.2 Response Rate

The questionnaires return rate was very important in order to see the level of participation in this study according to the sample size of the participants. This has given the current study the basics of evaluating the level of representation.

Table 4.1: Questionnaire Return Rate

Response	Frequency	Percentage (%)
Filled in questionnaires	176	100%
Unreturned questionnaires	00	0%
Total	176	100%

Out of the sample size of 176 respondents who were randomly selected through simple random returned their duly filled questionnaire. This was 100% response rate, indicating that the results are representative of the target sample and that the outcome of the data collected from the questionnaire would be a reflection of the true position in the institution. According to Kumar (2005) a questionnaire return rate above 50% is considered a good response. In this case, the return rate was considered excellent.

4.3 General Characteristics of the Respondents

4.3.1 Position and Department

The study sought to find out the various positions of the respondents working in KRA and their positions in the organization.

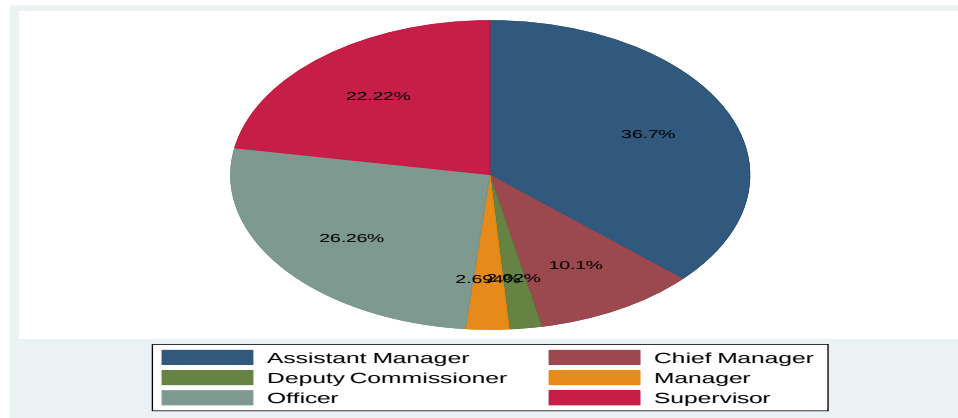


Figure 4.2: Respondents Position

Source: Researcher (2024).

The analysis above indicates that the study aimed to gather information from all departments across different positions within the organization. According to Figure 4.2, the majority of respondents were assistant managers (36.7%), followed by officers (26.3%) and supervisors (22.2%). Additionally, a significant percentage of respondents comprised chief managers (10.1%), along with others such as Managers and Deputy Commissioners. This distribution, as illustrated in the pie chart, reflects the diverse ranks of respondents within the organization. Furthermore, the study sought to identify the departments to which the respondents belonged, as outlined in Figure

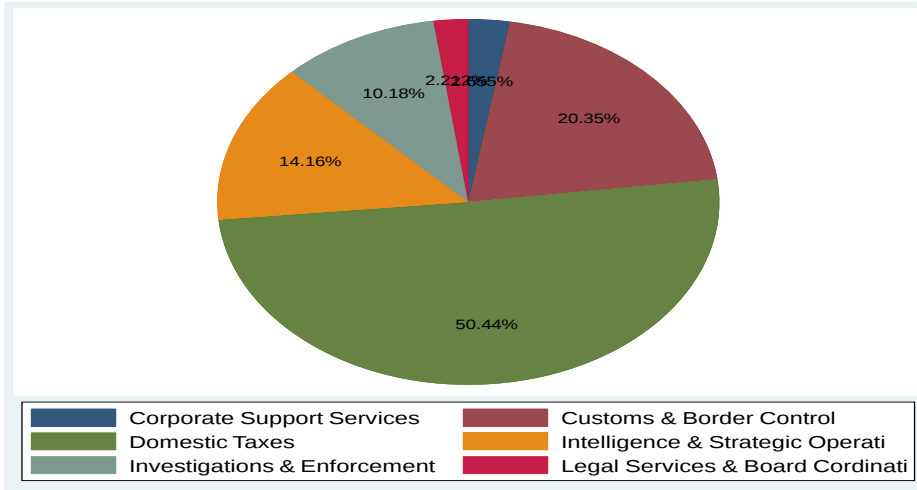


Figure 4.3 : Respondents Departments

Source: Researcher (2024)

Figure 4.3 depicts the representation of all departments within the organization, with respondents selected randomly. The analysis indicates that the domestic taxes department had the highest proportion of respondents, exceeding 50%, followed closely by customs and border control at 20.3%. Intelligence and strategic operations accounted for 14.16%, while the investigation and enforcement department comprised 10%. Corporate support services, legal services, and board coordination collectively represented the remaining percentage, which was less than 10%. This comprehensive participation from all departments underscores the importance of their information for the study.

4.3.2 Gender of the Respondents

Incorporating participation from individuals of all genders in a survey enriches the validity of the findings by providing a comprehensive understanding of diverse perspectives and behaviours. This inclusivity enables researchers to discern nuanced patterns and trends, thereby facilitating the formulation of well-informed decisions suited to the specific goals and objectives at hand.

Table 4.2: Respondents Gender

Gender	Frequency	%	Cum %
Male	93	53	53
Female	83	47	100
Total	176	100	100

Source: Researcher (2024)

According to Table 4.2, there was a slight predominance of male respondents compared to female respondents, with male comprising 53% and female 47% of the total sample. As a result, the sampled population exhibited gender balance, ensuring equitable representation of both genders in the study.

4.3.3 Years of Experience

The study aimed to determine the tenure of employment among respondents within the organization, particularly focusing on KRA employees to gauge their experience in tax-related matters. The accompanying bar chart illustrates the average number of years these individuals have been employed by the organization. It's worth noting that there were 12 non-responses to this question.

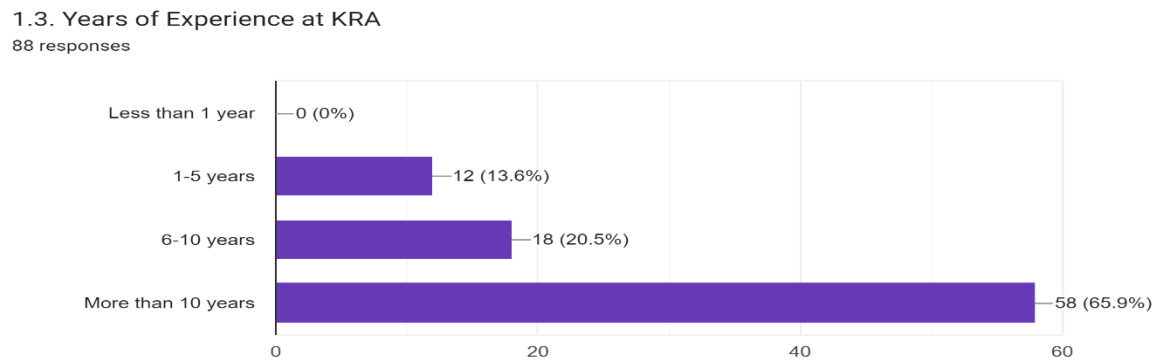


Figure 4.4: Years of Experience at KRA

Source: Researcher (2024)

The data from Figure 4.3 indicates that a significant majority, 66% of the employees surveyed, had accumulated over 10 years of experience with the organization. Additionally, 21% reported working for a duration ranging from 6 to 10 years, while approximately 14% had been employed for 1 to 5 years. Notably, no respondents reported having worked for less than one year. This comprehensive distribution suggests that nearly 100% of the surveyed individuals possessed significant experience within the organization. Consequently, the provided information can be deemed reliable. Furthermore, the study boasted substantial representation of senior managers, as illustrated in Figure 4.1.

4.3.4 Age of the Respondents

Both KRA employees and other individuals participating in the sample were requested to disclose their age, with the responses documented in Table 4.2.

Table 4.3: Age of Respondents

Age	Frequency	Percent
20-30	4	2%
30-40	44	25%
40-50	103	59%
Above 50	25	14%
Total	176	100%

Source: Researcher (2024)

Table 4.3 presents age distribution among the total sampled respondents reveals that 59% fell within the 40 to 50 years, while 25% were aged between 30 and 40 years. This aligns with expectations, as these age groups typically represent the most active segments of the labour force and business community, commonly referred to as the middle age. The middle age demographic is renowned for its innovative tendencies and adeptness with digital compliance, making them well-versed in business intelligence practices. Only 14% of the respondents were aged over 50 years. Additionally, Table 4.2 could be further summarized to include the mean and standard deviation. It's important to note that age was treated as a Likert scale variable, with ages between 20 and 30 assigned a value of 1, and ages above 50 assigned a value of 4.

Table 4.4: Further Summary on Age of Respondents

Variable	Obs	Mean	Standard dev	Min	Max
Age	176	3.08	0.7453	1	4

Source: Researcher (2024)

According to Table 4.4, the majority of respondents had a mean age of 3.08, indicating that most fell within the 40 to 50 years' bracket. The minimum age recorded in the table was 1, corresponding to the 20-30 age category, while the maximum age was 4, representing individuals above 50 years' old

4.3.5 Level of Education

Both KRA staff and other participants were asked to indicate their level of education, with their responses outlined in Table 4.5. It's noted that one person did not provide a response to this question

Table 4.5: Respondents Level of Education

Level of Education	Freq	Percent
Postgraduate	75	43.1
Undergraduate	61	34.7
Collage	25	14.6
High school	12	7
Primary school	2	.0.6
Total	175	100

Source: Researcher (2024)

Table 4.5 illustrates the range of educational attainment among the sampled respondents, spanning from postgraduate to primary school levels. The results reveal that 43.1% of the respondents held postgraduate degrees, 34.7% possessed undergraduate degrees, and 14% had attained education at the college level. This distribution aligns with expectations, possibly reflecting the prevalence of KRA employees across various departments, as previously discussed. Notably, a significant proportion, 77% of the respondents, had achieved at least undergraduate-level education or higher. This suggests that they are reliable and competent respondents capable of providing valuable insights into the research questions posed.

4.4 Tax Compliance

The study aimed to assess the level of tax compliance among taxpayers in Kenya. Respondents were presented with various tax requirements issued by the taxing authority and were asked to indicate the extent to which they adhere to each requirement. A five-point Likert scale was employed, with the following interpretations: [1] = Not at all, [2] = Less extent, [3] = Some extent, [4] = Great extent, [5] = Very Great extent. The figure below provides a summary of all the requirements along with the corresponding responses.

2.3 Compliance requirements On a five-point scale where [1] = Not at all, [2] = Less extent, [3] = Some extent, [4] = Great extent, [5] =Very Great extent, indicate the extent to which you adhere to the following tax compliance requirements.

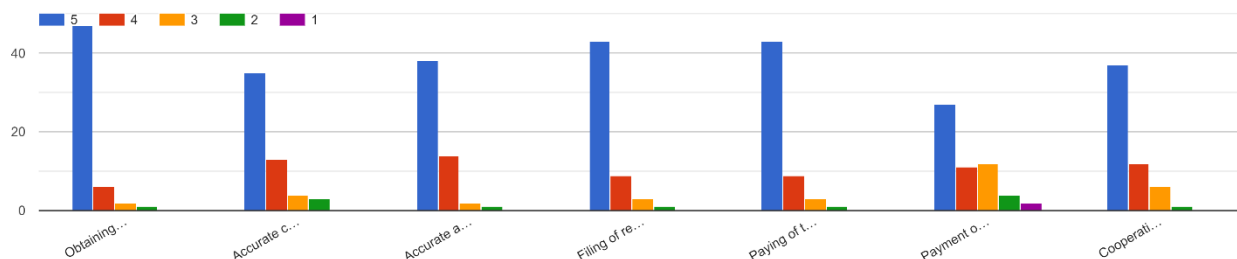


Figure 4.5: Taxing Authority Requirement and Respondent's Adherence

Source: Researcher (2024)

4.4.1 Obtaining a Personal Identification Number When Due

The sampled respondents were tasked with indicating the extent to which they adhered to the requirement of obtaining a PIN when it is due, using a five-point scale. The table below displays the responses provided by the respondents:

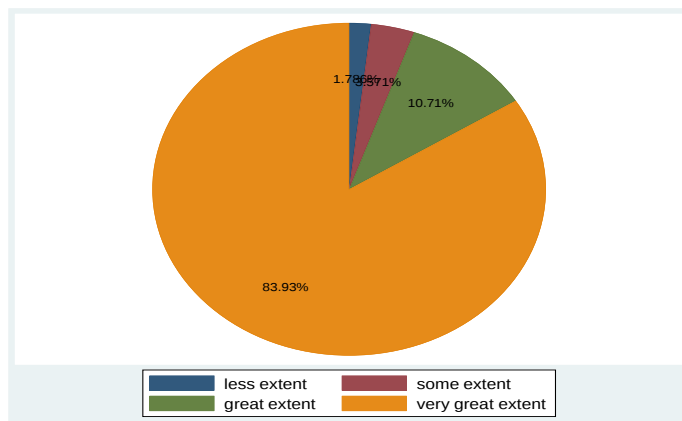


Figure 4.6: Obtaining a Personal Identification Number When Due

Source: Researcher (2024)

From Figure 4.6, it is evident that 84% of the respondents adhered to the requirement of obtaining a personal identification number (PIN) when it was due. This high compliance rate suggests that obtaining a PIN was prioritized by the majority of respondents, indicating their engagement in tax-paying activities. Additionally, 10.7% of the respondents considered obtaining a PIN to be of great importance, further highlighting their commitment to compliance. Conversely, only 5% of

respondents deemed it unnecessary to adhere to this requirement. These individuals likely represent categories of people who are not actively involved in significant economic activities.

4.4.2 Accurate Calculation of Tax Due

The study also aimed to assess the extent to which respondents were adhering to the requirement of accurately calculating the due tax. The responses are depicted in Figure 4.7 as follows:

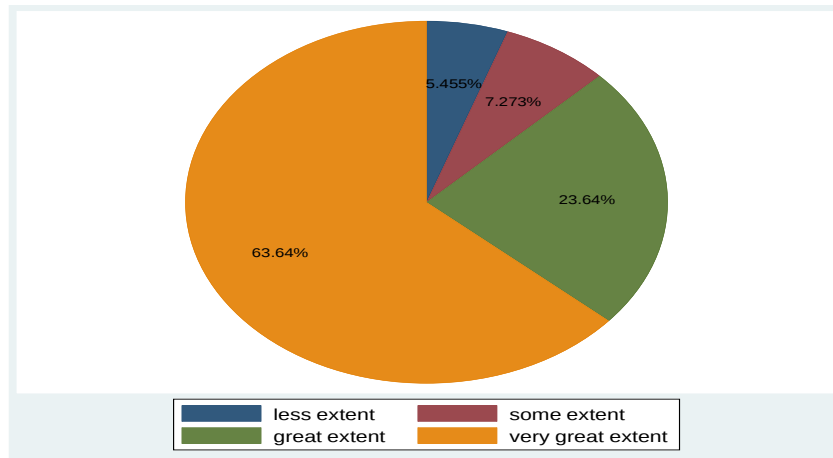


Figure 4.7: Accurate Calculation Of Tax Due

Source: Researcher (2024)

From Figure 4.7, it is evident that approximately 64% of the respondents regarded the accurate calculation of due taxes as a significant tax compliance requirement. This observation suggests that some Kenyans may not accurately calculate their taxes in order to pay less than what is required, underscoring the necessity for Business Intelligence solutions. Moreover, around 24% of respondents indicated a high degree of adherence to accurate tax calculation. However, about 14% of respondents fell into the last two categories, indicating that they did not view accurate tax calculation as a serious requirement. This suggests a tendency among these individuals to potentially understate their tax calculations to minimize their tax liabilities.

4.4.3 Accurate and Prompt Declaration of Tax Due

The study sought to investigate to what extent the taxpayers promptly and accurately declare their due taxes. To do this, the respondents were required to indicate to what extent on a five-point scale they adhered to this requirement. The responses are as Figure 4.8.

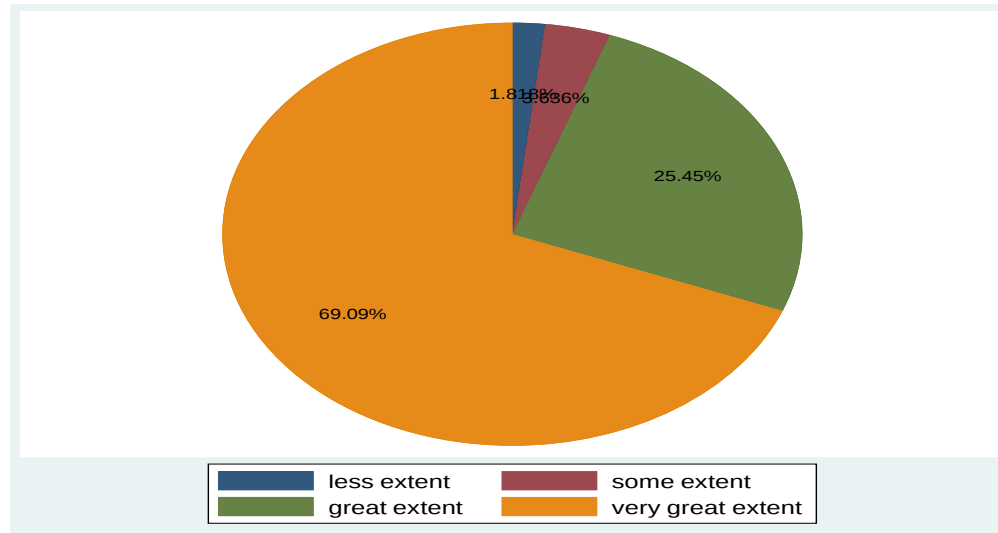


Figure 4.8: Accurate and Prompt Declaration of Tax Due

Source: Researcher (2024)

The figure 4.8 show that to a great extent the taxpayers adhered to the requirement of promptly and accurately declaring of tax due, this is because 69% of the respondents adhered it to a very great extent while 25% adhered to great extent. Only less than 6% had some extent and less extent.

4.4.4 Filing of Returns On Income by the Prescribed Date

This study wanted to find out to what extent the requirement of filing of returns on income by the prescribed date is adhered to. To do this, the respondents were required to indicate to what extent on a five-point scale they adhered to this requirement. The responses are as Figure 4.9.

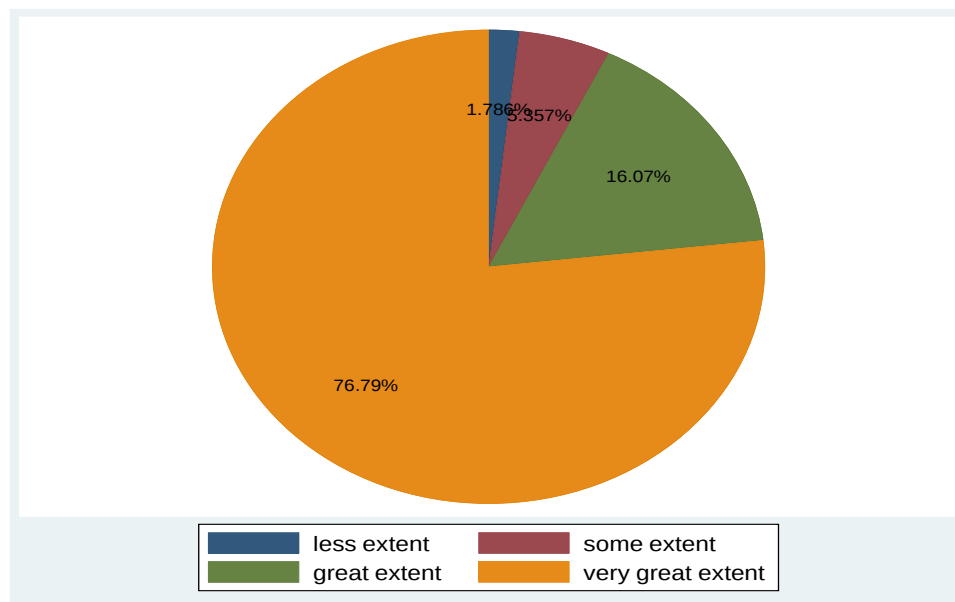


Figure 4.9: Filing of Returns on Income by the Prescribed Date

Source: Researcher (2024)

From the Figure 4.9, it is clear that over 77% percent had to a great extent complied with the KRA requirement of filing the returns per required date. In addition, the Taxing authority has very punitive measures which act as a deterrent. Only less than 7% that indicted they adhered to this to some extent or less extent.

4.4.5 Cooperating with KRA Officers in Conducting Audits

The study also wanted to find out to what extent the respondents were cooperating with KRA officers in conducting Audits by providing all the necessary information. The responses were as the diagram below.

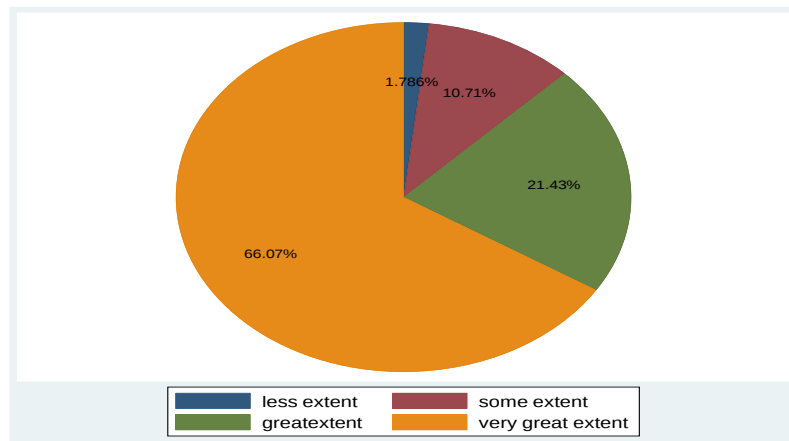


Figure 4.10: Cooperating With KRA Officers in Conducting Audits

Source: Researcher (2024)

It was observed from figure 4.9 that over 66% to a great extent cooperated with KRA officers when conducting audits. But 11% indicted that they adhered to some extent or less extent, meaning that they do not fully cooperate with them. This may be through hiding some of the documents so that they pay less taxes than required or trying to avoid being given a penalty. In conclusion from the above observations, it's clear that the tax payers to a greater extent adhered to most of the tax requirement they were supposed to. This is most likely because most of these requirements are entrenched in the law and failure to adhere to them is illegal.

4.5 Business Intelligence and Tax Compliance in Kenya

The first objective of the study was to assess the impact of Business Intelligence on tax compliance in Kenya. Business intelligence (BI) is a technological driven process where KRA has information of organizations and use it to know whether an organization is tax compliant or not. In order to achieve this objective, the questionnaire was administered to 100 KRA employees who were located at different working stations of KRA in Kenya. The collected information about tax compliance and business intelligence was then analyzed and results presented inform of descriptive and inferential statistics. The respondents were asked to state the extent to which Business Intelligence has positively impacted on tax compliance. Five items were developed on a five-point Likert scale where 1 represented not at all and 5 represented extremely. Figure 4.9, shows the results of the findings

2.1. To what extent do you believe that Business Intelligence tools have positively impacted tax compliance in Kenya?
88 responses

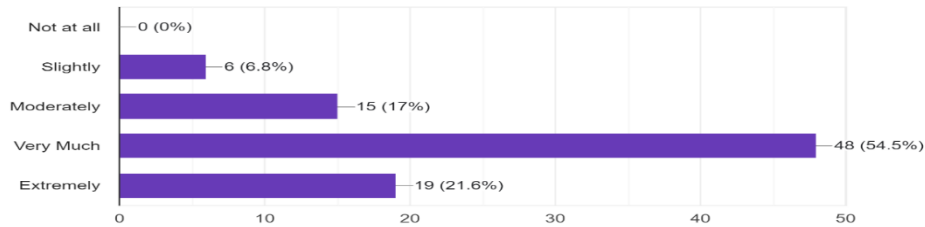


Figure 4.11 :Business Intelligence

Source: Researcher (2024)

From Figure 4.11 indicates that 54.5% of the respondent believed that Business Intelligence has very much positively impacted on tax compliance in Kenya while 21.6% believed that B.I had an extreme impact on tax compliance. From the analysis, 15% believed that business Intelligence had a moderate impact and 6.8% thought that the impact was slight. These results corroborated with” Slemrod &Wilson, 2019, who argued that Business Intelligence is increasing important instruments that enables tax authorities to identify fraud, evasion and anomalies more swiftly. The study went further to ask what aspects of tax compliance have been improved through the implementation of Business Intelligence. Five items were developed on a four-point Likert scale where 1 represented time and accuracy of filing tax returns and 5, respondents were to write any other item. The figure 4.12 below shows the results of the findings.

2.2. In your opinion, what specific aspects of tax compliance have been improved through the implementation of Business Intelligence? (Please check all that apply)

88 responses

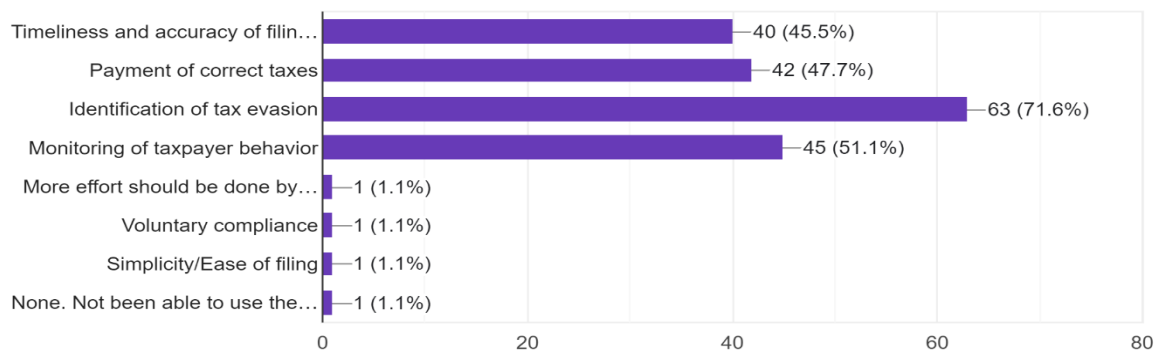


Figure 4.12: Aspects of Tax Compliance

Source: Researcher (2024)

The diagram above shows that the respondent believed Business intelligence has greatly improved on identification of tax evasion, 47.7% of the respondents also believed that it has made the tax payers to pay the correct taxes. In addition, 51% indicated that, it helped the institution to monitor tax payers' behavior while 45.5% of the respondent indicated that it helped on timeliness and accurate filing of the tax return. Other responses included; helping voluntary compliance, helping the tax payer to have ease in filing returns etc. Most these observations supported the study by Slemrod and Wilson, (2009).

4.5.1 Regression Results on Tax Compliance and Business Intelligence

In order to find out the factors that determine tax compliance in Kenya, the study used a multiple regression model as expressed in equation 3.3, which was;

$$TC = \alpha_0 + \alpha_1 BI + \alpha_2 Tr + \alpha_3 Tn + \alpha_4 Em + CS + \varepsilon$$

Where TC was tax compliance, BI was business intelligence, TR, was the tax rate, TN was nature of the tax and EM was enforcement measures and CS is the cost of compliance. BI was proxied by the ability of KRA to detect under declared return, as ranked by the respondents, Tr was proxied by perception about the tax rate, high or low as per the respondent. Where Tc was the dependent variable regressed against BI and other control variables. Tc variable, was proxied by paying of the tax due by prescribed date, ranked by the respondent as the highest form of tax compliance. The cost of compliance was obtained from the respondent.

The study took the various aspects of cost compliance, those which were ranked as great and very great extent affecting the compliance cost were taken. In this case actual payment of taxes was ranked the highest. The nature of the tax, the study used source of income the tax is based on, as a proxy for the variable, it had the highest ranking by the respondent that it greatly affects compliance levels. On Em, the study used the ranking of penalty and fines, was ranked by respondents as the enforcement measure very greatly extent affected compliance level.,

Table 4.6: Variable Affecting Tax Compliance

Tax Compliance	Coeff	Std Err	t	p > t
Business Intelligence	0.3905 **	0.1477	2.643	0.0143
Tax rate	-0.4186**	0.182	-2.306	0.0300
Tax Nature	0.0192**	0.0081	2.353	0.0271
Enforcement	0.3584	0.2336	1.534	0.1379
Compliance cost	-0.7905***	0.2474	-3.195	0.0039
Cons	4.606***	0.5223	8.82	0.000
No of Observations	175			
Pro> F	0000			
R²	0.6342			

****, **, * **Significant at 1%, 5% and 10%**

Source: Researcher (2024)

When observations for tax compliance were regressed against business intelligence, tax rate, tax nature, Enforcement measures and compliance as independent variables, it was observed from Table 4.6, that the coefficient of business intelligence was significant at 5%, this means that BI is a variable that positively affect tax compliance. From the above table it's clear that when BI increases by 1 unit, tax compliance increase by 39 percent. This means that the institution should increase BI so that taxpayers will continue to comply with paying the tax. This is also supported by Slemrod & Wilson (2009), who observed that BI helps to prevent tax evasion and enhance all the tax compliance.

The coefficient for tax rate is negative and significant. This means that the tax rate is one of the factors that affect tax compliance. From the above table it's clear that an increase of tax rate by one unit, tax compliance decreases by 42 percent. These results confirm other studies that have been done in Kenya and other countries. Majiwa (2016), observed that increasing tax rate by 1 unit reduces tax compliance by 0.025, this was a study conducted in Nairobi County. In addition, according to economic theory when tax rates are high the taxpayers try all means in order to evade the tax, hence increase in tax rate decreases tax compliance. In contrast, Yitzhaki (1974) theoretically proved that tax compliance increases with tax rates. Clotfelter (1983) however found that tax compliance decreases with increasing marginal tax rates, based on data from the Internal

Revenue Service's Taxpayers Compliance Measurement Program (TCMP) survey of 1969. However, Simiyu (2003) and Mutua (2011) study showed that high rates create undue burden to most businesses and have therefore been a hindrance towards increased compliance hence the higher the tax the lower the level of compliance.

From the table 4.6 analysis, the coefficient for nature of the tax is positively related with tax compliance. From the above table, the coefficient of nature of tax is 0.0192, meaning that tax compliance changes by 1 percent depending on the nature of the tax. Theoretically, for the taxes that are paid at source e.g., pay as you earn, the tax compliance is high unlike those that taxpayers are expected to file the returns. Andreoni *et.al* (1998) ascertained that certain sources of income with no reporting requirements that is farming income and sole proprietors have a higher prevalence of underreporting their incomes. Credence to this can be observed even locally where PAYE which has very high reporting requirements is usually the best performing tax accounting for over 60% of all income tax. The tax base onto which a specific tax is levied also has a considerable impact on the level of compliance, taxes mostly levied on the informal sector i.e., Turn Over Tax has generally not performed well. Friedman *et.al* (2000) observed that the size of the unofficial economy is negatively correlated with the tax rate so that a country with a big informal economy should have low rates so as to encourage compliance.

Enforcement is another factor that is positively related with tax compliance. The higher or the tighter the enforcement the higher the tax compliant, but from the above results, the coefficient was positively related but not significant

The results indicated that cost of compliance is negatively related with tax compliance. If the cost of compliance increases by 1 unit, tax compliance reduces by 79 percent. This is a very high coefficient, meaning that cost of compliance is a major determinant of tax compliance in Kenya. The results are supported by Thiga and Muturi, (2015) a studying Tax compliance among SME's in Kiambu County observed that low compliance cost is associated with high compliance level. Compliance cost involves a myriad of expenses or difficulties encountered by the taxpayer in complying with the tax law both in terms of administrative compliance; that is registration, filing and subsequent payment of the taxes and also technical compliance which involves maintenance of appropriate records, machines and organisation of the supply chain so as to observe the requirements of the law. Administrative compliance is mostly direct and therefore it has been the area of concern in most of previous research.

In conclusion, the study through the inferential statistics like the descriptive statistics found that, tax compliance is affected positively and negatively by different variables. These include Business Intelligence, Tax rate, nature of the tax and cost of compliance. The study found that tax compliance is positively related to BI, nature of tax and negatively related with tax rate and cost of compliance.

4.6 Factors influencing the effectiveness of business Intelligence on tax compliance

The second specific objective of the study was to investigate key factors influencing the effectiveness of business intelligence in improving tax compliance in Kenya. This objective was pursued using descriptive statistics, with targeted questions addressing the determinants of BI effectiveness. Given that KRA personnel are directly involved in applying BI to enforce tax compliance, respondents were sourced from within KRA. These factors were initially identified based on economic theory, after which data was collected via questionnaire. The pertinent data was then extracted and subjected to analysis for this section of the study. Utilizing a Likert scale, respondents were asked to rank the factors influencing BI effectiveness, assigning a rank of 1 to the least influential and 5 to the most influential. The findings from this investigation are presented in Figure 4.12.

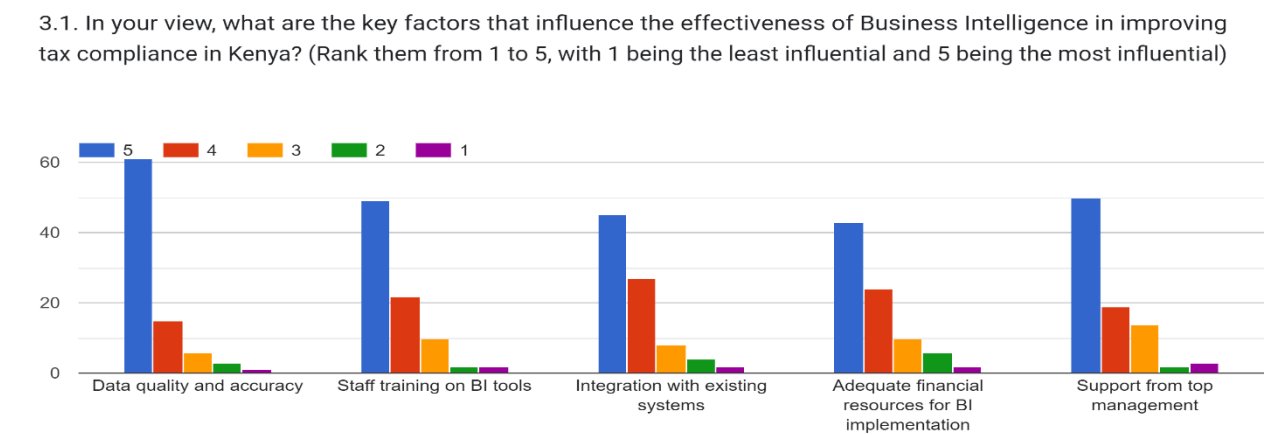


Figure 4.13: Factors that Influence BI

Source: Researcher (2024)

4.6.1 Data Quality and Accuracy

The following table 4.7, shows how the respondents ranked data quality and accuracy on effectiveness of business intelligence.

Table 4.7: Data Quality and Accuracy

Data Quality and Accuracy	Freq	Percent
Least influential	1	1%
Moderate Influential	3	4%
Influential	6	7%
Very influential	15	17%
Most influential	61	71%
Total	86	100%

Source: Researcher (2024)

The results from Table 4.7 reveal that when respondents were asked to rank data quality and accuracy as factors influencing the effectiveness of Business Intelligence (BI), a substantial 71% ranked it as the most influential factor, while 17% considered it influential. Remarkably, less than 1% of respondents ranked it as the least influential factor. This indicates that data quality holds significant sway over the effectiveness of BI in tax compliance. These findings align with Mann (2021), who asserted that accurate data-driven approaches are adept at addressing compliance challenges and fostering economic stability.

4.6.2 Training staff on Business Intelligence Tools

The study aimed to explore the perception of respondents regarding the effectiveness of staff training on BI tools. A ranking scale was utilized, with 5 indicating the highest level of influence and 1 representing the least influential.

Table 4 8: Training on BI Tools

Staff Training on BI tools	Freq	Percent
Least influential	1	1%
Moderate Influential	1	1%
Influential	8	10%
Very influential	27	31%
Most influential	49	57%
Total	86	100%

Source: Researcher (2024)

The findings regarding staff training on BI tools reveal that 57% of respondents ranked this as most influential factor in determining the effectiveness of BI in tax compliance as indicated in Table 4.8. Additionally, 27% indicated that staff training is very influential. Conversely, less than 2% of respondents regarded staff training as the least effective factor. These results underscore the importance of staff training in ensuring the effectiveness of BI implementation. Without adequate training, staff may struggle to utilize BI tools effectively, regardless of their inherent capabilities. Therefore, investing in staff training is crucial for maximizing the effectiveness of BI in tax compliance efforts.

4.6.3 Integration with Existing Systems

The respondents were also tasked with ranking the integration of existing systems and its effectiveness in enhancing Business Intelligence (BI). The table below illustrates the responses provided by the respondents:

Table 4.9: Integration with Existing System

Integration with Existing System	Freq	Percent
Least influential	1	1%
Moderate Influential	3	1%
Influential	9	10%
Very influential	29	31%
Most influential	44	57%

Total	86	100%
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Source: Researcher (2024)

The data presented in Table 4.9 indicates that 44% of the respondents believe that integrating BI with existing systems would make BI very effective, while an additional 29% indicated that integration would be effective. Only 1% of respondents perceived integration as least effective. These findings highlight the significance of integrating BI with existing systems as a major factor in enhancing its effectiveness. Moreover, the results from Table 4.8 are in line with a study by Dhayne and Hague (2019), which emphasized the importance of data integration and interoperability in developing comprehensive solutions, particularly in the context of BI adoption within the healthcare sector. According to their findings, seamless data integration and exchange across healthcare systems played a crucial role in improving patient care and outcomes. In addition, Nyauncho and Chirchir (2016) got similar results, the study showed that integrating BI on existing systems increased efficiency, decreased costs, and strengthened resilience. This study demonstrates the potential advantages of integration in creating comprehensive solutions beyond tax compliance and financial security.

4.6.4 Adequate Financing Resources for BI Implementation

To explore whether the availability of adequate resources for the implementation of BI affects its effectiveness, respondents were asked to rank this variable using ranking scales. The responses provided by the respondents are presented in Table 4.9.

Table 4.10: Adequate Funding for Implementation

Adequate funding for implementation	Freq	Percent
Least influential	2	2%
Moderate Influential	8	9%
Influential	10	13%
Very influential	23	27%
Most influential	42	49%
Total	85	100%

Source: Researcher (2024)

The data presented in Table 4.10 reveals that 42% of respondents identified adequate funding for the implementation of Business Intelligence as the most influential factor. Additionally, 23% of respondents stated that adequate funding is very influential in making BI highly effective. Only 2% of respondents considered adequate funding to be least effective. These findings underscore the importance of sufficient funding for the successful implementation of BI initiatives.

4.6.5 Support from the Management

The study aimed to determine whether support from management is essential for the effectiveness of Business Intelligence (BI). The rankings provided by respondents regarding this variable are presented in Table 4.11.

Table 4.11: Respondent Response on Support from Management

Support from the Management	Freq	Percent
Least influential	2	2%
Moderate Influential	9	9%
Influential	13	13%
Very influential	27	27%
Most influential	48	49%
Total	86	100%

Source: Researcher (2024)

According to Table 4.11, 49% of respondents considered support from management to be the most influential factor contributing to the effectiveness of Business Intelligence (BI), while an additional 23% believed that support was very influential. These results underscore the critical importance of management support for the successful operation of BI systems. Only 2% of respondents viewed management support as least influential, further highlighting its significance in ensuring the effectiveness of BI initiatives.

4.7 Expected Economic Impact

The third objective of the study was to explore the respondents' perceptions regarding the effect of improved tax compliance through Business Intelligence (BI) in Kenya. Respondents were presented with suggestions regarding the potential impact and asked to select their opinions

accordingly. Additionally, respondents were encouraged to provide any additional suggestions they had. Figure 4.12 illustrate the various responses provided by the respondents.

5.1. From your perspective, what economic benefits do you expect as a result of improved tax compliance through business intelligence in Kenya? (Check all that apply)

89 responses

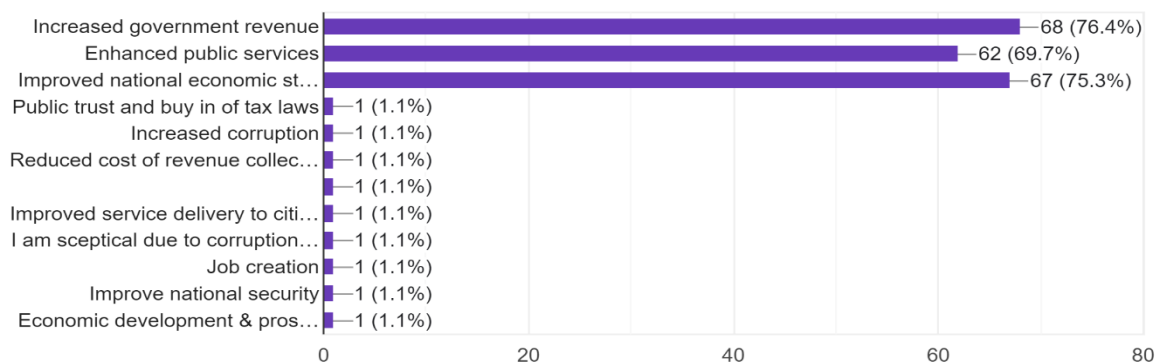


Figure 4.12: Respondents Opinion on Effect of BI on Economic Development

Source: Researcher (2024)

From Figure 4.12, it is evident that 76.4% of respondents believe that improved tax compliance through Business Intelligence would result in an increase in government revenue. This perception is supported by numerous studies. International research has shown that countries that have effectively utilized BI in tax administration have experienced significant improvements in revenue collection. For example, Singapore's Inland Revenue Authority utilizes advanced analytics to identify risk factors for tax evasion, allowing them to allocate resources more efficiently to high-risk cases (International Monetary Fund, 2021). Similarly, the Internal Revenue Service (IRS) of the United States employs data analytics to detect fraudulent tax returns and enhance compliance. Implementing BI could offer a transformative solution to Kenya's tax compliance challenges. By doing so, the government stands to significantly increase its revenue (IMF, 2021).

Fauvelle-Aymar (1999) investigated differences in the level of tax revenue among developing countries, contending that tax revenue is negatively affected by the degree of taxpayer noncompliance. The data she collected from the developing countries (1980-89) supported the theoretical prediction that tax revenue increases with taxpayer compliance.

From Figure 4.12, it is apparent that enhancing public services is a significant impact of improved tax compliance through Business Intelligence. A notable 69.7% of respondents indicated that increased revenue resulting from improved tax compliance would lead to enhanced public services provided by the government. With increased revenue, the government should be better equipped to provide more and higher-quality services to its citizens. Additionally, respondents expressed that improved tax compliance through Business Intelligence contributes to economic stability. A substantial 75.3% of respondents shared this view, indicating the perceived importance of tax compliance in fostering economic stability within the country.

4.8 Qualitative Analysis

4.8.1 Understanding the Role of Business Intelligence in Enhancing Tax Compliance

The integration of business intelligence (BI) tools into tax administration is pivotal for enhancing tax compliance. These tools offer advanced data analysis and management capabilities, which help tax authorities improve accuracy, efficiency, and overall effectiveness in monitoring and ensuring tax compliance. This section explores the role of BI in tax compliance by examining the experiences of KRA employees with BI tools, the specific systems and technologies in use, and the benefits realized through their application.

Experience with Business Intelligence Tools

To grasp how BI tools contribute to tax compliance, it is essential to understand their practical application within tax departments. This question seeks to uncover the firsthand experiences of KRA employees with BI tools, focusing on their usage and impact within their departments.

"Business intelligence tools have significantly transformed our approach to managing tax compliance. For example, our department uses data analytics platforms to monitor and analyze tax returns in real-time. This allows us to identify discrepancies and patterns that could indicate potential non-compliance." (KIR 001)

The response highlights the transformative effect of BI tools on tax compliance management. The use of data analytics platforms enables real-time monitoring and analysis of tax returns, which is crucial for detecting discrepancies and potential non-compliance. This shift from traditional methods to advanced BI tools demonstrates a more proactive approach to tax compliance, emphasizing the tools' role in enhancing the department's capability to manage and address tax-related issues effectively.

Specific Business Intelligence Systems and Technologies

Understanding the specific BI systems and technologies used at KRA provides insight into how these tools are integrated into tax compliance processes. This question explores the particular systems employed and their role in the overall tax administration framework.

"At KRA, we employ several business intelligence systems, including a comprehensive data warehousing solution and advanced analytics tools. These systems are integrated into our tax compliance processes by consolidating data from various sources, such as tax filings and payment records. This integration allows for comprehensive analysis and reporting, which supports decision-making and policy formulation." (KIR 005)

The response details the BI systems utilized by KRA, such as data warehousing solutions and advanced analytics tools. These systems are integrated into tax compliance processes by consolidating data from multiple sources, enabling comprehensive analysis and reporting. This integration is essential for providing a complete view of tax-related activities, which supports informed decision-making and policy development. The use of these specific systems illustrates how BI tools enhance the efficiency and effectiveness of tax administration.

Benefits of Using Business Intelligence for Tax Administration

Identifying the benefits of BI tools in tax administration is crucial for understanding their value. This question explores the key advantages of BI, focusing on how these tools improve tax compliance and the overall effectiveness of tax administration.

"One of the key benefits of using business intelligence in tax administration is its ability to improve data accuracy and integrity. BI tools help us identify errors and inconsistencies in tax returns, which can lead to more accurate assessments and better compliance. Additionally, BI enhances our capacity for predictive analysis, allowing us to anticipate potential compliance issues before they arise." (KIR 006)

The response outlines several significant benefits of BI in tax administration. BI tools enhance data accuracy and integrity by identifying errors and inconsistencies in tax returns, leading to more precise assessments and improved compliance. Furthermore, BI facilitates predictive analysis, enabling tax authorities to foresee and address potential compliance issues proactively. These benefits underscore the importance of BI tools in enhancing the efficiency and effectiveness of tax administration through improved data management and foresight.

4.8.2 Identifying the Challenges and Opportunities in Implementing Business Intelligence for Tax Compliance

While business intelligence (BI) offers significant benefits for enhancing tax compliance, its implementation can present various challenges and opportunities. This section aims to identify the obstacles encountered in implementing BI solutions, explore areas for improvement, and discuss how BI could be leveraged more effectively to address issues of tax evasion and non-compliance.

Challenges in Implementing Business Intelligence Solutions

Understanding the challenges faced during the implementation of BI solutions is crucial for identifying areas that need attention and improvement. This question explores the specific difficulties experienced by KRA employees in integrating and utilizing BI tools for tax compliance.

"One of the major challenges we've encountered is the complexity of integrating BI systems with existing tax administration processes. The systems often require significant customization to align with our unique needs, which can be both time-consuming and costly. Additionally, there are issues related to data quality and consistency, as well as resistance from staff who may be unfamiliar with the new technology." (KIR 009)

The response highlights several key challenges in implementing BI solutions. The complexity of integrating BI systems with existing processes requires substantial customization, which can lead to increased costs and time delays. Data quality and consistency issues also pose significant challenges; as inaccurate or inconsistent data can undermine the effectiveness of BI tools. Additionally, resistance from staff unfamiliar with the technology can hinder successful implementation. These challenges underscore the need for careful planning and support during the integration of BI systems to ensure their effective use in tax compliance.

Gaps and Areas for Improvement

Identifying gaps and areas for improvement in the current use of BI is essential for optimizing its effectiveness. This question seeks to uncover any deficiencies in how BI is currently utilized and explore potential improvements within the department.

"One gap we've identified is the lack of real-time data processing capabilities. While our BI systems provide valuable insights, they often rely on outdated or batch-processed data, which can delay decision-making. Additionally, there is a need for more advanced analytics tools to enhance our ability to detect and predict tax evasion patterns." (KIR 010)

The response points out significant gaps in the current use of BI tools. The reliance on outdated or batch-processed data limits the effectiveness of BI systems by delaying the availability of critical information for decision-making. The need for more advanced analytics tools to detect and predict tax evasion patterns further highlights the limitations of the current BI setup. Addressing these gaps could improve the timeliness and accuracy of insights provided by BI systems, enhancing their overall utility in tax compliance.

Utilization of Business Intelligence to Address Tax Evasion

Exploring how BI could be better utilized to address tax evasion and non-compliance is crucial for leveraging its full potential. This question investigates strategies for enhancing BI applications to improve tax enforcement and compliance efforts.

"I believe that business intelligence could be more effectively utilized by incorporating machine learning algorithms to analyze historical tax data and identify potential patterns of evasion. Additionally, integrating BI with other government databases could provide a more comprehensive view of taxpayer activities, enabling us to detect inconsistencies and potential fraud more efficiently." (KIR 007)

The response suggests advanced strategies for enhancing BI utilization to combat tax evasion. Incorporating machine learning algorithms into BI systems could improve the analysis of historical tax data and reveal patterns indicative of evasion. Integrating BI with other government databases would provide a broader and more comprehensive view of taxpayer activities, improving the detection of inconsistencies and potential fraud. These suggestions highlight the potential for BI to be a more powerful tool in addressing tax evasion and non-compliance through advanced data analysis and integration.

4.8.3 The Impact of Business Intelligence on Tax Compliance Outcomes

The impact of business intelligence (BI) tools on tax compliance outcomes is a critical area of investigation. This section examines how BI has influenced overall tax compliance rates, its role in detecting and preventing tax fraud, and its contribution to more efficient tax collection and administration. By understanding these aspects, we can assess the effectiveness of BI in enhancing tax compliance and identify areas for further improvement.

Impact on Overall Tax Compliance Rates

Assessing how the introduction of BI tools has influenced overall tax compliance rates helps measure their effectiveness in improving tax adherence. This question explores the direct effects of BI implementation on compliance outcomes within the department.

"Since the introduction of business intelligence tools, we've observed a noticeable improvement in overall tax compliance rates. The BI systems have provided us with better insights into taxpayer behaviors and compliance trends, which has allowed us to target our enforcement efforts more effectively. As a result, we've seen a reduction in non-compliance and an increase in voluntary tax payments."
(KIR 003)

The response indicates a positive impact of BI tools on tax compliance rates. Improved insights into taxpayer behaviors and compliance trends have enabled more effective targeting of enforcement efforts, leading to reduced non-compliance and increased voluntary tax payments. This suggests that BI tools are enhancing the department's ability to monitor and influence tax compliance, contributing to better overall tax adherence.

Role in Detecting and Preventing Tax Fraud

Understanding the role of BI in detecting and preventing tax fraud is essential for evaluating its effectiveness in safeguarding the tax system. This question investigates how BI tools contribute to identifying fraudulent activities and preventing tax evasion.

"Business intelligence plays a crucial role in detecting and preventing tax fraud by analyzing large volumes of data to identify anomalies and suspicious patterns. The advanced analytics capabilities of our BI systems allow us to flag unusual transactions and cross-reference data across different sources, which helps in uncovering fraudulent activities before they escalate." (KIR 004)

The response highlights the critical role of BI in fraud detection and prevention. BI tools' ability to analyze large datasets and identify anomalies enables the department to flag suspicious activities and cross-reference information, thereby uncovering fraud before it becomes a significant issue. This proactive approach enhances the department's ability to maintain the integrity of the tax system and prevent fraudulent activities effectively.

Contribution to Efficient Tax Collection and Administration

Evaluating how BI has contributed to more efficient tax collection and administration provides insight into its operational benefits. This question explores the specific ways in which BI tools have streamlined tax processes and improved administrative efficiency.

"Business intelligence has significantly contributed to more efficient tax collection and administration by automating data processing and reporting tasks. The BI systems have streamlined our workflow by providing real-time analytics and reports, reducing manual effort and errors. This automation has allowed us to

focus more on strategic initiatives rather than routine administrative tasks." (KIR 001)

The response emphasizes the operational benefits of business intelligence (BI) tools in tax collection and administration. Automation of data processing and reporting tasks has significantly reduced manual effort and errors, leading to more efficient workflows and streamlined operations. Real-time analytics and reporting capabilities enable the department to focus on strategic initiatives and make data-driven decisions, enhancing overall operational efficiency. This operational efficiency not only improves compliance but also optimizes administrative processes, suggesting that BI tools contribute to a more effective and responsive tax administration system. By integrating advanced analytics and automation, BI tools help transform tax administration into a more agile and efficient operation, ultimately leading to better management of tax compliance.

4.8.4 The Effectiveness of Business Intelligence in Addressing Tax Compliance Issues

Evaluating the effectiveness of business intelligence (BI) tools in addressing tax compliance issues involves a multifaceted approach. It starts with examining how BI tools impact tax compliance by assessing metrics such as improved compliance rates, reduced audit times, and enhanced fraud detection accuracy, which collectively indicate their effectiveness. Understanding taxpayer feedback is also crucial; responses often highlight increased transparency and efficiency but may also raise concerns about data privacy and system complexity. This feedback provides insight into the overall impact of BI tools on the taxpayer experience and identifies areas for improvement.

Additionally, exploring future advancements in BI, such as artificial intelligence, machine learning, and blockchain technology, is essential for identifying opportunities to further enhance tax compliance efforts. These innovations promise to revolutionize tax compliance management through advanced data analysis, predictive capabilities, and improved data security. By integrating these elements—impact metrics, taxpayer feedback, and future advancements—this evaluation aims to offer a comprehensive understanding of BI tools' contributions to tax compliance, highlighting their strengths, identifying areas for improvement, and outlining promising future directions.

Measuring the Effectiveness of BI Tools

Understanding how the effectiveness of BI tools in improving tax compliance is measured provides insights into the metrics and criteria used to evaluate their impact. This question explores the methods and indicators used to assess BI tools' contributions to tax compliance.

"We measure the effectiveness of business intelligence tools through several metrics, including improvements in compliance rates, the reduction in audit times, and the accuracy of fraud detection. Key performance indicators (KPIs) such as the number of compliance cases resolved, the speed of tax return processing, and the volume of detected discrepancies are regularly monitored to evaluate the impact of BI tools." (KIR 004)

The response highlights the use of various metrics to gauge the effectiveness of BI tools in tax compliance. Key indicators include improvements in compliance rates, reduced audit times, and enhanced accuracy in fraud detection. Metrics such as resolved compliance cases, processing speed, and detected discrepancies are crucial for assessing the impact of BI tools. By monitoring these key performance indicators (KPIs), the study provides a comprehensive view of how BI tools contribute to improving tax compliance, showcasing their role in streamlining processes and enhancing the overall efficiency of tax administration. Additionally, regular evaluations and feedback loops ensure that BI tools evolve to address emerging challenges, thereby continually refining their effectiveness and adapting to changing tax environments.

Taxpayer Feedback on BI Tools

Examining feedback from taxpayers regarding the use of BI tools in the tax process sheds light on the perceived effectiveness and acceptance of these tools. This question seeks to understand taxpayers' perspectives on how BI tools impact their experience with tax compliance.

"Feedback from taxpayers has generally been positive, with many appreciating the increased transparency and efficiency that BI tools have introduced. However, some have expressed concerns about data privacy and the complexity of new systems. Overall, taxpayers feel that the improvements in processing times and the accuracy of tax assessments have enhanced their experience." (KIR 003)

The response indicates that taxpayers have mostly positive feedback about BI tools, particularly appreciating increased transparency and efficiency in the tax process. They have noted significant

improvements in processing times and accuracy, which contribute to a more streamlined and reliable experience. However, there are concerns regarding data privacy and system complexity, which have raised some apprehensions among users. Overall, the general sentiment remains favorable, reflecting the effectiveness of BI tools in enhancing the taxpayer experience. Nonetheless, this feedback also highlights areas where further improvements could be made, emphasizing the need to address privacy issues and simplify system interfaces to maximize the benefits of business intelligence in tax administration.

Future Advancements in BI for Tax Compliance

Exploring future advancements and innovations in BI that could further enhance tax compliance provides insight into potential areas for development and improvement. This question aims to identify emerging technologies or approaches that could impact tax compliance positively.

"Looking ahead, advancements such as artificial intelligence and machine learning are expected to further enhance tax compliance. These technologies could provide more sophisticated data analysis and predictive capabilities, helping to identify potential compliance issues before they arise. Additionally, integrating BI tools with blockchain technology could improve data security and accuracy in tax reporting." (KIR 001)

The response suggests that future advancements like artificial intelligence, machine learning, and blockchain technology hold significant promise for improving tax compliance. AI and machine learning could offer advanced data analysis and predictive capabilities, allowing for more accurate forecasting and detection of anomalies. Blockchain could enhance data security and accuracy, ensuring transparency and reducing the risk of fraudulent activities. These innovations could address current challenges and provide more effective solutions for managing tax compliance, indicating a promising direction for the evolution of BI tools. Embracing these technologies could lead to more robust and adaptive tax compliance systems, ultimately supporting better enforcement and compliance practices.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMENDATIONS

5.1 Introduction

This chapter presents a summary of the findings generated in the previous chapter and the conclusions that can be drawn from the above findings. It also highlights policy recommendations that as well as suggestions for further studies.

5.2 Summary of the research findings

The main objective of the study was to examine the role of Business Intelligence (BI) in enhancing tax compliance in Kenya. To accomplish this, the study delineated three specific objectives: assessing the impact of BI on tax compliance, identifying key factors influencing the effectiveness of BI in tax compliance, and evaluating the anticipated economic impact of improved tax compliance through BI in Kenya. This study holds significant importance and timeliness, particularly in light of the ongoing debt crisis faced by the country. As Kenya seeks avenues to bolster revenue, leveraging BI to enhance tax compliance emerges as a promising strategy. By improving tax compliance, the country stands to generate more revenue, thereby facilitating the provision of better government services.

The results of the first objective revealed a significant influence of Business Intelligence (BI) on tax compliance in Kenya. The study found that a unit increase in BI corresponded to a 39% change in tax compliance. This finding was further supported by descriptive statistics, which involved interviews with numerous tax experts from KRA. Over 54.5% of these experts believed that there existed a positive relationship between BI and tax compliance. This assertion was subsequently confirmed by inferential statistics, affirming the crucial role of BI in enhancing tax compliance.

The analysis also revealed several other factors that impact tax compliance. One such factor is the tax rate, which exhibited a negative relationship with tax compliance. This suggests that reducing tax rates could potentially increase tax compliance. Both descriptive and inferential statistics indicated that an increase in tax rate by one unit resulted in a 2% reduction in tax compliance.

Additionally, compliance cost was found to negatively affect tax compliance. Taxpayers are more inclined to avoid paying taxes when compliance costs are high. The analysis showed that an increase in compliance cost by one unit led to a reduction in tax compliance by 0.223.

Furthermore, the nature of the tax was identified as a factor influencing tax compliance. Compliance rates were higher for taxes that are withheld at the source compared to taxes that require taxpayers to declare their income.

Descriptive statistics highlighted that taxpayers generally strive to adhere to tax compliance requirements set by the taxing authority. However, there is a need for Business Intelligence to verify the accuracy of the data provided.

Regarding the requirement for a Personal Identification Number (PIN), the majority of respondents indicated significant adherence to this requirement. This is likely because participation in meaningful economic activities in Kenya typically requires a PIN.

From the analysis, there are major factors that were found to affect the effectiveness of Business Intelligence. They included data quality and accuracy which the respondents ranked as the most influential tool in improving the effectiveness of BI. Staff training on BI tools was also one of the significant factors to be considered. In addition, for BI to be effective, the top management must support it, through funding, training the staff and protecting it from external attack. It was also evident from the analysis that for BI to be effective it must be integrated with other existing systems. This would greatly help it to be effective and improve tax compliance. Adequate funding must be provided to facilitate BI implementation. Without funding very little can be achieved through BI.

Finally, it was evident that Business Intelligence (BI) holds the potential to significantly contribute to the economic development of the country. BI facilitates tax compliance among taxpayers, leading to increased revenue for the government. With higher revenue, the government can enhance the provision of public services, ultimately improving the standard of living for all citizens in the country. This cycle of increased revenue, improved public services, and enhanced living standards underscores the crucial role that BI can play in driving economic growth and development.

5.3 Conclusions

The study underscores the pivotal role of Business Intelligence (BI) in fostering tax compliance. It emphasizes the necessity for government support and increased funding for the management of BI initiatives. Additionally, the study highlights the importance of integrating BI with existing systems to ensure its success.

Furthermore, the results of the study indicate that tax compliance levels are influenced by various factors, including tax rates, compliance costs, the nature of taxes, and enforcement instruments. The study empirically tested relationships derived from existing literature regarding the impact of these factors on tax compliance levels.

Notably, the study suggests that different factors have varying effects on tax compliance levels for individual taxpayers and corporations. In order to enhance tax compliance, the study recommends that the government focuses on reducing compliance costs. By reducing these costs, the likelihood of taxpayers avoiding or failing to comply with tax obligations is diminished, ultimately contributing to increased tax compliance levels.

5.4 Recommendations

The empirical findings yield several policy implications. Firstly, it is evident that Business Intelligence (BI) has a positive impact on tax compliance. Therefore, it should be a priority for the taxing authority to invest in BI initiatives to enhance tax compliance and boost government revenue.

To further improve the effectiveness of BI, increased funding towards its development and enhancement should be prioritized. Additionally, training programs for KRA staff and investments in modern technology are essential to ensure efficiency and effectiveness in BI implementation.

In order to minimize tax avoidance and evasion, it is imperative that the taxing authority ensures the cost of compliance is kept low. This can be achieved through streamlined processes and reduced administrative burdens for taxpayers.

Moreover, punitive measures should be implemented to deter taxpayers from non-compliance with tax requirements. Strong enforcement mechanisms and penalties for non-compliance should be enforced to maintain tax discipline and uphold compliance standards.

Prudent use of taxpayers' money by the government is crucial for building taxpayer confidence and encouraging full income declaration, leading to increased tax revenues. As observed in the research, high tax rates negatively impact tax compliance, suggesting a need for the government to consider reducing tax rates to enhance compliance.

Furthermore, the study suggests that the government should provide additional incentives for tax compliance among both individuals and corporations. These incentives would

complement existing enforcement measures and encourage voluntary compliance with tax obligations. By offering incentives, such as tax credits or deductions, the government can motivate taxpayers to fulfill their tax obligations willingly, thereby fostering a culture of compliance and contributing to overall tax revenue growth.

5.5 Area for further research

Conducting a comprehensive study on Business Intelligence (BI) and tax compliance across Kenya's 47 counties would provide valuable insights into regional variations and trends. Such a study would help policymakers tailor strategies and interventions to address specific challenges and leverage opportunities unique to each county.

Furthermore, a comparative analysis between the service, manufacturing, and agricultural sectors would offer valuable insights into sector-specific tax compliance patterns. This comparative study would enable policymakers to identify sectors with higher compliance levels and prioritize resources and support accordingly.

Additionally, investigating the role of technology and innovation in BI would be crucial for understanding how advancements in technology can enhance BI capabilities and improve tax compliance. Exploring innovative BI solutions and their effectiveness in different sectors and regions would inform policymakers about the most effective strategies for leveraging technology to enhance tax compliance efforts.

Overall, conducting these studies would provide policymakers with a deeper understanding of BI's role in tax compliance and inform evidence-based policy decisions aimed at fostering greater compliance and revenue generation.

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APPENDICES

Appendix I: Questionnaire for KRA Employees

Dear Respondent,

My name is **Michael M. Gichuki**, a postgraduate student at the National Defence University-Kenya, pursuing a Masters of Arts degree in National Security and Strategy. I am conducting a study on **Business Intelligence and Tax Compliance in Kenya**. You have been identified as a key informant to provide reliable and useful information in respect of the study. The information obtained will be acknowledged, credited and strictly used for academic purposes with utmost confidentiality.

Thank you for your kind cooperation.

Section 1: General Information

Please mark the applicable response with a $\sqrt{}$ or $\times$

1.1 Position: _____

Department: _____

1.2 Gender of the respondent

- | | |
|-----------|-----|
| a) Male | [] |
| b) Female | [] |

1.3. Years of Experience at KRA

- | | |
|-----------------------|-----|
| a. Less than 1 year | [] |
| b. 1-5 years | [] |
| c. 6-10 years | [] |
| d. More than 10 years | [] |

1.4 Highest Level of Education

- | | |
|------------------------|-----|
| a) Postgraduate | [] |
| b) Undergraduate | [] |
| c) College Certificate | [] |
| d) High school | [] |
| e) Primary school | [] |

1.5 Age of the respondent

- | | |
|------------|-----|
| a) 20 – 30 | [] |
| b) 30 – 40 | [] |

- c) 40 - 50 []
- d) Above 50 []

Section 2: Assessing the Impact of Business Intelligence on Tax Compliance

2.1. To what extent do you believe that Business Intelligence tools have positively impacted tax compliance in Kenya?

- a) Not at all []
- b) Slightly []
- c) Moderately []
- d) Very much []
- e) Extremely []

2.2. In your opinion, what specific aspects of tax compliance have been improved through the implementation of Business Intelligence? (Please check all that apply)

- a) Timeliness and accuracy of filing tax returns []
- b) Payment of correct taxes []
- c) Identification of tax evasion []
- d) Monitoring of taxpayer behavior []
- e) Other (please specify):

.....

2.3. Have you personally observed any challenges or limitations in the use of Business Intelligence tools for tax compliance? If yes, please elaborate.

.....

Section 3: Factors Influencing the Effectiveness of Business Intelligence

3.1. In your view, what are the key factors that influence the effectiveness of Business Intelligence in improving tax compliance in Kenya? (Rank them from 1 to 5, with 1 being the most influential and 5 being the least)

- a) Data quality and accuracy []
- b) Staff training on BI tools []
- c) Integration with existing systems []
- d) Adequate financial resources for BI implementation []
- e) Support from top management []

3.2. Are there any additional factors that you think significantly affect the success of business intelligence in enhancing tax compliance?

.....

Section 4: Other Factors Affecting Tax compliance

4.1 Tax Rate

a) In your opinion, do you think Kenya taxation rate is high?

Yes [] No []

b) If yes does this high rate discourage Kenyans from being tax compliant?

Yes [] No []

c) Does the amount payable in terms of taxes influence the taxpayer's compliance?

Yes [] No []

d) In your opinion does size of the firm determine tax compliance

Yes [] No []

Explain

why.....

4.2 Compliance Cost

On a five-point scale, where [1] = Not at all, [2] = Less extent, [3] = Some extent, [4] = Great extent, [5] = Very Great extent, to what extent do the following expenses affect taxpayers' compliance levels?

Aspects	5	4	3	2	1
Cost of employing new staff					
Software and internet					
Tax filing process					
Actual payment of taxes					
Maintenance of proper records					

4.3 Nature of tax

On a five-point scale where [1] = Not at all, [2] = Less extent, [3] = Some extent, [4] = Great extent, [5] = Very Great extent, indicate the extent to which each of the following affect tax payer's compliance levels?

Aspects	5	4	3	2	1
Frequency of filing the return					
How the tax is remitted (directly or indirectly)					
Source of income the tax is based on					
Ability of KRA accessing information					
Complexity of tax laws					

4.3 Enforcement Instruments

On a five-point scale where [1] = Not at all, [2] = Less extent, [3] = Some extent, [4] = Great extent, [5] = Very Great extent, indicate the extent to which each of the following affect the tax compliance levels?

Aspects	5	4	3	2	1
Use of information from 3 rd parties by KRA					
Tax penalties and fines					
Prompt audit and prosecution of tax offenders					
Ability of KRA to detect under declared tax returns					
How government uses the tax collected					

Section 5: Expected Economic Impact of Improved Tax Compliance

5.1. From your perspective, what economic benefits do you expect as a result of improved tax compliance through business intelligence in Kenya? (Check all that apply)

- a) Increased government revenue [☐]
- b) Enhanced public services [☐]
- c) Improved national economic stability [☐]

d) Other (please specify): _____

5.2. How do you think improved tax compliance contributes to the overall economic growth of Kenya?

.....

.....

.....

.....

Section 6.: Additional Comments
--

6.1. Do you have any additional comments, suggestions, or insights regarding the role of Business Intelligence on tax compliance in Kenya?

.....

.....

.....

Thank you.

Appendix II: Questionnaire for Individuals and Companies

Dear Respondent,

My name is **Michael M. Gichuki**, a postgraduate student at the National Defence University-Kenya, pursuing a Masters of Arts degree in National Security and Strategy. I am conducting a study on **Business Intelligence and Tax Compliance in Kenya**. You have been identified as a key informant to provide reliable and useful information in respect of the study. The information obtained will be acknowledged, credited and strictly used for academic purposes with utmost confidentiality.

Thank you for your kind cooperation.

SECTION 1: GENERAL INFORMATION

Please mark the applicable response with a $\sqrt{}$ or $\times$

1.1 Gender of the respondent

c) Male ☐

d) Female ☐

1.2 Age of the respondent

e) 20 – 30 ☐

f) 30-40 ☐

g) 40-50 ☐

h) Above 50 ☐

1.3 Highest Level of Education

f) Postgraduate ☐

g) Undergraduate ☐

h) College Certificate ☐

i) High school ☐

j) Primary school ☐

1.4 Have you been paying taxes?

Yes ☐ No ☐

- 1.5 In your opinion, failure to pay taxes is;
- a) Wrong and punishable []
 - b) Wrong but understandable []
 - c) Not wrong at all []
- 1.6 What are your sources of income?
- a) Employment income []
 - b) Business income []
 - c) Others []
- 1.7 Employment terms:
- a) Permanent terms []
 - b) Contractual employment []
 - c) Self-employment []
- 1.8 What is the number of employees in your firm?
- a) Less than 10 []
 - b) 10- 20 []
 - c) 20 -100 []
 - d) Above 100 []
 - e) Not applicable []

SECTION 2.0: FACTORS INFLUENCING TAX COMPLIANCE
--

- 2.1 Do you pay taxes?
- Yes [] No []

- 2.2 In your opinion is Kenyan tax rate high?
- Yes [] No []

2.3 Compliance requirements

On a five-point scale where [1] = Not at all, [2] = Less extent, [3] = Some extent, [4] = Great extent, [5] =Very Great extent, indicate the extent to which you adhere to the following tax compliance requirements.

Compliance requirement	5	4	3	2	1
Obtaining a personal identification number (PIN) when its due					
Accurate calculation of tax due					
Accurate and prompt declaration of tax due					
Filing of returns on income by the prescribed date					
Paying of tax dues by the prescribed date					
Payment of fines and penalties for overdue taxes					
Cooperation with KRA officers in conducting audits by providing all the necessary records					

2.4 Cost of compliance

On a five-point scale, where [1] = Not at all, [2] = Less extent, [3] = Some extent, [4] = Great extent, [5] =Very Great extent, to what extent do the following expenses affect payers tax compliance levels?

Aspects	5	4	3	2	1
Cost of employing new staff					
Software and internet					
Tax registration process					
Actual payment of taxes					
Maintenance of proper records					

2.5 Nature of tax

On a five-point scale where [1] = Not at all, [2] = Less extent, [3] = Some extent, [4] = Great extent, [5] =Very Great extent, indicate the extent to which each of the following affect tax payer's compliance levels?

Aspects	5	4	3	2	1
Frequency of filing the return					
How the tax is remitted (directly or indirectly)					
Source of income the tax is based on					
Ability of KRA accessing information					
Complexity of Law relating to taxation					

2.6 Enforcement Instruments

On a five-point scale where [1] = Not at all, [2] = Less extent, [3] = Some extent, [4] = Great extent, [5] =Very Great extent indicate the extent to which each of the following affect your tax compliance levels?

Aspects	5	4	3	2	1
Use of information from 3 rd parties by KRA					
Fines and penalties					
Prompt audit and prosecution of tax offenders					
Ability of KRA to detect under declared returns					
How government uses the tax collected					

Thank You

Appendix III: Interview Guide

Introduction

Thank you for participating in this interview. The purpose of this discussion is to explore the role of business intelligence in enhancing tax compliance within Kenya. Your insights will contribute to understanding how business intelligence tools are utilized, the challenges faced, and the impact they have on tax compliance. The information gathered will be valuable in assessing the effectiveness of these tools and identifying areas for improvement.

Section A: Understand the Role of Business Intelligence in Enhancing Tax Compliance

1. Can you describe your experience with business intelligence tools within your department?

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.....
.....
.....

2. What specific business intelligence systems or technologies are used at KRA, and how are they integrated into the tax compliance processes?

.....
.....
.....
.....

3. In your view, what are the key benefits of using business intelligence for tax administration?

.....
.....
.....

Section B: Identify the Challenges and Opportunities in Implementing Business Intelligence for Tax Compliance

4. What challenges have you encountered in implementing business intelligence solutions for tax compliance?

.....
.....
.....
.....

5. Can you identify any gaps or areas for improvement in the current use of business intelligence within your department?

.....
.....
.....
.....

6. How do you think business intelligence could be better utilized to address issues of tax evasion or non-compliance?

.....
.....
.....
.....

Section C: The Impact of Business Intelligence on Tax Compliance Outcomes

7. How has the introduction of business intelligence tools impacted the overall tax compliance rates in your department?

.....
.....
.....

8. What role do you think business intelligence plays in detecting and preventing tax fraud?

.....
.....
.....

9. In what ways has business intelligence contributed to more efficient tax collection and administration?

.....
.....
.....

Section D: The Effectiveness of Business Intelligence in Addressing Tax Compliance Issues

10. How do you measure the effectiveness of business intelligence tools in improving tax compliance?

.....
.....
.....

11. What feedback have you received from taxpayers regarding the use of business intelligence tools in the tax process?

.....
.....
.....

12. Looking forward, what advancements or innovations in business intelligence do you believe could further enhance tax compliance?

.....
.....
.....

Thanks

Appendix IV: Work Plan

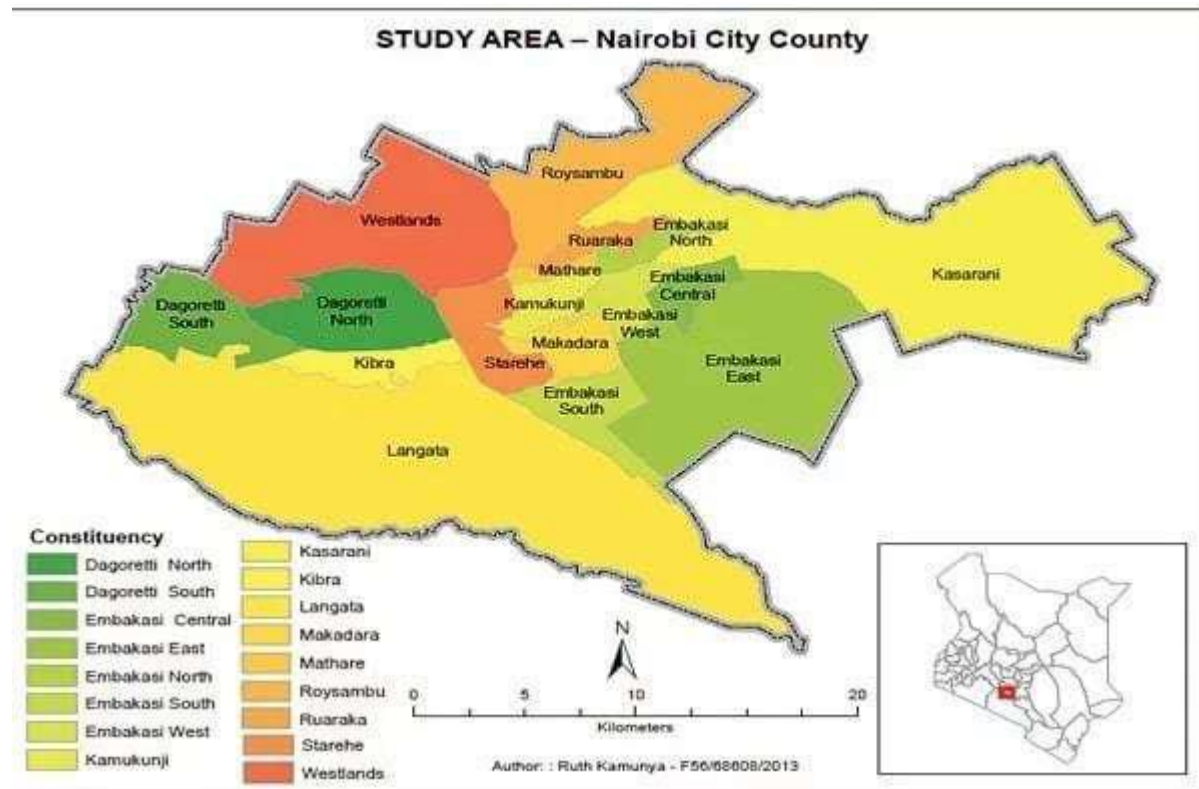
Phase	Activities	Timeline
Preparation	Define research objectives and questions	Weeks 1
	Conduct literature review	Weeks 2-5
	Develop research design and methodology	Weeks 6-8
	Secure ethical approvals and clearances	Weeks 9-10
Data Collection	Design and finalize data collection instruments	Weeks 11-12
	Pilot data collection instruments	Weeks 13-14
	Administer surveys and conduct research	Weeks 15-18
Data Analysis	Clean and organize quantitative data	Weeks 19-20
	Transcribe and code qualitative data	Weeks 21-22
	Quantitative data analysis	Weeks 23-25
	Qualitative data analysis	Weeks 26-27
Interpretation	Interpret research findings	Weeks 28-30
	Compare findings with literature and best practices	Weeks 31-32
Reporting	Write research report	Weeks 33-36
	Prepare presentations and visuals	Weeks 37-38
	Review, revise, and finalize research report	Weeks 39-40

Appendix V: Budget

Category	Item	Cost (USD)	Justification
Personnel	Researcher's salary	\$1,000	The remuneration of the researcher and research assistant are intended to compensate them for the time and effort they put into the project, which includes research design, data collecting, analysis, and reporting.
	Research assistant's salary	\$500	
Research Expenses	Data collection (surveys, interviews)	\$300	These expenses are for gathering data through surveys, interviews, and fieldwork. They also cover costs for research tools, data analysis software, and travel for data gathering.
	Data analysis software (e.g., SPSS)	\$200	
	Research materials and supplies	\$100	
	Travel for fieldwork or interviews	\$300	
Equipment	Laptop	\$1000	When managing projects, preparing reports, reviewing literature, and analyzing data, a laptop computer is a necessity.
Miscellaneous	Ethics clearance fees	\$200	This category includes costs related to obtaining ethics approval, a crucial component of human subjects' research. The final study papers' printing and binding expenses are also taken into account.
	Printing and binding of reports	\$200	
Contingency	Unforeseen expenses	\$300	To ensure flexibility in handling unanticipated scenarios, a contingency fund

	(10% of total)		is included to cater for unforeseen expenses that may develop throughout the study project.
Total Project Budget		\$4,100	

Appendix VI: Map of Study Area



Appendix VII: Approval From National Defence University-Kenya

Telephone: 051- 851141

Fax: 051-851046

Email: ndu-kenya@mod.go.ke

When Replying Please Quote:

Ref: NDU - K/AA & R/02



National Defence University-Kenya P O
Box 3812 – 20100
Nakuru, Kenya

23 November 2023

TO WHOM IT MAY CONCERN

RE: RESEARCH AUTHORISATION

Mr. Michael Mugendi Gichuki of National Defence College, a College of National Defence University-Kenya, successfully defended his Master of Arts research proposal and has been allowed to proceed to the field to collect data for his/her thesis.

The research's topic is, "**The Role of Business Intelligence and Analytics in Improving Tax Compliance and Economic Security in Kenya**". The Candidate will be conducting the field work with effect from December 2023.

The purpose of this letter, therefore, is to request you to accord him any necessary assistance to successfully conduct the research.

Your continued assistance is highly appreciated. Yours

faithfully,

Prof Anne W T Muigai

Deputy Vice-Chancellor
National Defence University-Kenya

Appendix VIII: Approval from NACOSTI



REPUBLIC OF KENYA



**NATIONAL
COMMISSION
FOR SCIENCE,
TECHNOLOGY
& INNOVATION**

Ref No: **641664**



Date of

Issue: **03/January/2024**

RESEARCH LICENSE

This is to Certify that Mr.. Michael Mugendi Gichuki of National Defence University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: The Role of Business Intelligence and Analytics in Improving Tax Compliance and Economic Security in Kenya for the period ending : 03/January/2025.

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 - ii. Adversely affect the lives of Kenyans
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 - iv. Result in exploitation of intellectual property rights of communities in Kenya
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14. The Commission shall have powers to acquire from any person the right in, or to, any scientific innovation, invention or patent of strategic importance to the country.
15. Relevant Institutional Scientific and Ethical Review Committee shall monitor and evaluate the research periodically, and make a report of its findings to the Commission for necessary action.

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Innovation(NACOSTI),
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