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Examining the Effects of Data Analytics on the Performance of Firms: A Case Study of the Banking Industry in Ndola District

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Abstract

This study's goal was to determine how business data analytics strategies affected the performance of banks in the Ndola district's banking sector. A descriptive research design was used with banks in the banking industry which served as the study's target demographic. To ensure that every bank in the population had an equal chance of being chosen, stratified and purposeful sampling was used. 50 employees were selected on purpose as the study's sample size. A questionnaire was used as a primary data gathering tool and was given to employees from at least 5 different departments, particularly in Information Technology, Finance, Operations, Marketing and Customer Service departments. The survey responses were reviewed and divided into a number of categories to make it easier to use descriptive statistics for analysis. The information collected from respondents was summarized using frequency distribution tables. To make the data easier to interpret and study, it was presented as frequency distribution tables, pie charts, and bar charts and in addition data narration was also used. The study found that banks in Ndola City's banking industry used reasonable data analytics techniques and tools to aid them in maintain and attaining a competitive

advantage, as well as mitigate financial risk and enhance customer experience. The research also showed that banks encountered many difficulties in the usage of business data analytics which includes organizational culture, human resource expertize, High Data Volume and Velocity, Support from top management, Customer trust and Transparency, Data Security and privacy. If performance of their banks were to remain competitive, the study advises banks in in Ndola District and other companies to implement good business data analytics practices. They should constantly make sure that the process is as inclusive as feasible while implementing data analytics practices. According to the study, commercial banks in Zambia's Ndola district should focus on business data analytics to identify patterns and correlations, improve resource management, and reduce bank hall congestion. The report also suggests that in order for Zambia's listed commercial banks to benefit as much as possible from business analytics technology, they should invest in the appropriate data analytics tools and enable their employees to use them and take appropriate action based on the knowledge they acquire.

Keywords: Data Analytics, Transparency, Performance, Data Security

1. Introduction

1.1 Background of the Study

Globally, digital banking operations and virtual banking systems are the result of progressive policies and technological advancements, especially in the areas of big data and information technology (Mcafee & Brynjolfsson, 2012; OECD, 2020). The phrase "business data analytics" (Delen & Ram, 2018) is relatively new in the business language. It refers to a concept that is essentially forward-looking and has developed from business intelligence (BI) (Janiesch, 2022). However, the terms "business analytics" (BA) and "big data analytics" (BDA) are frequently used interchangeably (Horani, 2023). Over the past few years, industry and academic communities have come to value business intelligence and data analytics, as well as the associated field of big data analytics (BDA), according to (Chen, 2012). However, the sole purpose of this study is to examine the impact that data analytics has in the 15 commercial banks that are registered under the bank of Zambia (BOZ, 2024). The most significant industry game changer is technology. Utilizing technology to promote growth is an important objective for every market player. The banks that adjust to technology changes the fastest are likely to see increases in client base and

revenue growth together with improvements in efficiency and customer service (PWC Zambia, 2016). In order to effectively design policies, monitor progress, and evaluate outcomes, the United Nations' 2030 Agenda for Sustainable Development and the global commitment to leave no one behind demand the collection, processing, and dissemination of an unprecedented amount of data, including disaggregated data (United Nations Report, 2019).

Businesses that employ big data to speed up the transformation process may find a wealth of insightful information and useful insights (Mikalef & Krogstie, 2020). Big data is the process of analyzing massive amounts of data so that different businesses and organizations (including banks, e-commerce, and insurance) can discover correlations and patterns in the spending habits of various demographics. This is where data analytics originates. This helps these industries find new opportunities, which leads to more profitable decisions, satisfied customers, and smarter business practices. Such information cannot be obtained with conventional information. Big Data was consequently developed to provide a way to handle enormous data and enable enterprises to grow at a faster pace.

Businesses utilizing big data might be more confident in their return on investment if they remove obstacles that might prevent them from fully putting the insights they have received from big data into practice. According to (Kagechu, 2019) in Kenya, the three main performance pillars improved by big data analytics are customer service, product alignment, and effective resource management. Firms and organizations are finding themselves with a limited choice of tactics that only slightly improves their performance in today's demanding business environment. Businesses in similar product-using industries that employ comparable technologies view business processes as one of their final lines of defense against analytics rivals who are extracting every last piece of value, as demonstrated by (Davenport, 2006). Businesses need to regularly assess their present goals and tactics in order to make the organization more successful in order to compete in the stated fast paced market. However, businesses in the same sector typically have comparable resources, which lessens their potential advantage and accounts for their relative performance. Data analytics adoption is at the forefront of the quest for improved business performance (DA).

There is currently a lack of information on the critical components influencing the effective use of BDA in banks, despite the importance of BDA in the banking industry and the high cost of infrastructure investment for BDA. Nonetheless, this study investigates whether BDA enhances bank performance and provides a conceptual model to evaluate the impact of variables influencing BDA adoption in the banking sector. The main goal of any business is to attain profits and have significant growth both in size of the organization as well as profits. (Chibwe, 2018) emphasizes that for the said business goals to be achieved which are measured through organizational performance and data analytics is an important tool in aiding strategic business decisions.

Data analytics is regarded as a key skill that can raise a company's success. Enhancing big data analytics skills should enable a business to operate at peak efficiency. This can be achieved through building big data analytics capabilities and figuring out what might encourage the development of those capabilities. Therefore, exceptional

company performance in an environment driven by data results from the ideal fusion of all available resources, including human resources (analytics expertise or knowledge), organizational resources (big data analytics management), and physical resources (IT infrastructure). These resources should be distinct and unmatched.

1.2 Statement of the Problem

Despite the increasing recognition of Data Analytics (DA) as a critical driver of sustainable performance, its effective application within the banking sector in Zambia remains insufficiently explored. While substantial investments have been made in data infrastructure, empirical evidence suggests that less than 0.5% of collected data is analyzed or effectively utilized (González-Carrasco *et al.*, 2019). The internal capabilities necessary for leveraging DA such as technical expertise, organizational readiness, and strategic integration are often underdeveloped or overlooked. Furthermore, existing literature predominantly focuses on the manufacturing sector, thereby creating a research gap concerning DA implementation in the banking industry. The complexities associated with Big Data extend beyond volume to include the ability to extract meaningful insights from vast and often unstructured datasets (Bughin, 2011). Zambian banks face considerable challenges related to inadequate hardware and software infrastructure, which impedes the efficient processing and analysis of such data. Consequently, data-driven decision-making is hindered, and technology adoption is frequently delayed or misaligned with institutional goals. Despite the widespread theoretical acceptance of DA, its practical implementation remains nascent, underscoring the need for a comprehensive, context-specific framework to guide its strategic application in the banking sector.

1.3 Objectives

1.3.1 General Objective

The general objective of this study was to examine the effect of data analytics on the performance of firms in the banking industry of Ndola district.

1.3.2 Specific Objectives

- 1 Analyzing data analytics tools and practices used in the banking sector.
- 2 Analyzing the effectiveness of data analytics in regards to the performance of firms.
- 3 Examining the challenges faced in the of usage of data analytics in the banking sector.

1.4 Research Questions

1. What data analytics tools and practices used in the banking sector?
2. What challenges are faced in the usage of data analytics in the banking industry?
3. What is the effectiveness of data analytics on the performance of firms?

1.5 Theoretical Framework

The Balanced Business Score Card Model will be explored in this research. However, the method includes a combination of financial and non-financial data in its four primary performance aspects. These comprise internal procedures, financial, customer, and learning and development. Previous researchers who have employed BSC in their research include Al-(Shubiri, 2012) to investigate

the impact of Business Intelligence on the performance of industrial firms; (Hou, 2015) to investigate the impact of Business Intelligence on firm performance; and (Owusu, 2017) to investigate the impact of BI on Ghanaian banks' performance. This methodology for measuring performance was produced by the study using a citation from Kaplan and Norton's (1992) study on the financial dimension of business science that supports the assessment of business intelligence achievement. Furthermore, the Resource Based Theory (RBV), which describes how a company integrates human skills and tangible and intangible resources to gain a unique competitive advantage in the market, has been identified as a functional theory for explaining the impacts of big data through knowledge generation in marketing (Erevelles *et al.* 2015). Market dynamics and habits are shifting as a result of the data revolution. While companies with resources and competencies to gain a competitive advantage are the focus of the contingent resource-based view (CRBV).

2. Literature Review

2.1 Analyzing data analytics tools and practices used in the banking sector

One of the first sectors to use Business Data Analytics for data-driven decision making is the banking sector (Hung, 2020; Al-Dmour, 2023). In 2010, there were just about two zettabytes of information on the planet; by 2020, that number had risen to 59 zettabytes. After 2019, the information started to produce quickly, and in the ensuing decades, it will produce more than six times as much. In addition, Analytics Insight claims that 2019 was a significant year for the big data industry. Data analytics effects on banking performance depend on a number of variables, such as talent, change management, industry dynamics, organizational culture, data quality, and technology infrastructure. Recognizing and addressing these factors is critical for firms looking to reap the benefits of big data analytics. Organizations can position themselves for greater performance results through big data efforts by investing in data quality and governance, guaranteeing access to the required resources and skills, and cultivating a culture of data-driven decision-making.

Following the company's merger with Cloudera and Hortonworks at the start of the year, big data is becoming more and more popular worldwide, and businesses are starting to realize how crucial data operations and orchestration are to their overall success. The big data sector is currently valued at US\$189 billion, up \$20 billion from 2018; it is expected to grow further, hitting US\$247 billion by 2022. Trends in Data Analytics indicate that machine learning will become the main focus, big data analytics will have a substantial impact on investment and cloud-based operations, and data scientists, officers, and managers will be in demand (Dialani, 2020). These trends are expected to bring in a substantial amount of money. For example, data innovation in cognitive computing is expected to be valued at around \$18.6 billion. In the US Data innovation in application infrastructure will reach almost \$11.7B, public safety and homeland security will reach about \$7.5B. In each scenario, market niche, and solution, the real-time data will also be regarded as a core value proposition. Additionally, the top businesses in the industry are fusing data innovation technologies with Internet of Things infrastructure at a quick pace. As such, data management must be taken into account in all innovation-related

decisions and business endeavors. The banking sector is the largest single source of data or innovation revenue, accounting for nearly 14% of total revenue. As a sector, data innovation is mostly related to discrete manufacturing, professional services, process manufacturing, and federal government activities (Adam *et al.*, 2014; Hassani *et al.*, 2018b). Among the major sectors, discrete manufacturing ranks second. It made up around 11.3% of the overall income. At 8.2% of total income, professional services continue to be at the same level as process manufacturing. Given the size of the banking sector, it is critical to recognize the benefits and obstacles of data innovation at every stage of the process. According to a 2019 Ferraris study, knowledge management and big data analytics capabilities have an impact on banking performance. The research's conclusions show that companies with superior BDA capabilities— both managerial and technological— performed better than others, and that KM orientation is crucial for amplifying the impact of BDA capabilities.

Banks have access to enormous volumes of data produced by their electronic platform business operations (Rao & Provodnikova, 2021). Banks today have access to a vast array of diversified and constantly growing customer data due to their numerous financial services, which include SME finance, online peer-to-peer lending, cryptocurrencies, trade management, money transfer, and mobile payment platforms (Hasan *et al.*, 2020). The appropriate administration and analysis of this data are deemed crucial by financial practitioners and specialists. Adopting BA is essential to banks' ability to modify their operations and procedures to satisfy customers, combat complex fraud schemes, and adhere to intricate legal requirements. Large amounts of consumer data, including demographics, financial circumstances, and transaction patterns, are currently being stored by banks from a variety of sources, such as over-the-counter sales, ATMs, mobile apps, and social networking sites (Hung *et al.*, 2020). Banks may use the power of BA to analyze these large datasets and provide individualized experiences based on individual preferences, increasing customer satisfaction and fostering loyalty. According to Ghasemaghaei and Calic (2020), "big data (Data Analytics)" refers to huge amounts of real-time accessible, structured and unstructured data. Many scholars and industry professionals have used the "Vs" idea to explain big data. According to Russom (2011), there are three distinguishing features of big data: volume, variety, and velocity. The vast amount of data generated and collected in the contemporary business environment—including through mobile devices and web apps—is covered in this volume. Variety is characterized as a spectrum of data models, including unstructured, semi-structured, and structured data that come from different sources and are challenging to assess using traditional analytical tools (Mohapatra & Mohanty, 2020). Velocity is the rate at which real-time data analysis and data generation are conducted to obtain actionable insights (Shukla, Muhuri, & Abraham, 2020). Additionally, banks can use data-driven projections to foresee trends and wants from their customers, enabling them to proactively offer pertinent goods and services that meet the changing needs of their clientele. Banks, for example, can improve their market targeting by classifying and segmenting consumer data according to services that are often used, credit card purchases, and other attributes. Statistical models and computational methods can then be

utilized to match customer characteristics with the most suitable product offerings (Power *et al.*, 2018). Moreover, predictive analytics enables bank managers to identify the most profitable customers, assess the likelihood of loan applicants defaulting, and promptly alert credit card customers about potential fraudulent activities. Using DA, one can identify areas that need to be optimized and streamlined, which can save a lot of money and increase productivity overall (Rahman, 2023). For instance, banks utilize prescriptive analytics to figure out how much cash ATMs should have on hand in order to run them as efficiently as possible. Overall, a number of important drivers have driven the adoption of DA in the banking sector, including the need to reduce costs while boosting operational efficiency, the expanding volume of data, and the increased focus on improving the customer experience. Adopting DA thereby helps banks function more efficiently, use resources wisely, and maintain their competitiveness in a constantly changing financial environment. (Omar Horani, 2023) observed that banking today interacts with clients through a variety of Internet channels or touchpoints. Horani did a study on Malaysian banks in regard to data analytics. Big data is proliferating as a result of this shift to the digital sphere, necessitating the use of sophisticated analytical techniques to efficiently manage service systems for banks. Data Analytics (DA) is one of the technology advances that are highlighted. These strategies utilize insights from data to improve customer experience and risk management in the banking business. Stakeholders from a variety of industries understand the opportunity and potential to use advanced analytics to Extract insights from data and make fact-based decisions as data storage and gathering technologies evolve throughout time (Kristoffersen, 2021). Thus, here's where data analytics come in. Due to its potential benefits for adopters across operational, tactical, and strategic levels in a variety of industries, including finance, financial services, insurance, manufacturing, and retail, data analytics (DA) emerges as one of the top methods for drawing decisive insights from data at this point and is gaining a lot of attention from academics and practitioners (Yalcin *et al.*, 2022; Horani *et al.*, 2023). The study further revealed that DA can be seen of as an iterative, methodical process that gathers, examines, and interprets data in order to obtain meaningful knowledge. The performance as a whole and the caliber of business judgments can both be greatly enhanced by this knowledge. The purpose of DA is to improve an organization's capacity to load, extract, and handle both historical and current data from many sources. In order to facilitate the interpretation and comprehension of the data, this procedure requires a clear depiction of the information flow inside an appropriate framework. To do this, BA makes use of cutting-edge technologies like Artificial Intelligence (AI) algorithms in addition to mathematical and statistical models. These technologies make it easier to make the best decisions, identify trends, and manage associated duties efficiently. A sequential variety of analytical techniques, including descriptive, predictive, and prescriptive methods, are used in the DA process (Schmitt, 2023). Every approach has its own set of tools and functions and is used for different objectives. In order to find hidden patterns and trends in data, for example, descriptive analytics uses both sophisticated data analysis and standard statistical approaches. Conversely, predictive analytics makes use of enormous volumes of data to predict future events by

leveraging machine learning and artificial intelligence approaches. Simultaneously, prescriptive analytics advances the procedure by employing optimization algorithms to improve forecasts and provide superior choices for action (Chen, 2020).

The findings of Kevin, Benard and Ronald (2013) on the adoption of information and communication technology (ICT) in the Tanzanian Banking Sector where the study utilized a qualitative research design, with the research instrument crafted from pre-defined measurement items sourced from previous studies. Questionnaires were disseminated to top and middle managers in selected banks in Tanzania through the snowball sampling technique. Partial least squares structural equation modeling (PLS-SEM) was employed to analyze the developed conceptual framework. Support from top management and the availability of financial resources Were identified as significant organizational factors, while the intensity of competition was recognized as a key environmental factor. The study, further suggested that while some factors are consistent across countries, there are also factors in each country. The researcher concluded that in Tanzania, for example, banks should invest more in ICT infrastructure, educate the public about the use of online banking products and lower fees on ICT devices. For this reason, it is interesting to understand better the BDA usage in the banking industry in the developing countries like in Tanzania. Unfortunately, there has not been much research done on BDA in the banking industry. Furthermore, as far as we know, no effort has been made to empirically analyze the moderating effects of perceived risk (PR) on technological factors and BDA adoption. Tanzania's IT scene constantly evolves, and its IT industry faces several difficulties. Like in many other countries, PRs influence the adoption of big data technologies and practices in Tanzania (Richard & Mandari, 2018). We think that organizations can quickly adopt BDA by developing comprehensive strategies that reduce PRs. Tanzanian banks are catching up to their foreign competitors, but much scope remains. Research on technology adoption in the banking sector reveals differences between developing and developed countries due to differences in innovative advancements in banking technologies. Yango optimizes its pricing approach with big data analytics. Based on current demand, traffic patterns, and driver availability, the platform modifies pricing. This dynamic pricing strategy increases income while optimizing driver utilization and improving rider experiences. Data analytics is now essential to a company's resource allocation, process optimization, and operational effectiveness. Organizations may optimize resource allocation, streamline operations, and make data-driven decisions by utilizing massive datasets and sophisticated analytics approaches. Real- world examples show how big data analytics has a positive effect on a variety of industries, improving competitiveness in today's data-driven corporate environment and resulting in cost savings and increased efficiency. Data analytics helps businesses allocate resources—like labor and equipment—in the most efficient way possible. To optimize crew schedules, for example, airlines use data analytics (Kopczak *et al.*, 2003). This ensures that the appropriate amount of crew members are allocated to each flight, saving labor costs and boosting operational efficiency. Big data analytics can be used by businesses to track and optimize energy use. For instance,

sensors and analytics are used in manufacturing to track energy use in real time, giving businesses the ability to spot chances to cut expenses and consumption (Huang *et al.*, 2018). Data analytics makes the supply chain more visible and coordinated, which helps with supply chain optimization. Organizations can eliminate excess inventory, lower carrying costs, and increase overall supply chain efficiency by making informed decisions based on data analysis on inventory levels, demand trends, and supplier performance (Verdouw, 2019). Take into consideration the following real-world examples to show how big data analytics affects operational efficiency, process optimization, and resource utilization: GE's Predictive Maintenance Program: data analytics is used by General Electric (GE) to streamline industrial equipment maintenance. Sensors gather performance data on the machinery, and algorithms for predictive analytics determine when maintenance is required. This strategy lowers downtime, increases the lifespan of machinery, and improves resource efficiency.

Strategic plans must be executed well in order to provide measurable outcomes. Organizations may track the advancement of strategic projects in real time with the use of big data. It makes it easier to track performance using key performance indicators (KPIs) and notifies businesses when there are deviations from the plan. This real-time visibility and control improve the company's capacity to change and make the required modifications to guarantee the accomplishment of its strategic objectives. For example, tech giants like Google and Amazon consistently innovate through utilizing big data to enhance recommendation systems, search algorithms, and user experiences (McAfee & Brynjolfsson, 2014). This loop of invention propels expansion, draws clients, and strengthens a company's edge over competitors.

2.2 Examining the challenges faced in the usage of data analytics in the banking sector

Consumers today have several banks, which forces the banks to obtain information from outside sources, much of it unstructured. In order to complement the conventional data warehousing and analytics approach, new technologies for data integration and business intelligence are needed to bring together transactional data from customer relationship management and payment systems, as well as unstructured data from both inside and outside the company. Thus, in this new context, DA management is essential to allowing customer centricity (Oracle, 2012). It is thought to be costly and challenging to employ DA solutions (Gupta, 2019; Mikalef & Krogstie, 2020; Tran, 2022). Alharthi, Krotov, and Bowman (2017) noted how important it was to get rid of things that were in the way of DA. These difficulties are related to technological constraints like infrastructure preparedness and data complexity, human obstacles like skill gaps and organizational obstacles like organizational culture and secrecy. It might be difficult for established banks to compete with newcomers to the market, including FinTech firms (Kikan, 2019). Because they are able to make more precise estimates, especially in a turbulent business climate, these new entrants have a noticeable competitive edge. Although the importance of DA as a topic of research is highlighted by an expanding corpus of literature on the DA domain, this body of literature covers DA from a variety of angles, including adoption, methodology, impact, and

applications across other domains. As a result, the goal of this review paper is to provide an overview of DA, with a particular emphasis on its adoption and performance impact on the banking sector.

Firms are under constant pressure to optimize capital and improve customer interaction, in addition to technological and regulatory constraints, as well as expectations to raise revenue and decrease expenses and the unstable global economy (Goel, 2012). The financial performance of financial Services institutions is still influenced by the state of important markets and economies. Based on the existing short-term projections, this indicates that established markets will continue to be cost-conscious, while emerging nations will spend more compared to their GDP, leading to uneven global expenditure. For banks, raising revenue has grown more difficult as they look for methods to make up for revenue lost to restrictions. Another important force behind the move towards a better data management platform is regulation and compliance. Due to the requirements these elements impose, data management solutions are under pressure because these institutions now have a stricter fiduciary duty to supply accurate data to regulatory bodies and because they need to transmit large volumes of data quickly. Faulty information can result in terrible consequences and catastrophic financial exposure.

One of the most important factors affecting how big data affects banking performance is the quality of the data utilized for analysis. Inaccurate insights and judgments might result from poor data quality (Amakobe, 2015). Good data governance procedures guarantee that information is gathered, kept, and handled in a way that preserves its accuracy and dependability (Nobanee, *et al.*, 2021). Businesses are better able to draw insightful conclusions from big data when they fund data quality programs and strong data governance frameworks (Eckerson, 2010). Data quality was found to be a crucial component influencing the success of data-driven efforts in a study conducted by Wang and Strong (1996) (Doko & Mishkovski, 2019). Businesses that put an emphasis on their data quality management procedures stand a better chance of utilizing big data to its fullest.

Similarly, recent studies (Huang, Yao, Krisp, & Jiang, 2021) emphasize future developments in BDA technological readiness, such as the introduction of blockchain for data security, the expanding use of cloud-based solutions, and the incorporation of artificial intelligence (AI) which requires huge capital investments. The ability of an organization to effectively integrate and employ state-of-the-art technologies, such as BDA tools and systems, is referred to as technology readiness. Technology infrastructure, IT capabilities, and workforce digital skills are some of its constituent parts (Chen, Liu, & Lin, 2013). According to Maroufkhani *et al.* (2020), an organization's readiness to use a technology is based on the availability of trained human, financial, and technological resources. In the current work, "technological readiness" consistently refers to a bank's ability and willingness to adopt and make use of cutting-edge technology in order to enhance client experiences, improve operations, and stay competitive in the digital age. A Connection between BDA and technical preparedness has been found through related study (Aziz, Long, & Wan Hussain, 2023; Maroufkhani, Iranmanesh, & Ghobakhloo, 2023; Saetang *et al.*, 2020). The degree to which someone believes that using a particular technology would enable

them to perform their work more effectively. According to Iranmanesh *et al.* (2023) this concept has been widely applied in the adoption of many technologies, especially BDA tools. Numerous research have examined the impact of perceived utility on BDA adoption (Alyoussef & Al-Rahmi, 2022; Eresia-Eke, Mojalefa, & Nyanga, 2023; Alamsyah, Setyawati, & Rohaeni, 2022). These results show that when consumers feel that new technology would improve their jobs, performances, and decision-making processes, they are more likely to accept and use it. Regarding financial institutions: Technology Readiness, Perceived Applicability, Bank Size, and Available Funds, Competitiveness Level The perception of intricacy Observed Pattern, Senior Management Assistance, Technology Perceived Risk DA Adoption Setting, Organizational Setting, and Environment Background Source(s). The possibility of a bank to apply BDA is significantly influenced by its financial capacity (Al-Dmour *et al.*, 2023). They maintained that banks with large resources are better able to invest in personnel, infrastructure, and cutting-edge data analytics tools. Studies by (Ilin, Ivetic, and Simitic, 2017) show a positive correlation between financial resources and the degree of BDA application in banking. Conceptually related work has also been published by Aziz *et al.* (2023), who contend that banks, especially those with minimal financial expenses, face important challenges in managing costs and ensuring that BDA activities are aligned with strategic goals. Financial organizations with ample resources can purchase state-of-the-art automation solutions to optimize their processes. Banks need an integrated data analysis solution that can process and analyze the massive amount of unstructured data generated daily in order to make efficient, customer-focused decisions in order to stay competitive in the cutthroat business environment and provide tangible value for customers (Ramachandran & Malladi, 2013). Using the vast amount of data at its disposal to provide tailored goods and services that meet the individual demands of its clients is essential if a bank wants to stand out from the competition. The emergence of technologically advanced social media platforms and their widespread, highly addictive appeal among millions of users has led to the accumulation of a growing amount of unstructured data on the internet and mobile devices. Banks may now take advantage of its processing and storage capacities by enhancing it with natural language processing and semantic analytics, thanks to the development of other big data.

2.3 Analyzing the effectiveness of data analytics with regard to the performance of firms

Within the banking industry, business data analytics has increased interaction with consumers. Initially, banks had complete control over their relationships with customers. Nowadays, customers have sporadic ties with several banks, and these institutions are no longer fully aware of the preferences, purchasing habits, and other actions of their clientele. Massively large amounts of data cannot be handled, processed, or stored by traditional relational database methods. Financial performance is one of the most established and well-known aspects of banking performance. A market-based approach to banking performance takes into account an organization's capacity to satisfy consumers as well as its performance in the marketplace. (Porter, 1985) and other authors have emphasized the importance of market share as a measure of

competitive advantage. The significance of operational efficiency in evaluating banking performance is emphasized by writers like Deming (1982) and Drucker (1954). Process optimization, waste reduction, and productivity enhancement are the main goals of operational efficiency. A company's operational success is assessed using key performance indicators (KPIs) that are connected to cost management, production efficiency, and resource use. The way the Banking executes its strategic ambitions is directly related to its performance from a strategic perspective. The balanced scorecard is first presented by writers like Kaplan and Norton (1996) as a framework that combines internal operations, financial, customer, and learning and growth perspectives. The degree to which these strategic goals are met and matched with the mission and vision of the bank serves as a gauge of its performance.

Businesses that are able to increase their market share are frequently thought to be operating efficiently. Another important factor is customer happiness, which Anderson and Sullivan (1993) addressed. They contend that happy consumers are essential to the long-term survival of a business because they are more likely to become devoted, repeat clients. Accordingly, from this angle, customer retention rates and customer satisfaction measurements are crucial markers of banking performance. Researchers that highlight the significance of financial measures in evaluating a company's performance include (Kaplan and Norton, 1992). Financial performance is typically gauged using profitability measures like net profit margin, return on equity (ROE), and return on assets (ROA). Additionally, authors like (Jensen and Meckling, 1976) promote the concept of shareholder wealth maximization as a fundamental purpose of banking performance. They contend that a company's main duty is to maximize shareholder wealth and create value for its investors through the effective use of its resources. The concept of stakeholder theory, first introduced by Freeman in 1984, broadens the focus of banking performance to encompass not only shareholders but also other stakeholders like suppliers, employees, and the community. This viewpoint bases its assessment of banking performance on the happiness and welfare of all parties involved.

Corporate social responsibility (CSR)-focused businesses are thought to be functioning well in terms of stakeholder interests (Matten & Moon, 2008). The notion of dynamic capacities was first presented by Teece, Pisano, and Shuen (1997). It highlights a company's capacity for innovation, adaptation to shifting market conditions, and seizing new possibilities. From this angle, the ability of a bank to adapt and innovate throughout time is directly related to its performance. This dimension is evaluated using metrics pertaining to patents, new product launches, and investments made in research and development (R&D).

The fact that social networks now collect extremely important psychographic data, such as users' interests, actions, and opinions, exacerbates this issue. Building more comprehensive and wide propensity models and guaranteeing that banks can handle customer satisfaction both depend on gaining a deeper grasp of a customer's preferences and interests. Bank employees may now use real-time client profile checks and discover recommended products and services based on relevant information thanks to Big Data tools. DA also play a significant role in bringing together the online and offline commerce worlds. For

example, a retailer may recommend a mobile carrier based on a customer's social media needs (Lacy, Diamond & Ferrara, 2012). DA has made it easier for businesses to comprehend how other people view their products so they may modify them or use them for marketing, if necessary. Banks can learn about their clients' opinions and even categorize them based on their geography or demographics by analyzing unstructured social media material (Versace & Massey, 2012). The idea of banking performance has expanded to encompass social and environmental effects in recent years. The "triple bottom line" approach was first presented by writers such as Elkington (1997). It assesses banking performance by taking into account social, environmental, and economic factors. This viewpoint highlights how important it is for businesses to follow sustainable business practices, which include lessening their impact on the environment and improving society. The accomplishment of goals and the successful completion of activities are common metrics used to assess performance. The focus is on how productive and successful people or groups are at reaching their predetermined goals. The concept of banking performance is complex, with many different facets and viewpoints. Diverse definitions and frameworks are offered by writers and academics to evaluate the performance of banks. These include financial measures, customer happiness, operational efficiency, strategy alignment, and stakeholder interests, innovation, and sustainability. The choice of which dimension to emphasize often depends on the context, industry, and organizational goals. A holistic understanding of banking Performance considers multiple dimensions to provide a comprehensive assessment of an organization's effectiveness and success.

The availability of highly integrated intra- and inter-organizational information systems, such as supply chain management systems, enterprise systems, and customer relationship management systems, has spurred interest in business analytics recently. These integrated systems offer real-time, rich, and fine-grained data that may be examined by advanced business analytics software to improve performance. Numerous business analytics solutions have been described by academics and commentators as ways to improve organizational performance. Kohavi *et al.* (2002), for example, describe Marketing applications that may lower customer attrition, boost customer profitability, raise the value of online transactions, and boost direct message campaigns for email and mail marketing. Likewise, applications in the fields of manufacturing and production have been identified that offer information regarding the performance of suppliers and partners, material expenditures, accuracy of sales forecasts for controlling materials inventory, accuracy of production plans, and accuracy of plans for order delivery (Kohavi *et al.*, 2002). Applications in other areas, such as finance, human resources, and R&D have also been described.

As a result of the accumulation of small performance gains resulting from the entrepreneurial actions of numerous dispersed actors, the researcher suggests that business analytics performance gains and competitive advantage are likely to be the result of organizational level capabilities rather than individual level skills. Only when an organization-level capability is in place can many unit and sub-unit managers use business analytics to improve performance at the same time. It is not likely to be the

consequence of random, independent acts. To take advantage of business analytics' potential, you must use Internal resources are frequently reconfigured to interfere in the internal and/or external environment, such as the supplier, customer, and product sectors. Below, the researcher utilizes the body of research on dynamic capabilities to understand how business analytics can contribute to performance gains and competitive advantage. The ability of a company to provide high-quality goods and services while cutting expenses, minimizing waste, and streamlining procedures is known as operational efficiency. Through the following methods, big data analytics plays a crucial role in improving operational efficiency: data analytics gives businesses the instruments they need to make defensible choices based on insights from data. Businesses can find operational bottlenecks, inefficiencies, and opportunities for change.

3. Research Design

In this research, a descriptive research design was adopted to conduct the study. (Creswell, 2003) in detail refers to this type of research design as one that determines and gives a report of how things are in a certain setting. The reason for using this research design is in order to get in-depth information about the phenomenon at hand. In this case, both quantitative and qualitative methods will be applied in the collection and generation of data in order to reduce on the biases as the two complement each other. In this case study, a descriptive research design was adopted to thoroughly examine the effects of Business Intelligence (BI) on marketing performance within beverage companies in Ndola District.

Given the complexity and multidimensionality of business intelligence systems, the study employed a mixed-methods approach, incorporating both quantitative and qualitative techniques to enhance the depth, credibility, and richness of the findings. Quantitative data was collected using structured questionnaires administered to a sample of 50 employees from selected beverage companies, enabling the researcher to capture measurable patterns, trends, and relationships between BI and marketing performance. On the other hand, qualitative data was generated through open-ended survey items and follow-up interviews, which provided context, interpretation, and insight into the lived experiences of employees, managers, and IT staff engaged in BI strategy implementation.

3.1 Target Population

A study population is a well-defined set of people or group of things, household, community, firms, or services that or which are being investigated (Noholas, 2013). This researcher will target SMEs in the Ndola district's Autospares sector.

3.2 Sampling Technique

Sampling refers to the process of selecting a sample such as participants from the population of interests so that the results gained by these participants can be fairly generalized to the population from which they were chosen (Noholas, 2013). In some cases, purposive random sampling will be used for this research. As the name suggests, purpose sampling will be used to select a sample for a particular purpose. Probability sampling aims at to achieve a homogenous sample. The researcher will provide self-

administered questionnaires to the chosen respondents, schedule for interviews and also observation in the banks. This will enable the researcher to collect both primary and secondary data. Primary data will be collected using semi structured questionnaires. On the other hand, secondary data will be collected from articles, books, newspapers, the internet, magazines and financial reports from the institutions.

3.3 Sample Size Determination

The study will target specific respondents from banks in the Ndola district's banking sector. The sample size will be 50 according to the Information and Communication University Research manual.

3.4 Data Collection Methods

Data will be collected using a structured interview schedule and questionnaire specifically designed for this study. The other Data about the respondents will be obtained from the selected sources. Data will be collected using both primary and secondary data collection techniques. Primary data will be gathered basically through structured questionnaires and interviews. The researcher will use a combination of structured questionnaires and interviews. The main instrument of data collection will be the questionnaire. Secondary data on the other hand will be gathered through review of available relevant materials such as print and electronic media; other dissertations will be; books, articles on NGP, and related reports.

3.5 Data Analysis

Thematic analysis and descriptive statistical analysis will be used to analyze data. Thematic analysis involves the classification of words and phrases that emerge from interviews and related to the same content into major themes (Bryman, 2018). Additionally, data obtained from questionnaires will be manually coded, synthesized and quantified into percentages, using STATA and presented in form of tables of frequency and percentages as descriptive statistics in Microsoft word.

4. Presentation of Research Findings and Discussion of Results

This chapter's study results are presented in this chapter in relation to the research's objectives. The purpose of this was to determine how business data analytics affected the performance of certain banks in Ndola. A 50% response rate is deemed satisfactory, 60% good, and 70% or more extremely good, according to Mugenda & Mugenda (2003) (Njeru, 2015). A 100% response rate was attained for this research. The researcher proceeded with data analysis as a result.

4.1 Background Characteristics

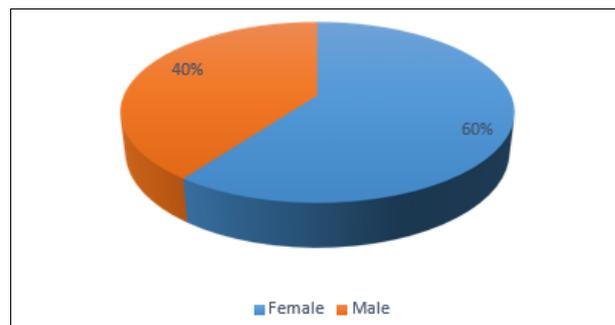


Fig 4.1: Gender of the respondents

In order to better understand the respondents, questions about their position within the company, the name of the company, their length of employment there, their gender, and their greatest degree of education were asked. 40% of the respondents were men, however the majority of respondents (60%) were women.

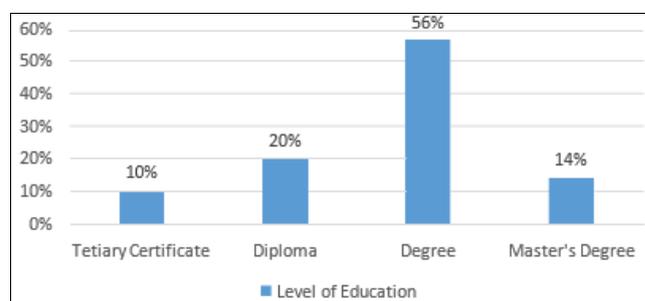


Fig 4.2: Highest qualification obtained

Among the respondents, 56% held Master's degrees, 20% possessed diplomas, while 10% held tertiary certificates. Interestingly, an additional 14% were also identified as Master's degree holders, suggesting a possible overlap or reporting inconsistency.

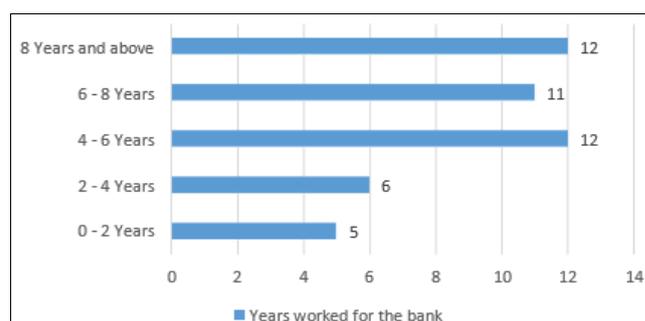


Fig 4.3: Operation period

Out of the 50 respondents, 5 employees (10%) had been employed for 0–2 years, 6 employees (12%) for 2–4 years, while 12 (24%) had worked for 4–6 years and 11 (22%) for 6–8 years. The remaining 12 respondents (24%) had over 8 years of experience in the banking industry.

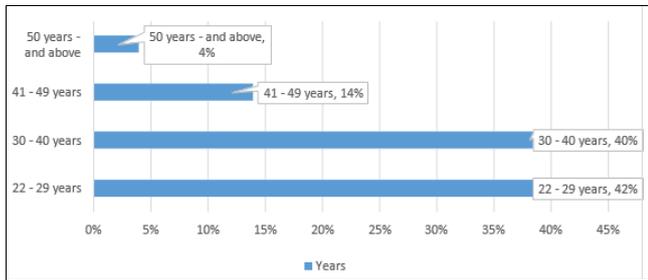


Fig 4.4: Age bracket

The largest proportion of respondents (42%) are aged between 22 and 29 years, followed closely by those aged 30 to 40 years, who make up 40% of the sample. Employees aged 41 to 49 years account for 14%, while only 4% are aged above 50.

This distribution indicates that the banking workforce in Ndola District is predominantly youthful, with over 80% of employees under the age of 40. This trend aligns with findings by the Zambia Institute of Banking and Financial Services (ZIBFS, 2020), which reported a demographic shift in the financial sector towards younger professionals, driven by the increasing demand for digital skills, adaptability, and innovation.

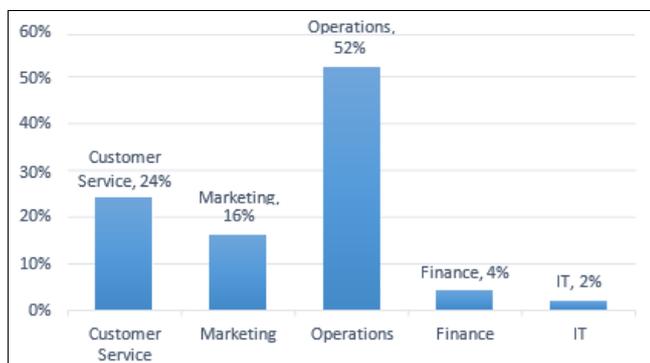


Fig 4.5: which department do you belong to

According to the graph above, 52% of the employees are positioned in operations, making it the dominant functional area within the sampled banks. This is followed by 24% working in customer service, 16% in marketing, 4% in finance, and only 2% in information technology (IT). The high concentration in operations suggests a strong emphasis on the core banking processes such as account management, transaction processing, and compliance activities.

4.2 Business Data analytics tools and practices used in the banking sector

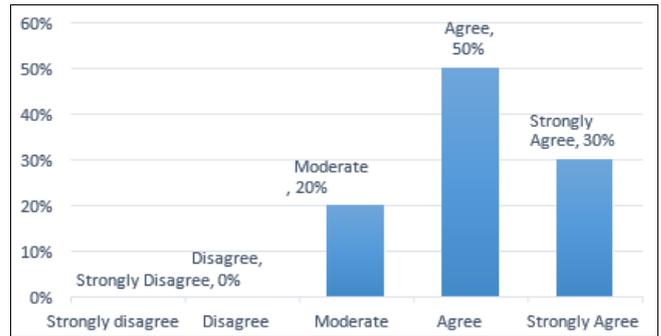


Fig 4.6: Does your organization use Data Analytics

The graph above demonstrates that banks in Ndola are actively utilizing Data Analytics (DA) to support and enhance their operational activities. This indicates a growing recognition of the data-driven decision-making within the local banking sector.

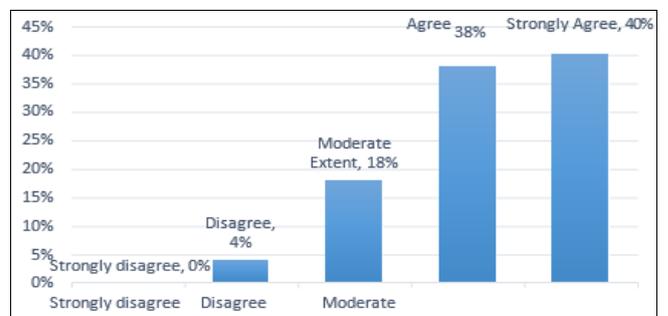


Fig 4.7: The bank uses data analytics to make decisions

The graph above reveals that 40% of respondents strongly agree that banks use data analytics (DA) to inform decision-making, while 38% agree to a large extent, and 18% moderately agree. These findings affirm that banks in Ndola are significantly reliant on data analytics for strategic and operational decision-making. This trend aligns with existing literature that identifies the banking sector as one of the earliest adopters of Business Data Analytics (Hung, 2020; Al-Dmour, 2023).

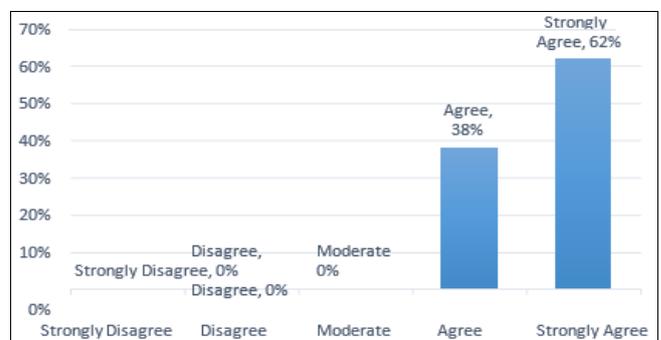


Fig 4.8: The organization uses customer data to develop marketing strategies

The graph above reveals that 62% of banks strongly agree, and 38% agree, that they extensively utilize customer data to inform their marketing strategies. This indicates a pervasive reliance on customer data analytics in designing and implementing effective marketing mixes. In today’s digital banking environment, vast volumes of customer data are generated through electronic platforms and financial transactions (Rao & Provodnikova, 2021).

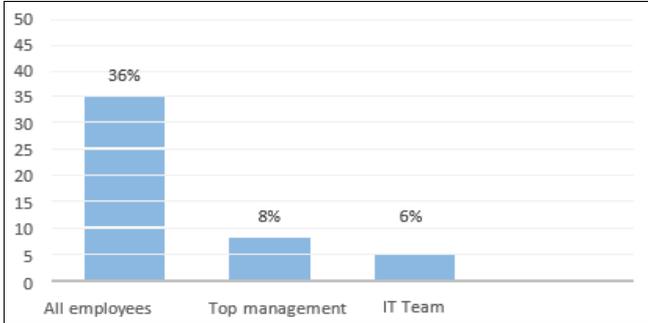


Fig 4.9: Who uses data analytics in your organization

According to the graph above, 36 out of the 50 respondents (72%) indicated that data analytics is utilized by all employees within their respective banks, reflecting a widespread organizational integration of data-driven practices. Meanwhile, 8 respondents (16%) reported that only top management engages with data analytics, suggesting a more centralized or strategic-level application in some institutions. Additionally, 6 respondents (12%) stated that data analytics usage is confined to the IT department, highlighting a more technical and support-oriented application.

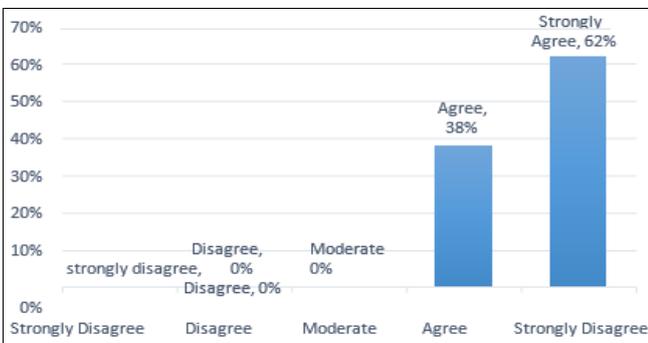


Fig 4.10: Data analytics has helped the organization to identify Opportunities in the market

The graph above indicates that 62% of the participants strongly agreed, while 38% agreed, that banks utilize data analytics to identify market opportunities. This unanimous agreement (100%) underscores the critical role of data analytics in enabling banks to explore emerging trends, uncover customer needs, and respond proactively to shifts in the competitive landscape.

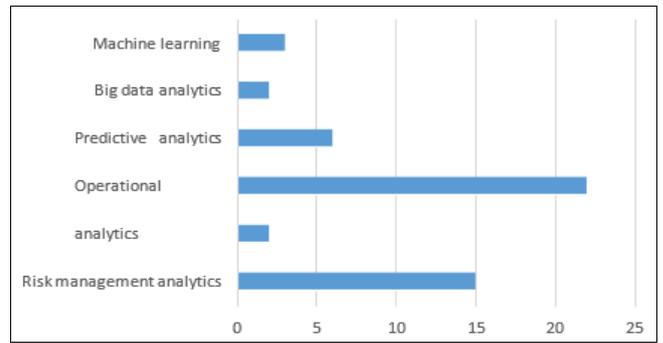


Fig 4.11: Which of the following data analytics tools are mostly used in your organization

Strategy statements on Data Analytics implementation practices

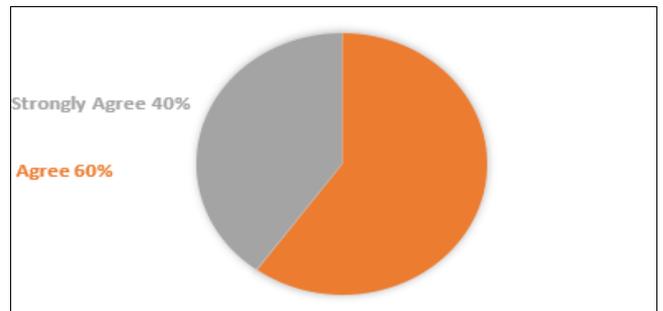


Fig 4.12: Company Data Analytics strategy is adequately and comprehensively communicated to members of staff

The graph above illustrates that out of 50 bank employees, 60% strongly agreed and 40% agreed that their respective banks communicate with them regarding data analytics strategies. This unanimous agreement (100%) suggests that banks in the Ndola District prioritize internal communication around data-driven initiatives, reflecting a strategic commitment to integrating data analytics across operational and decision-making processes.

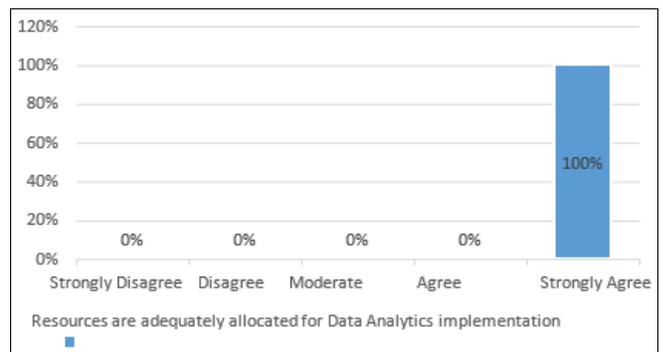


Fig 4.13: Resources are adequately allocated for Data Analytics implementation

The findings indicate that 100% of the respondents strongly agreed that their respective banks allocate resources for the implementation of data analytics initiatives. This unanimous response underscores a strong institutional commitment to data-driven transformation, suggesting that banks in the Ndola District recognize the strategic value of investing in analytics infrastructure, tools, and talent.

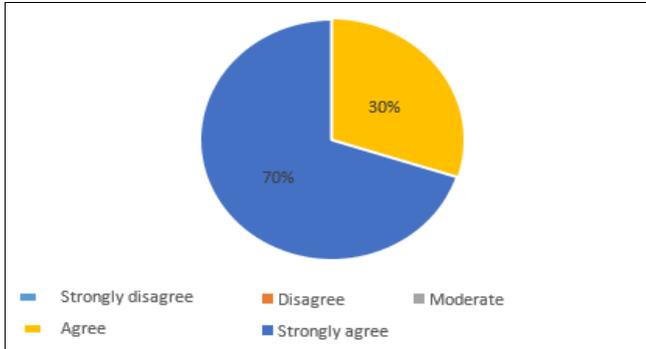


Fig 4.14: Organizational DA strategy is matched to organizational structure

The pie chart below illustrates that 70% of respondents strongly agree, while the remaining 30% agree, that their banks have a data analytics strategy that is aligned with the organizational structure.

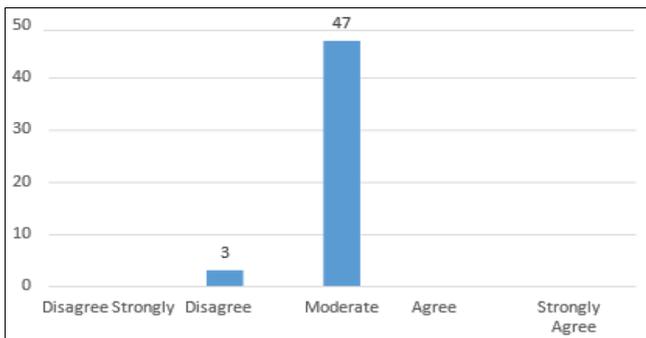


Fig 4.15: Organizational DA strategy is implemented purely based on set objectives and expected performance

The table above indicates that 47 out of 50 sampled employees (94%) stated that their bank's organizational data analytics (DA) strategy is implemented only to a moderate extent based on predefined objectives and expected performance outcomes, while 3 respondents (6%) disagreed entirely. This suggests that although banks in the Ndola District have adopted DA strategies.

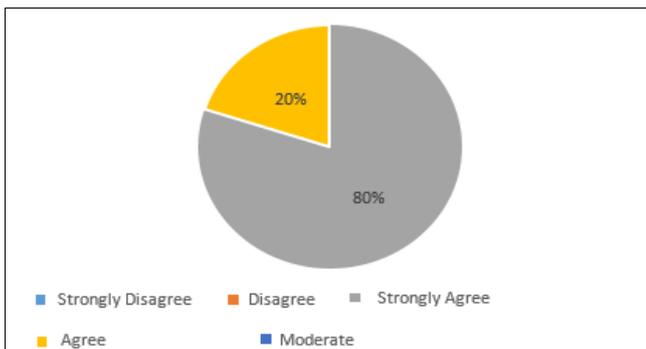


Fig 4.16: Organization is keen on implementing DA strategy in a way that yield highest performance

According to the pie chart above, 80% of the banks indicated a strong commitment to implementing data analytics (DA) strategies in a way that maximizes organizational performance, while the remaining 20% also agree with this approach, suggesting a shared strategic direction across institutions.

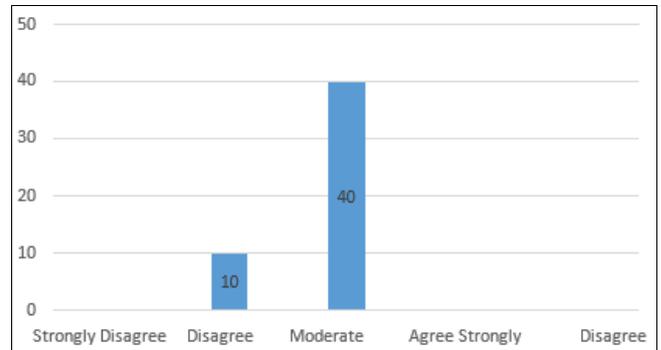


Fig 4.17: There are motivational systems in place to ensure success of DA strategy implementation

The graph above indicates that 40 out of the 50 sampled employees (80%) believe that, to a moderate extent, motivational systems are in place within their banks to support the successful implementation of data analytics (DA) strategies, while 10 respondents (20%) disagreed.

4.3 Challenges faced in the usage of data analytics in the banking industry

The challenges faced by banks in Ndola regarding data analytics adoption mirror those identified in various global contexts. In Ndola, 40% of respondents (20 out of 50) identified customer trust and transparency as a significant barrier, as insufficient customer information limits the ability to effectively use data analytics for improving satisfaction. 14% of respondents reported minimal top management support (7 respondents) and 6% cited organizational culture as hindrances. On the technical front, 24% of Ndola respondents (12 employees) reported high data volume and velocity as a key challenge requiring major infrastructure investments. Moreover, 12% (6 respondents) in Ndola reported inadequate human resource expertise, confirming local skills gaps as described by Musawa and Mbuya (2021) in Zambia's financial services sector. Data security and privacy concerns, though less frequently cited (4% or 2 respondents). A Chi-squared test on customer trust and transparency revealed a statistically significant relationship with data analytics usage (Pearson $\chi^2(12) = 20.0229, p = 0.027 < 0.05$), confirming that these variables are interconnected rather than independent. This underscores that trust issues directly impact banks' ability to leverage data analytics effectively. Collectively, these results demonstrate that the Ndola banking sector faces a complex interplay of challenges trust and transparency (40%), high data volume and velocity (24%), limited management support (14%), skills shortages (12%), organizational culture (6%), and data security/privacy (4%).

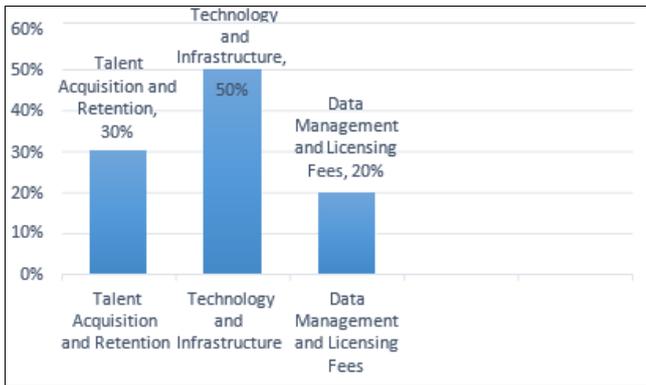


Fig 4.18: Which of the following expenses constitute the highest data analytics cost

The graph above illustrates the breakdown of expenses contributing to the highest data analytics costs within banks, revealing that 50% of the total costs are dedicated to technology and infrastructure. This reflects the substantial investment needed for hardware, cloud services, data centers, analytics platforms, and IT architecture essential for handling large-scale data processing (LaValle *et al.*, 2011 [14]; Chen *et al.*, 2020; Wamba *et al.*, 2017 [13]). Furthermore, 30% of expenses are allocated to talent acquisition and retention, highlighting the critical role of skilled professionals such as data scientists, data engineers, and analytics specialists whose expertise is essential for interpreting complex data and driving insights (Davenport & Patil, 2012; Manyika *et al.*, 2017).

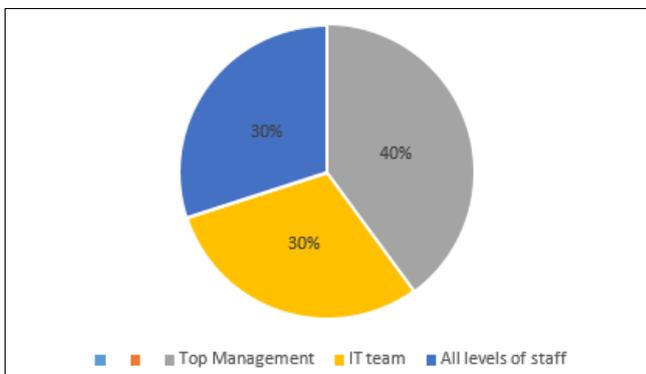


Fig 4.19: Who owns implementation and outcome of organization strategy in your company

The graph above reveals that in 40% of banks, top management holds primary responsibility for the implementation and outcomes of the organizational data analytics strategy. Meanwhile, 30% of banks report that all levels of staff are involved, and another 30% indicate that the IT team alone is accountable.

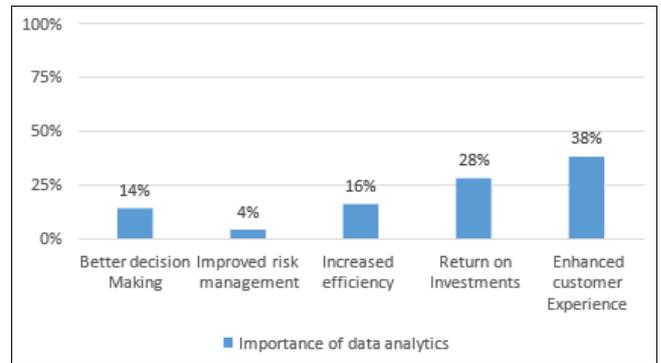


Fig 4.20: Importance of Data Analytics

The graph above shows that 38% of respondents perceive enhanced customer experience as the foremost benefit of data analytics adoption, followed by 28% citing improved return on investment (ROI), 16% noting increased operational efficiency, 14% indicating better decision-making, and 4% recognizing enhanced risk management. To assess the relationship between ROI and enhanced customer experience, a Chi-squared test was conducted with the null hypothesis (Ho) stating that ROI and enhanced customer experience are independent, and the alternative hypothesis (Ha) positing they are not. The test produced a Pearson chi-square statistic of 87.1131 and a p-value of 0.000 (alpha = 0.05), leading to rejection of Ho and confirming a statistically significant association between the two variables

4.4 Data analytics effectiveness regarding the performance of firms

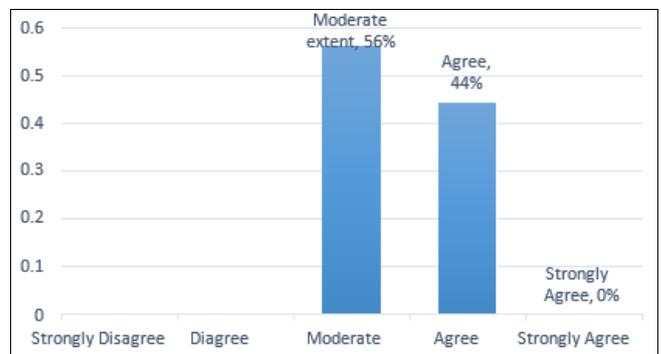


Fig 4.21: Business analytics has helped to reduce credit risk

Respondents were asked to assess the extent to which data analytics has contributed to reducing credit risk in their institutions. Results show that 56% of participants agreed that data analytics has significantly helped in mitigating credit risk, while the remaining 44% moderately agreed with

this assertion. This indicates a strong perception among banking professionals that data analytics plays a crucial role in enhancing credit risk management.

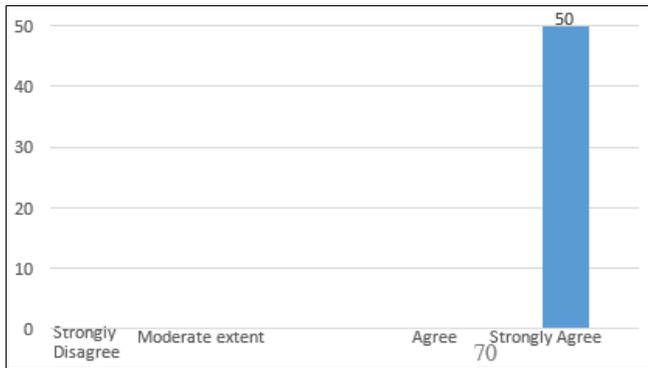


Fig 4.22: The use of insights from Business analytics has resulted in growth of return on investment

A survey of 50 respondents was conducted to assess whether the implementation of data analytics strategies had led to measurable growth in return on investment (ROI) within their organizations. The majority of respondents affirmed that business analytics initiatives have significantly contributed to improve ROI, highlighting enhanced decision-making, optimized resource allocation, and better customer targeting as key drivers of financial performance.

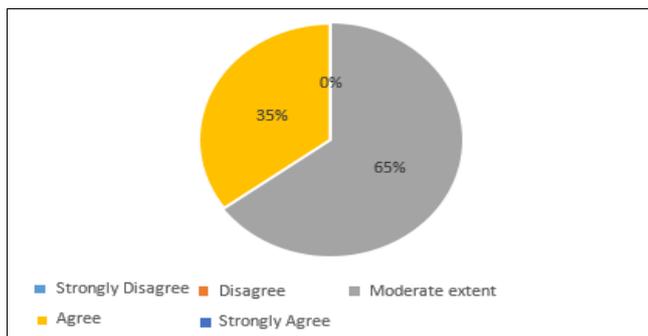


Fig 4.23: Business analytics has increased innovation by leveraging on customer analytics

The survey results indicate that 65% of respondents fairly agreed that data analytics has increased innovation within their banks by leveraging customer analytics, while 35% strongly agreed with this assertion. This demonstrates a widespread recognition of the role that customer analytics plays in driving innovative products, services, and processes. By analyzing customer behavior, preferences, and feedback, banks can develop tailored offerings and improve customer engagement, fostering innovation that supports competitive advantage.

The graph below illustrates that out of 50 respondents, 92% strongly agreed that business analytics has significantly aided in identifying effective marketing strategies, while the remaining 8% agreed with the statement. This overwhelming majority indicates strong support among banking professionals for the role of business analytics in shaping and optimizing marketing efforts.

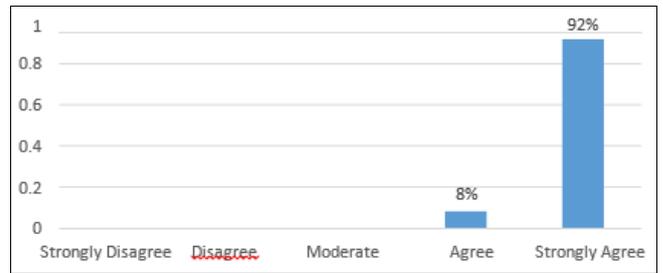


Fig 4.24: Business analytics has helped to identify marketing strategies

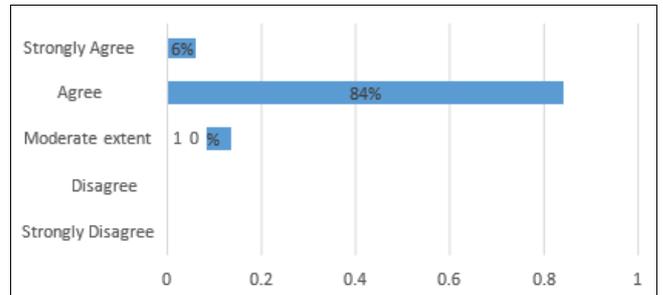


Fig 4.25: The use of data analytics has helped my organization to monitor variances (budget versus actual) on a real time basis

The graph indicates that 84% of respondents strongly agreed that banks use data analytics to monitor variances, while 10% agreed to a moderate extent and 6% to a very large extent. This distribution demonstrates that, overall, banks extensively leverage data analytics for variance monitoring, which is critical for identifying discrepancies in performance and enabling timely corrective actions.

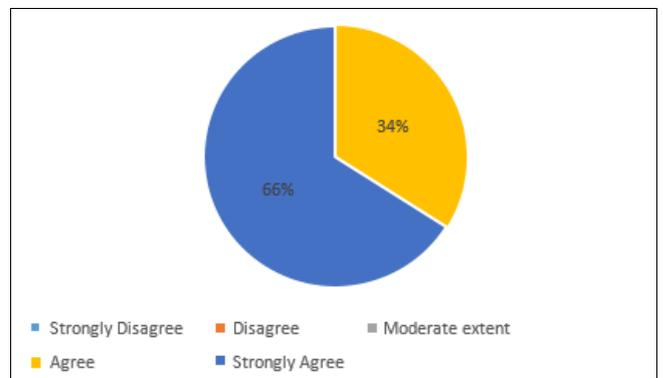


Fig 4.26: Business analytics leads to resource planning through monitoring of usage pattern

Out of the respondents, 66% indicated to a large extent that business analytics facilitates resource planning by monitoring usage patterns, while 34% also agreed to a large extent. This consensus suggests that banks widely recognize the role of analytics in optimizing resource allocation and operational efficiency by analyzing consumption trends. Such insights enable proactive planning and cost management, which are critical for sustaining competitive advantage.

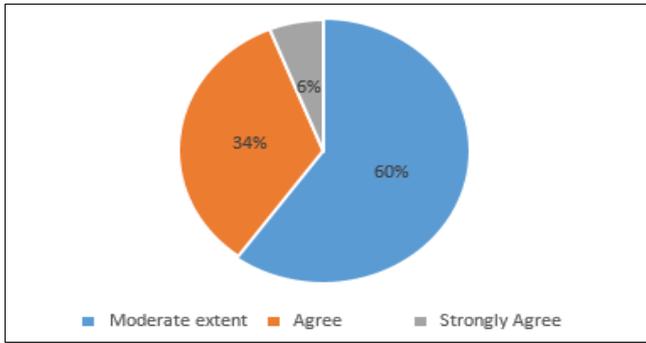


Fig 4.27: Insights from business intelligence has improved service quality which contributes to revenue growth

The graph above shows that 60% of respondents agreed to a moderate extent that business intelligence (BI) insights have improved service quality, thereby contributing to revenue growth, while 34% agreed to a large extent, and 6% to a very large extent. This highlights the significant role that BI plays in enhancing customer service within banks, which ultimately drives financial performance.

The graph below indicates that 93% of respondents strongly agree that business intelligence (BI) insights have enabled banks to gain a competitive advantage, while 7% agree to a moderate extent.

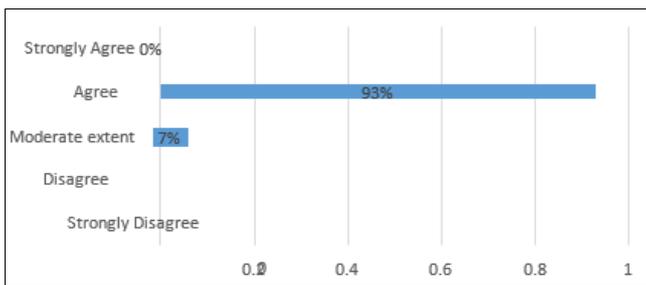


Fig 4.28: The use of insight from business intelligence has enabled our company to derive advantage over competitor products

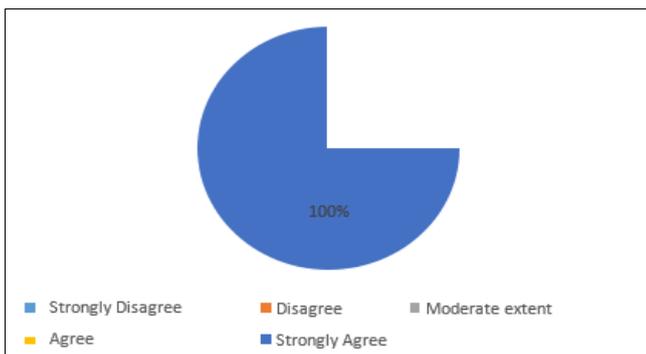


Fig 4.29: The use of business intelligence has facilitated better customer retention management

According to the graph above, 100% of the 50 respondents agreed that the use of business intelligence (BI) has significantly facilitated better customer retention management, enabled banks to tailor products to individual customer needs, and helped to predict customer trends and behaviors. This unanimous agreement highlights the strategic value of BI in enhancing customer relationship

management (CRM) within the banking sector. BI tools allow banks to analyze customer data, segment markets more accurately, personalize offerings, and proactively respond to shifting customer preferences.

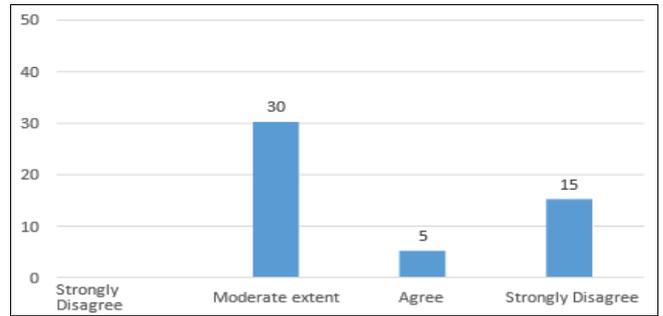


Fig 4.30: Insight from business intelligence has increased my organizations ability to predict and mitigate risks

The bar chart above indicates that 30 out of 50 participants (60%) stated that, to a moderate extent, business intelligence (BI) has improved their organization’s ability to predict and mitigate risks. Additionally, 15 participants (30%) strongly agreed, while 5 (10%) agreed. These findings suggest that BI plays a significant role in helping banks manage financial risks by enabling more informed, data-driven decision-making.

Data Analytics Strategy evaluation

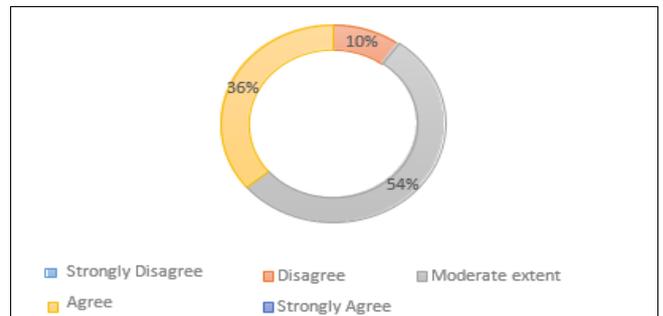


Fig 4.31: There is regular assessment of Data Analytics strategy at your company

The ring chart above reveals that 54% of respondents agreed to a moderate extent that there is regular assessment of the data analytics (DA) strategy within their banks, while 36% agreed, and 10% disagreed. These results suggest that although a majority of banks recognize the importance of evaluating their DA strategies, the depth and frequency of such assessments may still be insufficient.

According to the table below, 29 out of 50 respondents (58%) indicated that, to a moderate extent, there are clearly defined and measurable key performance indicators (KPIs) for each element of their bank’s data analytics strategic management plan. However, 14 respondents (28%) disagreed, and 3 respondents (6%) strongly disagreed, indicating that a notable portion of banking institutions may lack robust KPI frameworks to evaluate the performance and impact of their data analytics initiatives.

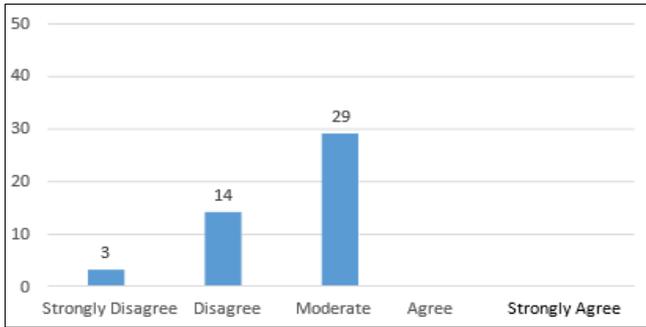


Fig 4.32: There is a clearly defined and measurable key performance indicators for each data analytics strategic management plan element

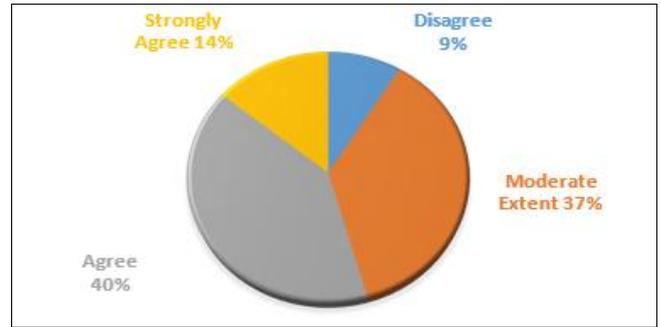


Fig 4.35: The success of strategy evaluation comprises of benchmarking peer companies and identify best practices

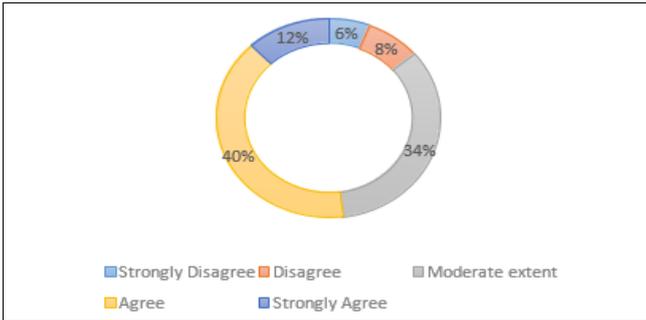


Fig 4.33: The Company reviews strategic Data analytics management out comes and corrective actions developed

The graph above illustrates that 40% of the banks in Ndola City agree that they review strategic data analytics management outcomes and develop corrective actions accordingly. Additionally, 34% of respondents indicated this is done to a moderate extent, 12% strongly agreed, while 8% disagreed, and 6% strongly disagreed.

The banks' responses to the statement reveal that 46% agreed, 42% agreed to a moderate extent, while 10% disagreed, and 2% strongly disagreed. This distribution indicates that a significant majority (88%) of respondents acknowledge the importance or validity of the statement, suggesting a strong consensus among banking professionals in Ndola regarding the topic in question likely related to the integration, implementation, or impact of data analytics strategies.

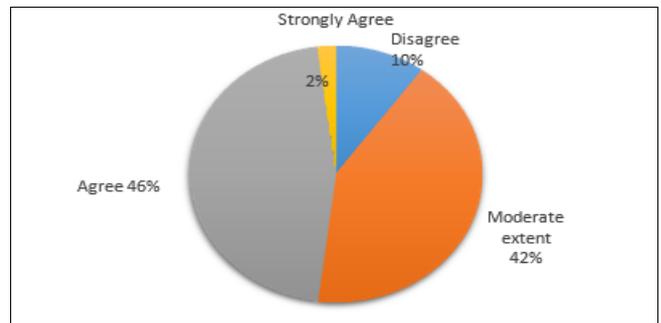


Fig 4.36: Clear assessment on technology exists to determine the adequacy of technology infrastructure

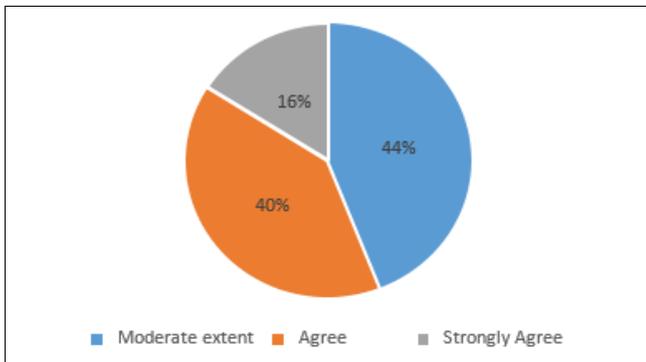


Fig 4.34: Data analytics Strategy evaluation involves continuous improvement

Based on the table above, 44% of respondents indicated that they moderately agree with the statement that data analytics strategy evaluation involves continuous improvement. Additionally, 40% agreed, and 16% strongly agreed, suggesting that while most banks in Ndola City recognize the importance of integrating continuous improvement into their data analytics strategy evaluation processes, the degree of implementation varies.

Based on the findings from the table above, it was observed that 46% of respondents strongly agreed and 40% agreed to a moderate extent that there is a clear assessment mechanism in place to determine the adequacy of technology infrastructure for data analytics in their banks. Conversely, 8% disagreed and 2% strongly disagreed, suggesting that while a majority of banks have made strides in evaluating the sufficiency of their technological setups, a small portion still face gaps in this area.

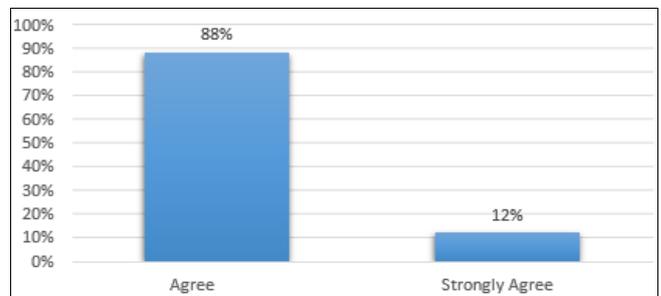


Fig 4.37: There is a system of Data governance and evaluation to assess the effectiveness of data governance policies and procedures to ensure data quality and security

According to the table, 88% of the respondents responded favorably and 12% strongly agreed, indicating widespread consensus that there is a system of data governance and evaluation in place within the banks. This suggests that most institutions in Ndola have implemented mechanisms to assess the effectiveness of data governance policies and procedures, ensuring data quality, integrity, and security are upheld.

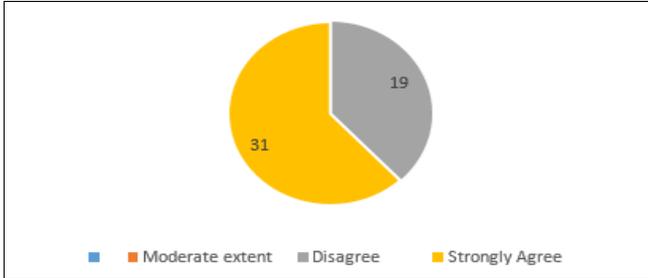


Fig 4.38: The Data Analytics strategies you have adopted in the last five years are related to the performance of your organization

The graph above indicates that 31 out of 50 employees (62%) strongly agreed and 19 employees (38%) agreed that the data analytics strategies adopted by their banks in the past five years are directly related to improvements in organizational performance. This unanimous agreement strongly suggests that the integration of data analytics has had a positive and measurable impact on performance outcomes such as operational efficiency, customer satisfaction, and profitability.

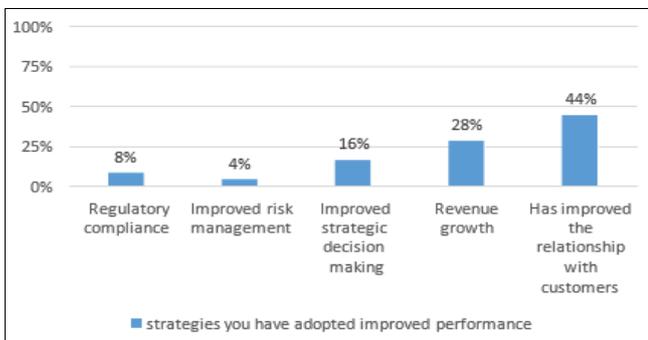


Fig 4.39: Strategies you have adopted improved performance

According to the graph above, 44% of respondents indicated that data analytics has improved the relationship with customers, while 28% attributed it to revenue growth, 16% stated it enhanced decision-making, 8% noted improvements in regulatory compliance, and 4% cited better risk management. These findings suggest that customer relationship management is perceived as the primary benefit of data analytics among banks in Ndola, followed by measurable financial gains and strategic improvements in decision-making.

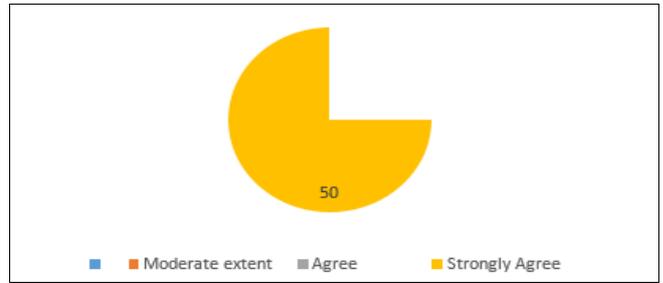


Fig 4.40: Data analytics affects the company's strategic decision making

According to the table above, all 50 respondents (100%) strongly agreed that data analytics significantly influences their company's strategic decision-making processes and is critical to effective decision-making in the banking sector. This unanimous response highlights the central role that data analytics plays in guiding long-term strategies, shaping competitive approaches, and optimizing operational efficiency within banks in Ndola.

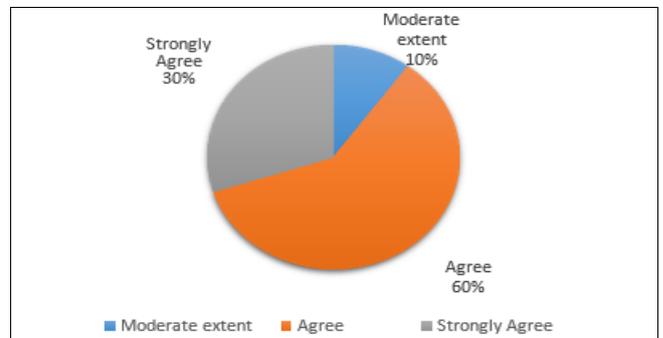


Fig 4.41: Data analytics strategies has increased competitive advantage

Based on the table above, 60% of respondents agreed that their bank's data analytics strategies have increased competitive advantage, while 30% strongly agreed to a very large extent, and 10% agreed to a moderate extent. This overwhelming positive response (100%) clearly indicates that banks in Ndola view data analytics as a strategic tool for gaining and sustaining a competitive edge in today's rapidly evolving financial landscape.

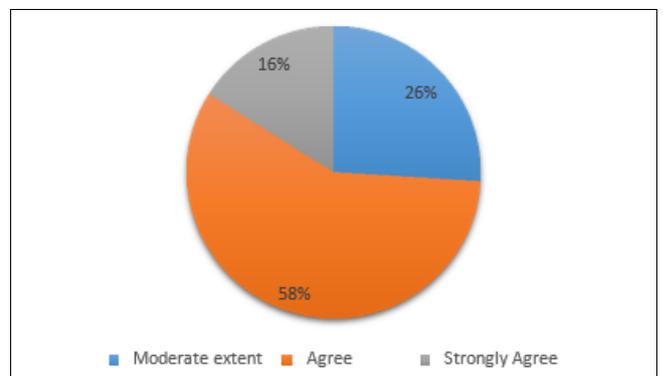


Fig 4.42: Data analytics has improved customer experience

According to the findings above, 58% of respondents agreed that data analytics has improved customer experience, while 26% moderately agreed, and 16% strongly agreed to a very large extent. These results indicate that a substantial majority of bank employees in Ndola acknowledge the positive impact of data analytics in enhancing how customers interact with banking services, from personalized offerings to faster and more efficient service delivery.

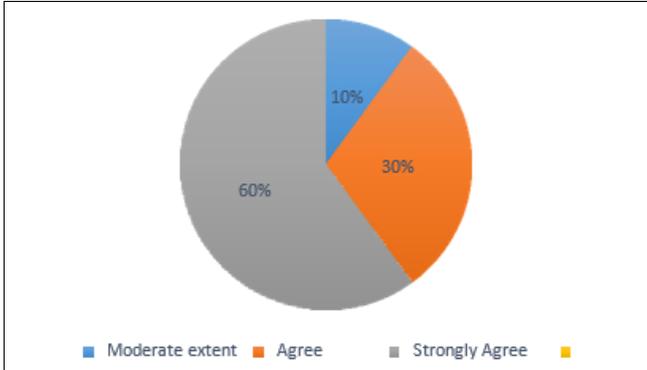


Fig 4.43: Data analytics Strategy management affects company financial performance

The pie chart above illustrates that 60% of respondents strongly agree, 30% agree, and 10% moderately agree that data analytics strategy management significantly affects company financial performance. This unanimous positive feedback (100%) clearly demonstrates that employees in the Ndola banking sector perceive data analytics as a critical driver of financial outcomes, including profitability, cost efficiency, and return on investment.

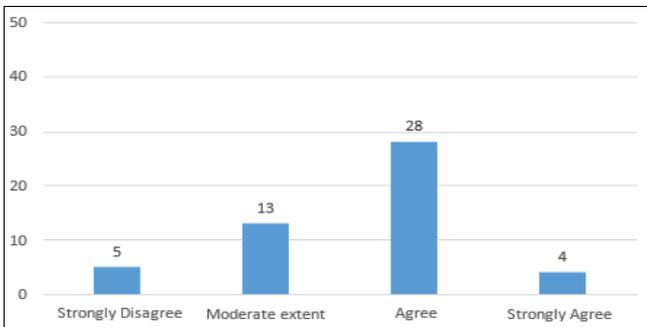


Fig 4.44: Our company is guided by data analytics policy to achieve digital transformation

Based on the findings from the table above, 28 out of 50 businesses (56%) agreed that their bank is guided by a data analytics policy to achieve digital transformation. Additionally, 13 firms (26%) agreed to a moderate extent, 4 (8%) strongly agreed, while 5 firms (10%) strongly disagreed with the statement.

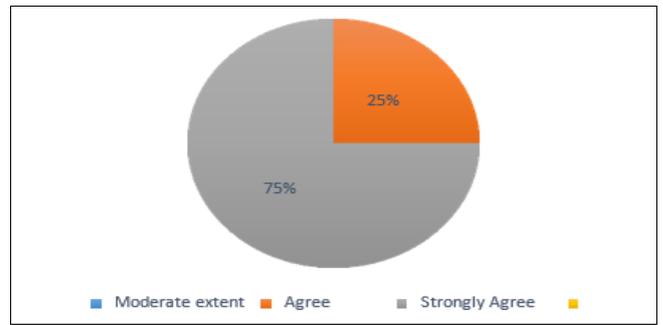


Fig 4.45: Data analytics has reduced credit risk

The table above reveals that 75% of respondents strongly agreed and 25% agreed that banks use data analytics to reduce credit risk. This unanimous affirmation (100%) underscores the critical role that data analytics plays in enhancing credit risk management within banks operating in Ndola. Through the application of analytics, banks are able to assess borrower creditworthiness more accurately, detect early warning signals, and implement proactive risk mitigation strategies.

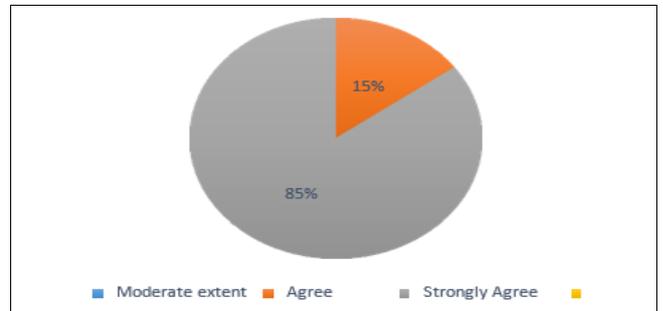


Fig 4.46: On overall, to what extent has the data analytics strategies adopted by your organization improved the performance of your business

The pie chart above indicates that 85% of the participants strongly agreed to a very large extent, while 15% agreed that the statement presented presumably related to the effectiveness of data analytics or a specific strategic outcome accurately reflects their experience. This overwhelming consensus (100%) highlights the broad acceptance and perceived impact of the data analytics initiative among the respondents, demonstrating that the majority of banks in Ndola recognize and value the strategic benefits derived from data-driven practices.

5. Conclusion and Recommendations

5.1 Conclusion

The study comes to the conclusion that banks in the banking industry in Ndola City performed better when data analytics practices were adopted. This is demonstrated by the positive

correlation found between banks' performance in terms of enhanced Customer Experience, increased efficiency, improved Risk Management, compliance and Regulatory Reporting, Better decision making and Return on investment. This indicates that banks in the banking sector perform better when data analytics management practices are adopted. The respondents mentioned that internal factors, external factors, Human resource expertise, High Data Volume and Velocity, Support from top management, Organizational culture, Customer trust and Transparency, Data Security and privacy all had an impact on the bank's ability to make data analytics strategic decisions. In addition, respondents overwhelmingly agreed that their business had implemented new strategies to gain a competitive edge. Banks conducted internal and external analysis to choose the strategies to implement, and they were guided by their organizational data analytics strategy to do so. To a larger extent banks affirmed that the DA strategies they adopted in the last five years were responsible for improved business performance. In addition, based on the chi square it was found out that change in enhanced customer experience and return on investments were related to business data analytics practices that were implemented. In addition, the p-value suggested that there may be some relationship or association between the aspects of deliberately set data analytics practices and the outcomes related to business performance. Nonetheless, in most banks it was a sole responsibility of IT team and top management to formulate and implement data analytics strategies. Hence, inclusion in business data analytics was cited as one of the challenges regarding business data analytics formulation and implementation. It is a good practice for all employees to be involved which should be adopted by banks. Additionally, Customer trust and Transparency was the main challenge, as banks were finding it hard to get access more relevant from their clients that can be ideal to use in tailor making some products. To guarantee that banks can handle client satisfaction and to create more comprehensive and detailed propensity models, it is necessary to fully comprehend a customer's preferences and interests. As a result, banks are increasingly forced to import information from outside sources, much of which is unstructured. Banks can now detect potentially sensitive information that is not protected in an appropriate manner and make sure it is stored according to regulatory requirements. Up until the recent past, fraud analysis was usually performed over a small sample of transactions, but increasingly banks are analyzing entire transaction history data sets. Similarly, the number of data points for loan portfolio evaluation is also increasing to accommodate better predictive modeling.

5.2 Recommendations

Based on the aforementioned, the researcher concludes that an organization's capacity to leverage the constantly expanding amount of big data gathered on its clients, goods, and services is a major factor in its capacity to improve performance. A bank must use the vast amount of data at its disposal to provide tailored goods and services that are intended to meet the unique requirements of its clients if it is to stand out from the competition. An increasing amount of unstructured data is being generated on the internet and mobile devices as a result of the development of technology-enabled social media platforms and their highly addictive popularity among millions of users. Banks can use all of this

data to exploit their competitors. As a result, in order to be sustainable in today's difficult business climate, they require to distinguish themselves through the adoption of growth strategies such as innovative product design, low cost manufacturing of products, superior quality and efficient after sales service, where data analytics is a key factor. According to the report, Zambian commercial banks should maximize their use of business analytics to identify trends and correlations, improve resource management, and reduce bank hall congestion. This improves customer service, gives information for new product development, results in targeted offers, and makes it easier to spread the word about deals and promotions, all of which boost sales. The report also suggests that in order for Zambian listed commercial banks to benefit as much as possible from business analytics technology, they should purchase the appropriate big data analytics tools and provide their employees with the training they need to use the tools and take appropriate action based on the knowledge they acquire. Using social media for marketing is less expensive than using traditional marketing channels because to the recent developments in the various social media platforms. In order to reduce marketing expenses, the researcher advises management of Kenya's listed commercial banks to make the most of social media. The study's conclusions not only highlighted the advantages of big data but also the obstacles that prevent businesses from obtaining the best return on their investment. As a result, it suggests that more research be done on the difficulties that Zambia has when implementing big data analytics. Further research on the effects of big data in other economic sectors is advised by this study.

5.3 Suggestions for Further Research

This study has proven that banks in the finance sector may apply data analytics techniques and business planning to increase business performance. To build on the findings, the researcher advises that a comparable investigation be carried out in areas other than Ndola City.

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