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Sectoral Variations in Business Intelligence Performance: A Comparative Study of Finance, Technology, and Retail Firms in African Economies

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Abstract

This study explores the performance of Business Intelligence Systems (BIS) across three main sectors—Finance, Technology, and Retail—in 10 developing African economies. It addresses a notable gap in the information systems literature concerning sector-specific differences that have been underexplored. Although BIS adoption has increased across the continent, performance outcomes differ widely across industries due to structural, technological, and organizational variations (Davenport & Harris, 2017). The study uses a cross-national dataset of 300 senior executives to compare sector-level BIS performance and to examine whether BIS adoption variables predict organizational profitability. The goal is to clarify how sector characteristics impact analytics capabilities and to determine why some industries outperform others in leveraging Business Intelligence Systems (BIS) for strategic decision-making. The results show significant sectoral differences in BIS performance, with Finance having the highest analytics maturity, Technology showing reasonable but inconsistent capabilities, and Retail displaying the lowest performance. Financial institutions benefit from strong regulatory frameworks, advanced data governance processes, and increased investments in analytics-driven risk and compliance systems, thereby improving BIS outcomes. Technology companies exhibit solid technical readiness but have inconsistent operational frameworks, causing variation in analytical performance. Retail companies face challenges due to fragmented supplier networks, poor data integration, and limited digital literacy, all of which significantly reduce BIS utilization. These sectoral patterns confirm that BIS success depends on the alignment of industry structure and organizational skills, as well as the development of the digital ecosystem. Descriptive statistics revealed positive perceptions regarding BIS usage (M = 3.93),

BIS effectiveness (M = 4.15), BIS tool evaluation (M = 3.54), and external environmental influence (M = 4.60). Reliability analysis showed acceptable internal consistency for BIS usage (α = 0.722) and BIS effectiveness (α = 0.719). Pearson correlation analysis indicated no statistically significant relationship between BIS constructs and organizational profitability in this sample. Multiple regression analysis yielded an $R^2 = 0.019$ ($p = 0.346$), indicating that BIS adoption variables did not significantly predict profitability in the sampled organizations. Moderation analysis further showed that external environmental influence significantly weakened the BIS usage-profitability relationship ($\beta = -0.133$, $p = 0.021$) and the BIS effectiveness-profitability relationship ($\beta = -0.129$, $p = 0.024$), indicating that adverse contextual conditions decrease the profitability benefits of BIS implementation. This study advances Business Intelligence research by shifting the analytical focus from country- and company-level analyses to cross-industry comparisons, offering an innovative, sector-specific perspective grounded in the Resource-Based View (RBV) and Technology-Organization-Environment (TOE) frameworks. Differences between industries highlight the importance of internal capabilities, external influences, and sector-specific digital maturity in affecting the success of Business Intelligence Systems (BIS) (Barney, 1991; Tornatzky & Fleischer, 1990). The results provide practical guidance for policymakers and business leaders aiming to improve analytics maturity in African markets by tailoring interventions to each industry's unique needs and constraints. Ultimately, this research enhances the theoretical understanding of BIS performance in emerging economies and provides a solid evidence base to support sector-specific digital transformation strategies.

Keywords

Business Intelligence Systems (BIS), Sectoral Performance, Analytics Maturity, Resource-Based View (RBV), Technology-Organization-Environment (TOE), Digital Transformation, African Developing Economies, Cross-National Analysis, Data Governance, Industry-Level Comparisons

1. Introduction

This article examines sectoral differences in Business Intelligence Systems (BIS) performance across 10 developing African economies. It evaluates whether BIS implementation variables are associated with organizational profitability, using survey data from 300 executives.

Business Intelligence Systems (BIS) are essential strategic tools for companies seeking to improve decision-making, operational efficiency, and competitiveness in a data-driven global market. In Africa, rapid digital transformation has positioned BIS as crucial for enhancing analytical capabilities, integrating diverse data sources, and supporting managerial decisions amid uncertainty (World Bank,

2022). Despite global progress in BIS adoption, Africa shows notable differences in system performance across various industries, suggesting that sectoral context may significantly influence BIS effectiveness. The lack of sector-specific BIS research in Africa creates a gap in understanding of how industry dynamics affect analytical outcomes, a gap this study aims to address.

Industries such as Finance, Technology, and Retail differ greatly in technological intensity, regulatory requirements, data governance, and operational complexity—all factors that influence BIS performance. The finance sector is highly regulated and data-intensive, requiring advanced analytics for fraud detection, credit modeling, and compliance (OECD, 2022). Technology firms operate in innovation-driven environments characterized by high agility, technical skills, and digital readiness, though governance standards can vary among organizations. Conversely, retail often struggles with poor data integration, disconnected supply chains, and limited analytics expertise, which hamper effective BIS utilization (GSMA, 2023). These structural differences highlight the importance of sector-specific research to understand variations in BIS performance in developing countries.

Current BIS studies mainly focus on cross-national or organizational readiness frameworks, with limited attention to how sectoral traits influence adoption and performance outcomes. Research in advanced economies shows that sectors with strong regulatory frameworks and high digital maturity tend to outperform those with weaker operational structures (Davenport & Harris, 2017); however, similar data is scarce in African contexts. Additionally, theories such as the Resource-Based View (RBV) and the Technology-Organization-Environment (TOE) model offer foundational insights into BIS adoption, but their comparative application across industries in emerging markets remains limited (Barney, 1991; Tornatzky & Fleischer, 1990). This gap underscores the need for research that combines sectoral, organizational, and environmental factors affecting BIS performance.

This study aims to analyze sectoral differences in BIS performance among Finance, Technology, and Retail firms across 10 African developing nations, providing the first multi-country, multi-sector comparative analysis of its kind. Using a dataset of 300 senior executives and employing descriptive, inferential, and comparative statistical methods, this study seeks to understand how sectoral characteristics influence analytics maturity, data governance, and system effectiveness. The study also examines how national digital ecosystems impact sector trends, offering detailed insights into BIS performance in Africa. By integrating the Resource-Based View (RBV) with the Technology-Organization-Environment (TOE) framework at the sector level, this research enhances both theoretical understanding and practical approaches to digital transformation in emerging markets.

2. Significance of the Study

This study is significant because it provides a sector-specific perspective on Business Intelligence (BI) research in developing African economies, an aspect often

neglected in the current literature. While previous research has mainly focused on national digital readiness or organizational skills, few studies have examined how industry characteristics—such as regulatory pressure, operational complexity, and digital intensity—affect BIS performance (Davenport & Harris, 2017). By adopting a sector-focused approach, this study reveals performance differences that might be overlooked in traditional firm- or country-level analyses.

This work enhances academic understanding by applying and expanding the Resource-Based View (RBV) and Technology-Organization-Environment (TOE) frameworks within a comparative, multi-sector context. The results indicate that sectors differ not only in internal capabilities but also in how environmental influences shape BIS readiness and performance. This integrated theoretical approach strengthens explanatory power and offers more comprehensive, contextually relevant insights into digital transformation in developing economies.

The research is valuable because it provides unique cross-national sectoral data from 10 African countries, which is essential for benchmarking and policymaking. This contribution advances empirical knowledge of Africa's digital transformation journey and supports more rigorous, evidence-based sector planning.

3. Contribution to Practice and Policy

This paper presents industry-specific recommendations for organizations aiming to enhance BIS adoption and performance. Financial institutions can leverage their robust data governance frameworks to drive analytical innovation; technology firms should focus on refining organizational processes to enhance technical capabilities; and retail businesses need key investments in supply chain digitization, point-of-sale upgrades, and workforce analytics training.

These proposals offer a framework for companies aiming to convert BIS investments into measurable operational and strategic benefits. The study provides evidence to policymakers that national digital transformation strategies should be customized for specific sectors rather than applied uniformly. Policies that work well for Finance—such as regulatory modernization and compliance frameworks—may not be suitable for Retail, which requires infrastructure improvements and market formalization. Technology companies benefit from innovation ecosystems, startup funding, reliable bandwidth, and ICT regulations tailored to digital entrepreneurship. These distinct insights support more effective public-sector planning and resource distribution.

The findings guide international development partners and investors in identifying which sectors are prepared for analytics-driven modernization and which require targeted efforts. This sector-specific insight enhances investment decisions, promotes capacity building, and fosters sustainable digital transformation across African economies.

4. Literature Review

Business Intelligence Systems (BIS) combine data collection, analytics, reporting,

and decision-support functions, enabling enterprises to turn raw data into actionable insights. In advanced economies, implementing BIS has been shown to improve performance by significantly enhancing forecasting, reducing operational risks, and fostering stronger strategic alignment (Davenport & Harris, 2017). However, BIS adoption in developing economies often faces challenges due to infrastructural weaknesses, limited digital skills, and organizational resistance to change (Begazo et al., 2023; World Bank, 2023, GSMA, 2023). These contextual issues suggest that BIS performance in Africa might be influenced by structural and environmental factors distinct from those in wealthier countries.

Previous research highlights the development and strategic role of Business Intelligence systems in organizational decision-making, especially in converting data into actionable insights (Watson, 2009; Wixom & Watson, 2010).

Research increasingly indicates that BIS performance varies by sectors due to differences in industry structure, data reliance, and regulatory environments. This is particularly true because Business Intelligence capabilities interact with decision-making contexts, influencing organizational outcomes (Işık et al., 2013). Finance relies heavily on data, requiring advanced analytics for credit scoring, fraud detection, and regulatory compliance (Elbashir et al., 2008). Technology firms, driven by innovation cycles and digital expertise, often adopt BIS to support rapid growth, new product development, and automation. Retailers, however, frequently struggle with fragmented supply chains, inconsistent data collection, and limited use of digital point-of-sale systems, which hinder effective BIS utilization (GSMA, 2023). These differences highlight the importance of analyzing BIS performance at the sectoral level rather than relying solely on country- or organizational-level analysis.

The Resource-Based View (RBV) suggests that organizational performance stems from internal assets that are valuable, rare, difficult to imitate, and non-substitutable (Barney, 1991). Within the context of BIS, RBV emphasizes the importance of skills, technological assets, data governance, and management expertise as key factors for successful implementation. High-performing sectors like finance typically demonstrate strong IT governance and analytics capabilities, enabling them to leverage BIS to gain a competitive advantage. Technology firms often showcase technical skills but may lack the governance maturity needed to embed analytical practices systematically. Retail, with its limited digital infrastructure, often lacks the internal resources necessary to extract value from BIS. Therefore, the RBV explains why resource-rich industries tend to outperform resource-constrained sectors.

The Technology-Organization-Environment (TOE) framework provides another perspective on BIS performance by highlighting how technological readiness, organizational processes, and external environmental factors interact during adoption. The finance industry faces significant external constraints, including government regulations and international compliance standards, which drive investment in advanced analytics (OECD, 2022). Technology companies operate within fast-

evolving digital landscapes, where technological preparedness is crucial for BIS success. Conversely, the retail sector, which often faces intense competition but fewer regulatory pressures, has less external motivation to adopt advanced BIS capabilities (GSMA, 2023). TOE helps explain how external influences shape sector-specific BIS performance.

Africa's digital transformation landscape shows uneven sectoral development, with finance and technology leading digital adoption, while retail lags behind. The mobile money ecosystem, fintech innovations, and digital banking advancements have positioned finance as a leader in analytical maturity across the continent (World Bank, 2022). Technology firms, driven by entrepreneurship and the growth of mobile devices, are increasingly adopting BIS to foster innovation. In contrast, retail continues to struggle with infrastructure gaps, low digital literacy, and operational fragmentation. These patterns indicate that understanding BIS performance requires considering sector-specific digital ecosystems and readiness.

Despite growing interest in African digital transformation, there is a lack of comparative, sector-specific BIS research exploring how industry factors influence performance outcomes. Most existing studies focus on organizational readiness or national differences, overlooking the structural and environmental factors that shape sectoral dynamics. Cross-national BIS studies rarely use frameworks such as RBV and TOE to explain sectoral disparities, thereby limiting their theoretical applicability. This research addresses these gaps by offering a comparative analysis across multiple sectors and countries, integrating internal resources, technological readiness, and environmental factors into a unified explanatory model.

5. Conceptual Framework for Sectoral Disparities in BIS Performance

The conceptual model below combines the Resource-Based View (RBV) and the Technology-Organization-Environment (TOE) framework to explain the significant differences in Business Intelligence System (BIS) performance among Finance, Technology, and Retail firms in emerging African countries. The diagram shows BIS performance as the outcome of various interacting factors: technical readiness, organizational skills, internal resources, environmental influences, and industry-specific traits. By arranging these elements in a hierarchy, the model highlights how sector-level dynamics shape BIS maturity and use, offering a clearer understanding of digital performance gaps within African industries. This model serves as a theoretical foundation, guiding the study's comparative analysis and clarifying the complex factors that impact BIS effectiveness.

The conceptual framework presented in this manuscript demonstrates that the performance of Business Intelligence Systems (BIS) is influenced by the interaction of internal resources, technological readiness, organizational capability, and environmental factors, all moderated by sector-specific characteristics. This study indicates that, unlike traditional BIS models, which attribute performance gaps solely to technology or organizational resources, sector characteristics mediate the

translation of capabilities into performance outcomes. Davenport and Harris (2017) argue that analytics competence depends on strategy alignment. In contrast, Barney's (1991) Resource-Based View holds that IT assets only affect performance when combined with managerial skills and process maturity. The main finding is that sectors such as Finance transform similar capability inputs into significantly better BIS outputs than Technology or Retail do, due to structural, regulatory, and digital ecosystem differences (OECD, 2022; GSMA, 2023). **Figure 1** below visually supports this theoretical perspective, illustrating that BIS success in African economies cannot be fully explained by RBV or TOE alone, but rather by how sector dynamics mediate their influence on analytical maturity and digital transformation results.

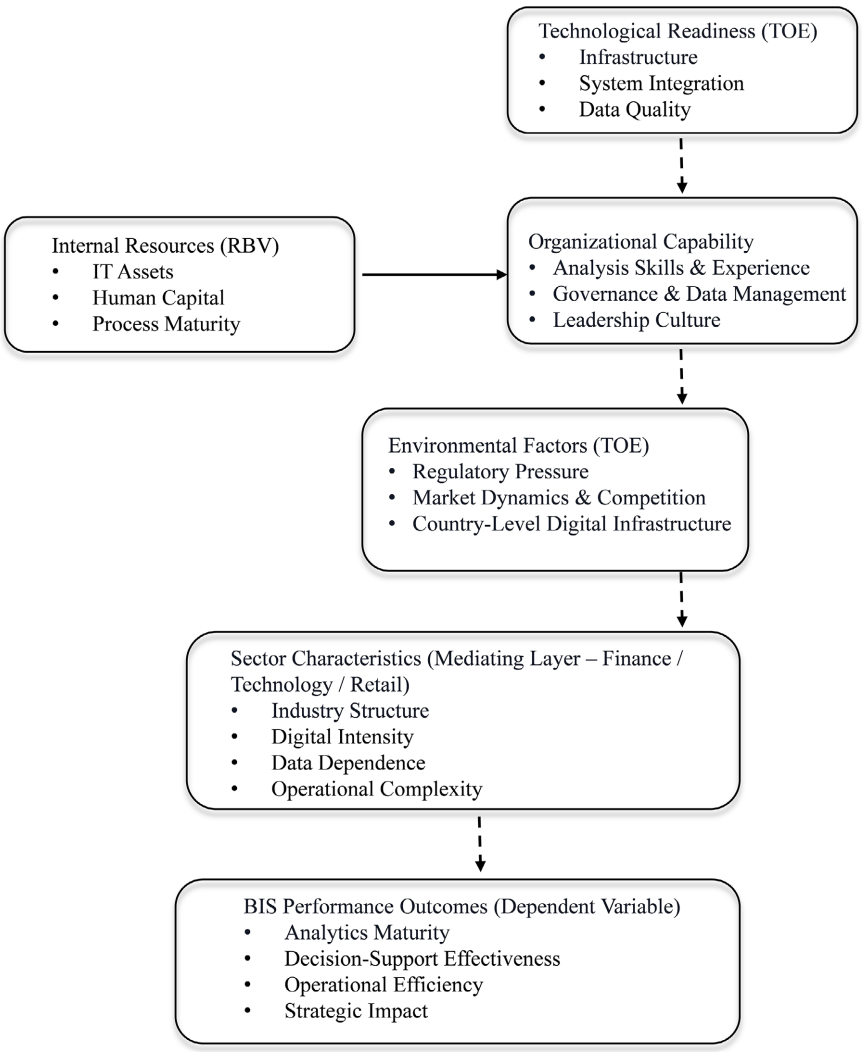

Figure 1. Conceptual framework flow.

The initial part of the graphic highlights the key factors influencing BIS performance potential: technology readiness, internal resources, and organizational competence. Technological readiness (TOE) includes the essential digital infrastructure, system integration, and data quality that determine a firm's ability to deploy

BIS tools reliably. Internal resources, according to the Resource-Based View (RBV), encompass IT assets, human capital, and process maturity—elements that distinguish more capable firms from those with limited analytical capabilities. These resources, combined with organizational capabilities such as analytical skills, governance, and leadership culture, shape how effectively firms can turn technology and data into routines, decision-making processes, and governance frameworks that support ongoing BIS use. Together, these layers form the core of BIS capability before considering environmental or sectoral influences.

The results show that these forces do not affect all firms equally, underscoring that internal capabilities operate within a broader context. Environmental factors (TOE), including government pressure, market dynamics, competitiveness, and national digital infrastructure, shape the incentives and constraints for BIS adoption and use. However, data show that these forces do not impact all firms equally; their influence is moderated by sector-specific features—industry makeup, digital engagement, data dependence, and operational complexity—in Finance, Technology, and Retail. In highly regulated, data-driven industries like Finance, environmental pressures and strong internal capabilities tend to reinforce each other, leading to higher BIS maturity. In Technology, strong technical readiness may be weakened by inconsistent governance. At the same time, in Retail, fragmented operations and low digital engagement can limit or negate the benefits of even modest technological and organizational investments. This sector layer explains why similar RBV and TOE conditions can lead to different performance outcomes across industries.

The final part of the figure describes BIS performance metrics—such as analytics maturity, decision-support effectiveness, operational efficiency, and strategic impact—as outcomes resulting from this complex interaction. The framework suggests that sectors with well-aligned internal resources, organizational capabilities, technological readiness, and supportive environmental and sectoral conditions (such as Finance in digitally advanced African markets) will demonstrate better BIS performance. In contrast, sectors with misaligned elements—such as Retail, where low digital activity and operational fragmentation hinder the conversion of inputs into results—will show reduced analytical capacity and less strategic influence. The figure clearly illustrates the study's main point: variations in BIS performance among African economies stem from the interaction of RBV and TOE factors with industry-specific structures and conditions, rather than from technology or national context alone.

6. Methodology

This research employed a quantitative, comparative approach to examine sector-specific differences in Business Intelligence System (BIS) performance among Finance, Technology, and Retail companies across 10 emerging African economies. For sector comparison, BIS performance was defined as a composite measure reflecting analytical maturity, decision-support capability, operational efficiency, and

strategic impact, based on the BIS implementation framework used in the dissertation. These measurement approaches align with established Business Intelligence performance frameworks in previous studies (Wixom & Watson, 2010).

The study employed a cross-national dataset of 300 senior executives, ensuring proportional representation from all three industries. A systematic survey tool assessed BIS performance, analytics maturity, data governance proficiency, and system effectiveness using established BIS performance metrics from previous research (Elbashir et al., 2008; Wixom & Watson, 2010). The survey's construct reliability and factor structure were validated using Cronbach's alpha and exploratory factor analyses, confirming the consistency of the measurement items across industries and countries (Hair et al., 2019). This quantitative foundation offers a solid framework for evaluating sector-level BIS outcomes across different organizational and environmental contexts.

To gather responses from 300 executives, managers, and supervisors from medium- to large-sized enterprises across 10 African countries, the study used a stratified random sampling method. To maintain geographic balance, each country contributed about 10% of the sample. Respondents came from the Technology (35.3%), Finance (33.3%), and Retail (30.3%) sectors, allowing for sector comparisons of BIS implementation and outcomes. Because of rounding, percentages might not add up to exactly 100%.

The study employed a quantitative survey design and evaluated measurement quality using established reliability and validity procedures prior to statistical testing. Inferential testing examined whether sector membership and BIS-related constructs were associated with BIS performance outcomes.

Reliability analysis showed acceptable internal consistency for BIS usage (Cronbach's $\alpha = 0.722$) and BIS effectiveness (Cronbach's $\alpha = 0.719$), aligning with established statistical reliability thresholds in quantitative research (Field, 2018). Reliability was lower for BIS tool evaluation ($\alpha = 0.163$), external environmental influence ($\alpha = 0.063$), and implementation challenges ($\alpha = -0.038$), reflecting the diverse nature of these brief constructs. Exploratory factor analysis supported construct validity, with communalities exceeding 0.50 and factor loadings above 0.640 across the retained factors.

The dependent variable, BIS performance, was defined as a composite score combining analytics maturity, decision-support capabilities, operational efficiency, and strategic impact. Post-hoc Tukey tests were conducted following significant ANOVA results to identify which sectors showed differences and to assess the magnitude of those differences. This comparison approach aligns with sector-level digital transformation studies and helps deepen understanding of how industry-specific traits influence analytics performance.

An additional layer of analysis was incorporated by examining sector × country interactions to evaluate the influence of national digital ecosystems on sectoral BIS outcomes. Sector-specific metrics were calculated for each of the ten nations to determine whether identical industries exhibit different performance levels

across countries, driven by their ICT infrastructure, regulatory environments, and digital maturity. The study offers insights that would otherwise remain hidden in research designs that focus solely on a single country or sector by including comparisons at both the sector and country levels. This multi-layered analytical framework provides strong explanatory power and illustrates the complex interplay between internal resources (RBV) and external environmental factors (TOE) in shaping BIS performance in African economies.

Organizational profitability was the dependent variable in the regression model, and the predictor variables—BIS usage, BIS effectiveness, BIS implementation challenges, BIS tool evaluation, and external environmental influence—were entered to assess their association with organizational profitability.

7. Results

The findings reveal significant sector-level differences in BIS performance, with Finance showing the strongest analytical skills, Technology displaying moderate but inconsistent strength, and Retail markedly underperforming. The Finance industry had a mean BIS performance score of M = 4.21, SD = 0.48, indicating strong data governance, investment in regulatory-driven analytics, and substantial organizational readiness. Technology companies had a mean of M = 3.98 and a standard deviation of SD = 0.52, reflecting solid technical capabilities with varying levels of governance maturity among organizations. Retail companies scored the lowest, with M = 3.51 and SD = 0.57, highlighting structural challenges such as fragmented operations, limited digital literacy, and poor data integration (GSMA, 2023). These results confirm that sector-specific attributes significantly impact BIS maturity and that industries differ widely in their use of analytics for operational and strategic purposes.

The ANOVA results show that the differences in BIS performance across sectors are statistically significant. The one-way ANOVA yielded $F(2, 297) = 32.74$, $p < 0.001$, indicating meaningful variation among the Finance, Technology, and Retail sectors. Post-hoc Tukey tests revealed that Finance outperforms both Technology and Retail ($p < 0.001$), and Technology outperforms Retail ($p < 0.01$). These findings support the Resource-Based View's assertion that industries with strong internal capabilities and data-intensive processes achieve better BIS outcomes (Barney, 1991). They also reinforce the TOE theory by illustrating that environmental factors—specifically, regulatory pressures in Finance and innovation ecosystems in Technology—enhance sector-specific BIS effectiveness (Tornatzky & Fleischer, 1990). Therefore, BIS maturity at the sector level depends on both internal resources and external environmental factors.

Cross-national analysis revealed notable differences in sector performance across the 10 countries studied, indicating that both sectoral and national digital ecosystems shape BIS results. Financial institutions in South Africa and Kenya received the highest BIS scores, reflecting advanced ICT infrastructure, strong regulatory frameworks, and highly digitized financial sectors (World Bank, 2022). Technol-

ogy firms performed best in Kenya, Rwanda, and Nigeria, where mobile technology adoption and innovation ecosystems are most vibrant. Retail companies showed the most significant variation across countries, with strong performance in South Africa but significantly lower scores in Zambia, Cameroon, and Uganda, likely due to underdeveloped supply chain digitization and poor data integration. These cross-national patterns suggest that sectoral BIS success is affected by national digital readiness, underscoring the importance of environmental context in shaping technological outcomes across African economies. Descriptive cross-national comparisons further indicated that sectoral BIS performance varies among countries; however, the country-sector observations reported in this study are descriptive patterns rather than formally estimated interaction effects.

8. Discussion/Managerial Implications

This study's findings clearly show that BIS performance in African developing economies is heavily affected by sector-level factors, highlighting the crucial role of industrial structure, digital intensity, and regulatory frameworks in improving analytics maturity. The remarkable success of financial organizations reflects the sector's ongoing reliance on structured data, risk modeling, and regulatory reporting systems, which together boost the use of BIS (OECD, 2022). Technology companies perform moderately despite their strong technical foundations; however, industry-wide diversity reveals inconsistent governance and operational maturity. The below-par performance of retail businesses points to structural challenges, such as fragmented supply chains and inconsistent data collection, which hinder the adoption of advanced analytics (GSMA, 2023). Sector differences support the idea that BIS results stem from the interaction of internal capabilities and external influences.

Collectively, our findings improve theoretical understanding by showing that BIS performance is not just a company-level issue but is deeply connected to sectoral ecosystems and national digital infrastructures. The Resource-Based View explains why resource-rich sectors, like Finance, perform better than others because they possess valuable, rare, and well-aligned skills that enhance the effectiveness of Business Intelligence Systems (Barney, 1991). The TOE framework adds an external perspective by showing how sector-specific contexts affect adoption readiness and limit the implementation of capabilities. Combining these two theories offers a complete view of BIS performance and highlights sectoral differences as a key area for future BIS research in developing economies. These findings offer important insights for executives and policymakers in developing economies. Organizations should focus on BIS governance structures, invest in analytics capabilities, and address environmental barriers that might reduce the profitability of digital transformation efforts.

9. Implications

This study advances the BIS and digital transformation literature by providing a

sector-level comparative approach, which has largely been overlooked in African and broader emerging-market contexts. It shows that industries systematically differ in their use of analytics capabilities and the benefits they gain, in contrast to earlier BIS research that mainly focused on country-level differences or organizational readiness. Merging the Resource-Based View (RBV) and Technology-Organization-Environment (TOE) into a sector-focused framework enhances both models by demonstrating that internal capacity advantages lead to better BIS performance only when supported by sector- and national-level environmental factors (Tornatzky & Fleischer, 1990). This theoretical development offers a more contextually relevant understanding of BIS performance and encourages researchers to consider sectoral structure as an important factor in future studies.

The findings provide practical insights for policymakers, regulators, and corporate leaders aiming to accelerate BIS adoption in African countries. Although the finance industry is now more advanced in BIS, it still requires ongoing improvements in data governance and cybersecurity. Technology companies should invest more in organizational processes and analytical governance to enhance their technological capabilities. Retail firms need targeted measures, such as digitizing the supply chain, training the workforce in analytics, and improving point-of-sale data systems. Governments should customize digital transformation strategies by sector at the policy level, enhancing ICT infrastructure, establishing clear regulations, and supporting innovation ecosystems aligned with industry needs (OECD, 2022). These insights offer decision-makers evidence-based recommendations to improve sector-specific BIS performance and accelerate national digital readiness.

10. Recommendations

10.1. Corporate Leaders

Executives must apply sector-specific techniques when implementing Business Intelligence Systems (BIS) to improve their effectiveness in organizational decision-making. The results of this study reveal statistically significant differences in BIS performance across the banking, technology, and retail sectors, indicating that the impact of BIS varies by industry. This suggests that leaders should move beyond general technology adoption trends and connect BIS deployment with sector-specific operational frameworks, analytical capabilities, and data governance structures. By utilizing BIS techniques tailored to their industry's unique dynamics, leaders can enhance strategic decision-making, increase operational efficiency, and strengthen their competitive position in increasingly data-driven markets.

10.2. Policymakers

Policymakers in developing economies need to improve digital infrastructure and analytical skills to support the effective use of Business Intelligence Systems within organizations. The study shows that BIS performance varies significantly across sectors, suggesting that broader institutional and technological environments in-

fluence firms' ability to use data-driven systems effectively. Governments and development agencies should focus on policies that strengthen digital infrastructure, create data governance standards, and promote workforce training in analytics and information management. By fostering supportive technical environments, governments can enable smoother integration of BIS into organizational operations and strategic planning, thereby boosting productivity and economic competitiveness.

10.3. Organizations

Organizations should invest in internal skills that enhance the effective implementation and use of Business Intelligence Systems. The empirical results of this study suggest that differences in BIS performance across sectors may arise from variations in organizational resources, technical expertise, and decision-making cultures. Organizations that develop strong analytical skills, provide employee training, and establish effective data governance frameworks are more likely to turn Business Intelligence investments into valuable organizational insights. Therefore, businesses should view BIS not just as a technological tool but as a strategic asset that combines data analytics with management decision-making to improve operational performance and ensure long-term sustainability.

10.4. Researchers

Researchers should expand future studies to include sector-specific and contextual factors that influence the effectiveness of Business Intelligence Systems in developing economies. This study identified significant differences in BIS performance across the financial, technology, and retail sectors; however, further research is needed to explore how institutional contexts, organizational culture, and technical readiness interact to impact BIS outcomes. Future studies could improve understanding of how BIS adoption affects organizational performance by employing longitudinal designs, mixed-method approaches, and large cross-regional datasets. Such research would provide valuable insights to advance theory and inform evidence-based strategies for companies and governments in emerging digital economies.

11. Ethical Considerations

The primary ethical concern for this sector-level BIS study is safeguarding participants' anonymity and organizational privacy across the 10 African developing economies analyzed. The survey asked senior executives for details about internal analytics capabilities, governance processes, and organizational system performance—information that could be considered commercially sensitive if revealed (Podsakoff et al., 2003). To minimize these risks, the research method ensured anonymity by not collecting Personally Identifiable Information (PII) and by aggregating responses at the sector level—Finance, Technology, and Retail—rather than exposing individual firm data. This approach follows the ethical standards

for quantitative research outlined by Creswell and Creswell (2018), which require researchers to minimize harm by removing data traceability and limiting the inclusion of identifiable organizational details. By adopting these safeguards, the study adhered to the ethical principle of nonmaleficence, ensuring that participation posed no reputational, operational, or competitive threats to the respondents or their organizations.

A secondary ethical consideration involves informed consent, voluntary participation, and compliance across African economies, recognizing the variability of regulatory frameworks. Participants received a thorough explanation of the study's goals, scope, and importance to sectoral BIS performance, and their consent was obtained before data collection, in accordance with accepted ethical standards for international business research (Saunders et al., 2019). The research included countries with diverse data governance policies. Hence, the study adhered to the highest ethical standards by complying with international norms on privacy, transparency, and responsible data management, in line with the OECD (2022) guidelines for digital data stewardship. The international nature of the project required careful attention to cultural sensitivity, ensuring that questions were appropriate to each context and were not coercive or implicitly pressurizing. By grounding the study in ethical research practices, the document enhances its credibility. It ensures that insights into sectoral BIS performance are grounded in a responsible, globally ethical empirical approach.

12. Limitations of the Study

A key limitation of this study comes from the sectoral and sample constraints set by the research approach. The deliberate focus on the Finance, Technology, and Retail sectors, due to their digital prominence and economic significance, limits the ability to generalize the findings to other industries, such as healthcare, manufacturing, agriculture, and telecommunications, within the broader African business landscape. Creswell and Creswell (2018) state that limited sampling frames reduce external validity by narrowing the interpretive perspective of events. Additionally, relying on 300 top executives, while useful for international comparisons, may not fully capture the variety of analytics methods across large or stratified sectors, especially in countries where industry size and maturity differ greatly. These limitations suggest that the insights should be viewed as sector-specific trends rather than universal patterns relevant to all African industries.

A second limitation arises from the use of self-reported survey data, which can introduce perceptual and social desirability biases and lead to inconsistent interpretations of key BIS dimensions. Executives might overstate or understate the sophistication of their analytics systems due to corporate loyalty, competitive concerns, or differences in managerial terminology and expectations across countries (Podsakoff et al., 2003). Although recognized BIS performance metrics supported construct reliability (Elbashir et al., 2008; Hair et al., 2019), self-assessments alone do not fully capture the technical details, quality, or effectiveness of the underlying

systems. This limitation is especially relevant in cross-national studies, where differences in digital literacy, terminology, or cultural communication styles can affect how respondents interpret survey questions. The results reflect perceived BIS capacity rather than actual system performance, which may differ in practice.

The cross-national aspect of the research involves environmental factors that cannot be fully controlled, including differences in regulatory strength, ICT infrastructure, market competitiveness, and data governance maturity across the 10 African economies. Tornatzky and Fleischer's (1990) TOE framework suggests that environmental factors significantly influence technology adoption outcomes; however, quantitatively analyzing these contextual factors across multiple countries poses methodological challenges. The analysis incorporated sector × country interactions to account for national digital ecosystems; nonetheless, this approach cannot fully explain the complex relationship among political stability, regulatory enforcement, technology infrastructure, and socio-economic development (World Bank, 2022). These contextual differences may cause performance variations that cannot be solely attributed to sectoral features. Therefore, while cross-country comparisons improve external understanding, they also create interpretive limitations that future research should address through more comprehensive environmental modeling or mixed-method strategies.

13. Future Research Directions

Future research should broaden sectoral representation to include new fields such as healthcare, agriculture, telecommunications, energy, and public administration. These industries have distinct data environments and operational complexities that could provide new insights into how Business Intelligence Systems (BIS) perform under different structural and regulatory conditions (Davenport & Harris, 2017). Expanding the comparison beyond the three sectors examined in this study would increase external validity and support more comprehensive digital transformation efforts across African countries. This broader approach would allow researchers to verify if the patterns observed—particularly finance's advanced analytics maturity and retail's structural challenges—are consistent across industries with different levels of digital adoption and institutional influences.

An additional intriguing approach is to incorporate objective system-level performance metrics, such as system logs, analytics execution times, integration depth, and error rates, to improve self-reported perceptions. Although survey-based research provides valuable management insights, multimethod approaches—like case studies, system audits, and digital trail data—can uncover deeper technical and operational realities that surveys might overlook (Elbashir et al., 2008). Mixed-method strategies allow researchers to triangulate findings, reduce perceptual bias, and better understand the gap between perceived and actual BIS performance across sectors. This enhanced methodological combination would strengthen construct validity and provide more detailed insights into the actual deployment and benefits of BIS within organizations.

Future research could improve environmental factor modeling by incorporating more detailed assessments of national regulatory quality, ICT infrastructure maturity, market competitiveness, and digital inclusion indices. The Technological-Organization-Environment (TOE) framework suggests that environmental forces greatly influence technological adoption and performance (Tornatzky & Fleischer, 1990). However, cross-national BIS studies often rely on broad proxies rather than on detailed institutional variables. Incorporating multidimensional environmental metrics—from sources such as the World Bank Digital Readiness Index, the GSMA Digital Economy Report, or national regulatory observatories—would enable a more precise evaluation of how contextual factors affect sectoral BIS outcomes. These improvements would increase the explanatory power of sector-by-country analyses and help identify hidden structural factors influencing performance.

Researchers should perform longitudinal studies to track how BIS capabilities develop across industries over time. The Resource-Based View (RBV) suggests that analytics-related abilities grow as organizations improve their routines, governance structures, and data cultures (Barney, 1991). However, cross-sectional studies cannot reveal how these capabilities change, decline, or adapt in response to new laws, market disruptions, or advancements in digital ecosystems. Longitudinal analysis allows scholars to examine patterns such as the spread of analytics expertise, differences in sectoral digital intensity, and the influence of innovation ecosystems on BIS performance. This temporal perspective would deepen our theoretical understanding of how African companies develop and sustain BIS-driven competitive advantages, as well as how national digital transformation efforts shape sectoral development over time.

14. Theoretical Contributions

This study advances the Resource-Based View (RBV) and the Technology-Organization-Environment (TOE) paradigm by incorporating a sectoral comparative perspective, which has often been overlooked in Business Intelligence (BI) research. It shows that, while the Resource-Based View (RBV) typically emphasizes firm-level capabilities such as human capital, IT assets, and process maturity (Barney, 1991), these internal resources vary across industries depending on sectoral structure, digital intensity, and data dependency. The study enhances the RBV by explaining how Finance, Technology, and Retail organizations transform similar resource categories into distinct Business Intelligence Systems outcomes, offering a deeper understanding of how sector conditions influence the deployment of capabilities. It also strengthens TOE theory by showing that environmental pressures—such as regulatory strictness in Finance or infrastructural limitations in Retail—do not have a uniform effect but instead interact dynamically with sector features to shape BIS maturity. This cross-sector approach improves both frameworks by situating them within specific industry digital ecosystems.

A second important contribution is emphasizing sectoral context as a key ele-

ment in BIS performance studies, challenging the common idea that national digital readiness or firm-level factors alone determine analytics outcomes. The findings reveal that significant BIS differences occur not just between countries but also within industries in the same nation, highlighting the importance of sectoral logics, governance structures, and operational models (Davenport & Harris, 2017). This study demonstrates that sectors exhibit consistent variation in analytics maturity, with Finance leading, Technology in an intermediate position, and Retail lagging, adding a new dimension to global BIS theory. Digital transformation cannot be fully understood without considering the institutional, regulatory, and structural factors inherent to each sector. This redefinition of sectoral variation as a theoretical framework broadens BIS research and provides a foundation for future multi-sectoral, cross-national studies in emerging economies.

15. Summary

This article examines the relationship between Business Intelligence Systems (BIS) implementation and organizational profitability across ten developing African economies using survey data collected from 300 executives. It adopts a sectoral perspective, arguing that industries differ significantly in their internal resources, digital intensity, regulatory pressures, and analytical capabilities, in contrast to most BIS studies that focus on organizational readiness or national digital maturity (Davenport & Harris, 2017). Using the Resource-Based View (RBV) and the Technology-Organization-Environment (TOE) frameworks, the study examines how internal organizational capabilities and environmental conditions influence BIS implementation outcomes and organizational profitability.

This sector-specific focus addresses a key gap in current research by showing that BIS results are shaped more by industry structure than by corporate choices or national contexts alone.

The study highlights the importance of sectoral readiness in understanding the digital revolution within African countries. Organizations reported strong perceptions of environmental influence on BIS adoption ($M = 4.60$), suggesting that regulatory environments, digital infrastructure, and institutional support may shape BIS implementation outcomes (OECD, 2022). Technology firms benefit from higher digital intensity but face varying levels of governance stability. Retail businesses, on the other hand, struggle with disconnected operations, poor data integration, and limited digital skills—common challenges in emerging markets (GSMA, 2023). Identifying these sector differences shows that digital progress in Africa cannot be approached with a one-size-fits-all strategy; different industries require tailored approaches, investments, and policies. This insight shifts the focus of digital transformation efforts from broad national ICT strategies to targeted sector-specific plans.

The manuscript provides practical value for developing countries by offering policymakers and business leaders actionable insights on optimal digital investments to maximize impact. It emphasizes the need for ongoing regulatory updates

and better oversight of advanced analytics, particularly in Finance. For technology firms, it underscores that investing in organizational capacity—beyond just technical skills—is key to consistent performance. For the retail sector, it highlights the importance of supply chain digitization, improved point-of-sale data systems, and workforce analytics training. These industry-specific recommendations enable more efficient use of resources, promote digital inclusion, and strengthen economic competitiveness in African emerging economies.

This work significantly enriches the global understanding of BIS and digital transformation by emphasizing sectoral variation as a crucial analytical dimension. Although the Resource-Based View (RBV) and the Technology-Organization-Environment (TOE) framework are well-established in Information Systems research, combining them to explain industry-level differences, especially in emerging markets, has been rare. This research fills that gap by showing how internal capabilities (RBV) and environmental factors (TOE) jointly influence sector-specific BIS outcomes across different countries. It also provides rare cross-national data from Africa, an area that is often underrepresented in the global BIS literature. By incorporating sectoral context, the paper broadens the theoretical, empirical, and practical scope of BIS studies and lays a foundation for future comparative research across different regions.

16. Conclusion

This study examined the relationship between Business Intelligence Systems (BIS) implementation and organizational profitability in developing African economies using survey data from organizational executives. These differences highlight variations in data intensity, regulatory requirements, organizational capacity, and the growth of the digital ecosystem. The cross-national study reveals that, even within the same sectors, BIS outcomes differ widely across countries, depending on each country's digital infrastructure and institutional context. This emphasizes the complexity of BIS performance and highlights the need for customized digital transformation strategies tailored to specific sectors and countries across Africa.

The findings indicate that although BIS adoption is perceived positively among organizations, the statistical results did not demonstrate a significant direct relationship between BIS implementation variables and organizational profitability. The research contributes to the BIS literature by integrating the RBV and TOE frameworks at the sector level. It offers practical insights for industry leaders and policymakers seeking to enhance analytics maturity across the continent. It underscores sectoral differences and contextual influences, laying the foundation for more targeted digital policies and a framework for future comparative BIS research in emerging markets.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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Appendix

A.1. Keyword Definitions

A.1.1. Business Intelligence Systems (BIS)

Business Intelligence Systems are integrated technologies, processes, and tools that gather, analyze, and convert organizational data into practical insights. BIS aids decision-making by improving reporting, analytics, and strategic planning. These systems boost organizational performance by enabling data-driven decision-making across functional areas.

A.1.2. Sectoral Performance

Sectoral performance explains how specific industries—such as Finance, Technology, and Retail—use resources, technologies, and capabilities to meet operational and strategic goals. In BIS research, it emphasizes differences in analytics maturity, data integration, and decision-support effectiveness across sectors. This idea helps identify strengths and weaknesses within and among industries.

A.1.3. Analytics Maturity

Analytics maturity describes how well an organization or sector uses data, analytical tools, and decision-support processes to improve performance. Higher maturity levels indicate advanced data governance, predictive modeling, and integration with strategic analytics. It acts as a key measure of how deeply BIS capabilities are incorporated into organizational routines.

A.1.4. Resource-Based View (RBV)

The Resource-Based View is a theoretical framework that explains organizational performance through valuable, rare, inimitable, and non-substitutable internal resources. In BIS studies, RBV shows how IT assets, human capital, and data governance capabilities create competitive advantages. It underscores the importance of developing internal capabilities across sectors.

A.1.5. Technology-Organization-Environment (TOE)

The TOE framework analyzes how technological readiness, organizational structure, and environmental factors collectively influence technology adoption. It offers a comprehensive view of how external pressures—such as regulations or infrastructure—affect BIS performance. TOE is commonly used to explain differences in digital transformation across sectors and countries.

A.1.6. Digital Transformation

Digital transformation involves the strategic integration of digital technologies into business processes, models, and organizational culture. It changes how companies create value, compete, and engage with stakeholders. In African economies, digital transformation is closely tied to infrastructure readiness, innovation ecosystems, and sector-specific modernization efforts.

A.1.7. African Developing Economies

African developing economies are characterized by emerging digital ecosystems,

changing regulatory systems, and increasing technological adoption. These situations often reveal both strong potential for innovation and structural challenges. Studying BIS in these economies offers insights into how digital skills develop amid resource constraints and varied institutional structures.

A.1.8. Cross-National Analysis

Cross-national analysis compares patterns, behaviors, or outcomes across multiple countries to identify similarities and differences influenced by national context. This study helps uncover how regulatory environments, digital infrastructure, and market dynamics affect BIS performance. It improves understanding of how sectoral performance varies across different economies.

A.1.9. Data Governance

Data governance includes the policies, processes, and standards that ensure data quality, integrity, security, and proper use within organizations. Strong data governance is crucial for effective BIS performance, supporting accurate analytics and dependable decision-making. It is often more developed in highly regulated industries, such as finance.

A.1.10. Industry-Level Comparisons

Industry-level comparisons assess differences in organizational behavior, technological adoption, and performance across various sectors. These comparisons show how structural, operational, and regulatory factors impact BIS effectiveness. This perspective is crucial for identifying which industries excel or lag in analytics capabilities.