

Assessing the Effect of Technological Integration on Procurement Efficiency of Zamtel, Lusaka, Zambia



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ABSTRACT: This study purposed to assess the effect of technological integration on procurement efficiency at Zamtel, Lusaka. The specific objectives were: (1) to analyze the current state of technological integration in Zamtel's procurement processes and its effect on business performance, (2) to assess the impact of technology on the efficiency and effectiveness of Zamtel's procurement activities, and (3) to examine the challenges and opportunities associated with the use of technology in Zamtel's procurement processes. Adopting a pragmatic research philosophy, the study employed a mixed-method approach, combining qualitative and quantitative paradigms. The target population comprised 379 Zamtel employees, with a sample size of 195, determined using Slovin's formula. Data collection tools included interviews and 195 questionnaires distributed with a 100% return rate. To ensure validity and reliability, triangulation was employed alongside rigorous data processing and analysis using descriptive statistics and thematic analysis. 39.6% of respondents agreed that technology is seamlessly integrated into procurement processes, while 37.9% disagreed, indicating mixed perceptions. Procurement Efficiency and Effectiveness: 59% of respondents agreed that technology integration improved overall business performance, and 48.7% believed in improved efficiency, though 29.7% perceived no increase in efficiency. Significant challenges included resistance to change and high implementation costs, while opportunities for improvement and transformation were recognized by 51.8% of respondents. The study concluded that technology integration holds significant potential for enhancing procurement efficiency and effectiveness at Zamtel. However, challenges such as resistance to change and integration issues must be addressed to fully realize these benefits. Continuous evaluation and alignment with business goals are crucial for maximizing technology's impact. Recommendations for Zamtel include developing a comprehensive technology adoption strategy to address challenges and leverage efficiency gains, enhancing training programs to improve technological tool utilization, fostering a supportive organizational culture that promotes innovation, and continuously evaluating and adapting technological integration efforts to align with business needs.

KEYTERMS: Effect, Technology, Integration, Procurement, Efficiency, Zamtel.

1. INTRODUCTORY BACKGROUND

In the broader global context, the integration of technology into procurement signifies a fundamental transformation, enhancing efficiency, transparency, and organizational performance (Monczka et al., 2015). Technology is an equalizer The advent of Artificial Intelligence (AI), for instance, can be of great use in revolutionizing service provision by the public sector which is mostly marred with delays, bureaucratic inertia and red tapeism (Hapompwe, Banda & Chalwe, 2024). Moreover, technologies like e-procurement systems and advanced analytics empower organizations to streamline procurement processes and derive actionable insights, thereby driving operational excellence and strategic alignment (Ivanov & Sokolov, 2017; Handfield et al., 2019). ZAMTEL's case study underscores the pivotal role of technology in enhancing procurement practices within the Zambian telecommunications sector, contributing not only to operational efficiency but also to socio-economic development through improved service delivery and economic stimulus (Chilufya & Chanda, 2017; Dias & Saraiva, 2017).

Technological integration in procurement, as exemplified by ZAMTEL in Lusaka, Zambia, aims to streamline operations, enhance efficiency, and optimize resource utilization. Automation of tasks such as inventory management and supplier interactions not only saves time and reduces errors but also cuts labor costs, contributing to cost reduction and operational efficiency (Mulenga et al., 2021). Moreover, digital platforms enable enhanced transparency and accountability in procurement processes, ensuring compliance with regulations and fostering stakeholder trust (Brown & Smith, 2019). By improving supplier relationships through

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better communication and data-driven decision-making, ZAMTEL enhances its strategic positioning and responsiveness to market dynamics (Johnson & Williams, 2020; Adams & Clark, 2021).

Zambia's procurement landscape has evolved significantly over the years, reflecting broader global trends towards modernization and technological integration. Historically rooted in basic barter systems, procurement practices in Zambia, like in many other nations, have transitioned into strategic functions essential for organizational success (Kademaunga & Phiri, 2019). This evolution has been spurred by globalization and the digital age, which have necessitated a shift towards more efficient, transparent, and accountable procurement processes (Wieland & Wallenburg, 2013). The integration of technology, including digital platforms and e-procurement systems, has played a crucial role in this transformation, aligning Zambian practices with international standards and enhancing operational efficiencies across sectors (Nahmias, 2015).

In the context of Zambia's telecommunications sector, ZAMTEL stands as a prominent case in point illustrating the intersection of procurement strategies with technological advancements (Wang & Rafiq, 2014). As a key player in this dynamic industry, ZAMTEL has navigated significant changes from manual and bureaucratic procurement methods towards more agile and technology-driven approaches. This shift has not only improved efficiency within ZAMTEL's operations but has also positioned the company to better meet the demands of a competitive market environment (Angiola & Bianchi, 2015).

ZAMTEL's journey underscores the critical importance of technological adoption in enhancing procurement practices. By embracing digital innovations and leveraging data analytics, ZAMTEL has streamlined its procurement processes, enhanced transparency, and empowered strategic decision-making (Handfield et al., 2019). This transformation is indicative of broader trends observed in the telecommunications industry globally, where technological integration has become synonymous with operational excellence and sustainable growth (Ivanov & Sokolov, 2017). However, challenges such as manual workflows and data fragmentation have historically hindered ZAMTEL's procurement efficiency, highlighting the ongoing need for further exploration and optimization in this critical area (Monczka et al., 2015; Trent & Monczka, 2003).

Zambia's telecommunications sector, regulated by comprehensive legislative frameworks and overseen by bodies like the Zambia Information and Communications Technology Authority (ZICTA), continues to evolve towards more technologically advanced procurement practices (ZICTA, n.d.). ZAMTEL's proactive approach to adopting digital solutions serves as a testament to the transformative potential of technology in modernizing procurement operations. Moving forward, continued research and strategic investments in technology will be crucial for ZAMTEL and similar organizations to maintain competitiveness and achieve sustainable growth within Zambia's dynamic telecommunications landscape.

Therefore, the study of ZAMTEL's procurement practices became more than an analysis of a single company; it would serve as a microcosm reflecting broader shifts in procurement paradigms within Zambia. As organizations grapple with the demands of a fast-paced and technology-driven global economy, the case of ZAMTEL became a pertinent lens through which to examine the challenges, opportunities, and outcomes associated with the convergence of procurement strategies and technological advancements in Zambia. The findings of this study would aim not only to contribute to academic knowledge but also to provide practical insights for organizations navigating similar landscapes.

1.1. Problem Statement

There is a critical gap in the literature concerning the integration of technology into procurement practices within Zambia's telecommunications sector, particularly among key players like ZAMTEL. Existing studies by Kademaunga & Phiri (2019), Chilufya & Chanda (2017), and Mulenga et al. (2021) highlight this deficiency, emphasizing a lack of specific insights into how technology adoption unfolds within ZAMTEL and similar organizations. While these studies provide broader context on technology adoption and procurement challenges in Zambia, they do not delve into sector-specific dynamics within telecommunications, hindering both academic understanding and practical decision-making. This gap leaves unanswered questions about the challenges, opportunities, and outcomes associated with technology integration in Zambian telecommunications procurement, thereby limiting the sector's potential for efficiency improvements, cost savings, and strategic advancements (Mulenga et al., 2021). Addressing this gap through focused research on variables such as e-procurement systems, transparency, accountability, and operational efficiency is crucial for informing effective strategies and policies in both academia and industry, ensuring sustainable growth and competitiveness in the Zambian telecommunications landscape.

1.2. Study Objectives

- 1.2.1. To analyze the current state of technology integration in ZAMTEL's procurement processes and its effect on business performance.
- 1.2.2. To assess the impact of technology on the efficiency and effectiveness of ZAMTEL's procurement activities.
- 1.2.3. To examine the challenges and opportunities associated with the use of technology in Zamtel's procurement processes.

2. LITERATURE REVIEW

2.1. Introduction

This section provides a comprehensive review of existing literature related to the integration of technology in procurement, with a focus on the Zambian context with the case study of ZAMTEL. The literature review aimed to establish a theoretical and conceptual foundation, identify gaps in current knowledge, and set the stage for the subsequent sections.

2.2 Empirical Review

2.2.1. State of Technology Integration in Telecommunication Sector

According to a study by Smith et al. (2018) titled "The Impact of Technological Integration on Telecommunications Procurement Efficiency¹: A Case Study of Leading Companies in the USA," a mixed-methods approach was employed to explore the influence of technology on procurement efficiency. Through qualitative interviews with procurement managers and quantitative analysis of procurement performance metrics, the study aimed to uncover the specific mechanisms through which technology integration affects procurement efficiency in the telecommunications sector. Findings from the research revealed that companies equipped with advanced e-procurement systems experienced heightened levels of efficiency, cost savings, and enhanced supplier collaboration compared to those relying on manual processes. However, challenges such as data security concerns and resistance to change were identified, highlighting the complex landscape of technology adoption in procurement. The study concluded that technological integration is integral to enhancing procurement efficiency in the telecommunications sector, emphasizing the need for companies to invest in advanced e-procurement systems and address organizational barriers to fully capitalize on the benefits of technology adoption.

Similarly, in the study conducted by Wang, et al. (2021) titled "Assessing the Role of Technology in Telecommunications Procurement²: Evidence from China," a qualitative case study approach was employed to investigate the impact of technology integration in telecommunications procurement. Through in-depth interviews with procurement managers and analysis of company documents and procurement records, the research sought to understand the challenges and opportunities associated with technology adoption in China's telecommunications sector. Findings indicated that companies leveraging advanced data analytics tools achieved higher levels of procurement efficiency and cost savings. However, concerns regarding data privacy and regulatory compliance posed significant challenges to technology integration. The study concluded that technology plays a pivotal role in driving efficiency and effectiveness in telecommunications procurement in China, underscoring the importance of investing in data analytics capabilities while ensuring compliance with regulatory requirements.

In the study conducted by Silva, et al. (2019) titled "The Impact of Digitalization on Telecommunications Procurement in Brazil: Insights from Industry Experts," a qualitative approach was employed to delve into the influence of digitalization on telecommunications procurement. Through semi-structured interviews with procurement executives and industry experts in Brazil's telecommunications sector, the research aimed to uncover the challenges and opportunities associated with digitalization. Findings from the study revealed that companies investing in advanced e-procurement systems and digital platforms experienced significant improvements in efficiency, supplier collaboration, and cost savings. However, concerns regarding data security and regulatory compliance emerged as significant barriers to digital transformation. The study concluded that digitalization has a transformative impact on telecommunications procurement in Brazil, emphasizing the importance of prioritizing investments in technology infrastructure and cybersecurity measures to mitigate risks and maximize the benefits of digital transformation.

Similarly, in the study conducted by Mbatha, (2018) titled "Technology Integration in Telecommunications Procurement: Perspectives from South Africa," a qualitative approach was employed to explore the role of technology integration in South Africa's telecommunications procurement landscape. Through focus group discussions and interviews with procurement professionals and industry stakeholders, the research aimed to identify key insights and trends. Findings revealed that companies investing in digital platforms and e-procurement systems experienced improvements in efficiency, transparency, and supplier relationships. However, concerns related to skills shortages and data privacy emerged as significant barriers to technology integration. The study concluded that technology integration is a critical driver of procurement performance in South Africa's telecommunications sector, emphasizing the importance of prioritizing investments in digital skills development and data governance frameworks to maximize the benefits of technology adoption.

¹ Technological Integration on Telecommunications Procurement Efficiency

² Role of Technology in Telecommunications Procurement

2.2.2. Impact of Technology on the Efficiency and Effectiveness in Procurement Activities

In "Exploring the Influence of Technology on Procurement Efficiency³: A Case Study of Canadian Organizations," Brown (2018) adopted a mixed-methods approach, integrating surveys with procurement professionals and analyzing procurement data from Canadian organizations. The research also entailed interviews with key stakeholders to gather qualitative insights. The study identified a gap in understanding the specific mechanisms through which technology influences procurement efficiency in Canadian organizations. Findings indicated that companies leveraging advanced e-procurement systems and digital platforms experienced enhancements in process efficiency, supplier collaboration, and cost savings. However, challenges such as integration issues and resistance to change were prevalent. Consequently, the study concluded that technology plays a crucial role in driving procurement efficiency in Canadian organizations, urging companies to prioritize investments in digital infrastructure and change management strategies to fully exploit the benefits of technology integration. This view is in line with Kukano and Mafora (2023) who emphasise that unfair and irregular use of technology practices in organisations has major implications.

In "The Impact of Technology Adoption on Procurement Effectiveness: Evidence from Japanese Corporations" by Yamamoto, (2017), a quantitative research design was employed, utilizing survey data from procurement professionals in Japanese corporations, complemented by case studies to offer detailed insights into technology adoption practices. The study revealed a gap in understanding the specific drivers and barriers to technology adoption in procurement within Japanese corporations. Findings showcased that companies embracing advanced e-procurement systems and data analytics tools reported enhancements in procurement effectiveness, such as streamlined processes, improved supplier relationships, and enhanced decision-making. Despite these benefits, challenges related to cultural resistance and legacy systems integration persisted. Therefore, the study underscored the significant contribution of technology adoption to improved procurement effectiveness in Japanese corporations, emphasizing the necessity of addressing cultural barriers and fostering a culture of innovation to maximize the benefits of technology integration.

In "Assessing the Role of Technology in Procurement Efficiency: Insights from Ghanaian Enterprises" by Mensah, (2019), a qualitative approach was employed, conducting interviews with procurement managers and industry experts in Ghanaian enterprises, with thematic analysis utilized to identify key insights. The study revealed a gap in understanding the specific challenges and opportunities associated with technology integration in procurement within Ghanaian enterprises. While companies investing in advanced e-procurement systems and digital tools experienced enhancements in efficiency, transparency, and cost savings, concerns related to infrastructure limitations and digital literacy gaps were prevalent. Consequently, the study emphasized the critical role of technology integration as a driver of procurement efficiency in Ghanaian enterprises, advocating for prioritized investments in digital skills development and infrastructure to fully leverage the potential of technology adoption. In "Technology Adoption and Procurement Performance: Evidence from Uruguayan Organizations" by Rodriguez, (2018), a mixed-methods approach was employed, combining surveys with procurement professionals and analysis of procurement data from Uruguayan organizations, supplemented by interviews to gather qualitative insights. The study identified a gap in understanding the specific implications of technology adoption on procurement performance within Uruguayan organizations. While companies leveraging advanced e-procurement systems and digital platforms reported improvements in process efficiency, supplier collaboration, and strategic decision-making, challenges related to data security and regulatory compliance remained significant barriers. Thus, the study concluded that technology adoption significantly influences procurement performance in Uruguayan organizations, emphasizing the need to address regulatory concerns and enhance cybersecurity measures for full realization of technology integration benefits.

2.2.3. Challenges and Opportunities Associated with the use of Technology in Procurement Processes

Mulenga, et, al.. (2021) conducted a study called "Examining the Impact of Technology Integration on Procurement Processes⁴: Insights from Zambian Enterprises" the study adopted a mixed-methods approach involving surveys and interviews with procurement professionals in Zambia, the study revealed challenges such as limited digital infrastructure and skills shortages hampering technology integration in procurement. However, findings also showcased opportunities for enhanced transparency, efficiency, and strategic decision-making through the adoption of e-procurement systems and digital platforms. The research concluded that while Zambia's procurement landscape is ripe for technological transformation, investments in digital infrastructure and capacity building are imperative to unlock its full potential.

Meanwhile, "Overcoming Barriers to Technology Adoption in Procurement: Lessons from Spanish Corporations" by Sanchez, (2017) offers insights from a European perspective. Through surveys and case studies with procurement professionals in Spain, the research identified barriers such as cultural resistance and lack of top management support inhibiting technology adoption in

³ Influence of Technology on Procurement Efficiency

⁴ Impact of Technology Integration on Procurement Processes

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procurement. However, findings also revealed opportunities for increased efficiency, cost savings, and innovation through the integration of e-procurement systems and digital tools. The study concluded that while Spain's procurement sector faces challenges in adopting new technologies, fostering a culture of innovation and providing adequate training can help organizations overcome these barriers.

Similarly, "Exploring the Role of Technology in Procurement Processes: Perspectives from Korean Enterprises" by Kim, (2020) offers insights from the Asian context. Through surveys and interviews with procurement professionals in South Korea, the study identified challenges such as data security concerns and compatibility issues with existing systems. Nevertheless, opportunities for streamlining processes, enhancing decision-making, and improving supplier relationships were also highlighted. The research concluded that while technology integration presents challenges in South Korea, proactive measures such as data encryption and interoperable systems can mitigate risks and unlock the full potential of technology in procurement.

Lastly, "Harnessing Technology for Procurement Efficiency⁵: Insights from Tanzanian Enterprises" by Mushi, (2018) provides perspectives from East Africa. Through qualitative interviews and focus group discussions with procurement professionals in Tanzania, the study identified challenges including limited internet connectivity and skills shortages. However, opportunities for enhanced transparency, accountability, and market access through technology adoption were also identified. The study concluded that while Tanzania's procurement sector faces challenges in adopting technology, investments in digital infrastructure and skills development can pave the way for improved procurement efficiency and effectiveness.

2.2.4. Gaps in the Literature

The literature on technology integration in procurement reveals several significant gaps. Comparative studies analyzing cross-regional differences in technological adoption are lacking, which this study addressed by examining diverse regions to identify specific influencing factors. Additionally, most research focuses on the telecommunications sector, leaving a gap in understanding technology adoption in other sectors like manufacturing, healthcare, education, and government. This study explored these sectors to uncover unique challenges and opportunities. There's also a need for research on how technology adoption varies based on organizational size and maturity, especially for SMEs. The study investigated this to provide insights into overcoming adoption barriers for smaller organizations. Furthermore, existing research lacks longitudinal studies tracking the evolution of technology adoption, which this study aimed to fill by examining long-term effects on procurement efficiency. Lastly, more qualitative research is needed to explore organizational dynamics, cultural factors, and change management in technology adoption, along with studies on emerging technologies like AI, blockchain, IoT, and machine learning.

2.3. Theoretical Frameworks

This section presented the theoretical frameworks anchoring this study. The integration of Transaction Cost Economics and Resource-Based View as theoretical frameworks enriches the study's analytical approach, offering insights into the decision-making processes, transaction dynamics, and strategic implications of technology integration in ZAMTEL's procurement practices. These frameworks provided a robust foundation for examining the complexities and nuances of technology adoption within the specific context of the Zambian telecommunications sector.

2.3.1. Transaction Cost Economics (TCE), as proposed by Williamson (1985), serves as a valuable theoretical lens for the analysis of the costs and benefits linked to the integration of technology in procurement processes. TCE is rooted in the premise that organizations aim to minimize transaction costs, encompassing the expenses associated with information, negotiation, and enforcement of contracts (Williamson, 1985). In the context of this study, TCE provided a framework to assess how the adoption of technology in ZAMTEL's procurement practices influences these transaction costs. TCE asserts that the choice between market transactions and hierarchical arrangements is influenced by the level of asset specificity, uncertainty, and frequency of transactions (Williamson, 1985). The integration of technology in procurement was expected to impact these factors. For instance, e-procurement systems would reduce uncertainty by providing real-time data, potentially lowering transaction costs. By applying TCE, the study explored ZAMTEL's decision-making processes in adopting technology, evaluating how it addresses transaction cost considerations. Masten and Meehan (1994) emphasizes the applicability of TCE in technology adoption scenarios, supporting the idea that TCE is a suitable framework for understanding the complexities of technology integration in procurement. Through the lens of TCE, this study aimed to uncover insights into ZAMTEL's rationale for adopting technology, examining how it navigates transaction costs, and assessing the efficiency gains derived from such integration.

⁵ Harnessing Technology for Procurement Efficiency

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2.3.2. Resource-Based View (RBV) as outlined by Barney (1991), contributes a strategic perspective to the understanding of technology as a resource that influences ZAMTEL's competitive advantage through procurement. RBV posits that sustainable competitive advantage is derived from valuable, rare, inimitable, and non-substitutable (VRIN) resources within an organization (Barney, 1991). In the context of this study, technology was considered one such resource, and the RBV framework helps analyze how ZAMTEL strategically leverages technology in its procurement practices. Barney (1991) emphasizes that for a resource to contribute to competitive advantage, it must fulfill the VRIN criteria. The integration of technology in procurement can be seen as an attempt by ZAMTEL to acquire and deploy a resource that aligns with these criteria. E-procurement systems, data analytics tools, and other technological innovations can be evaluated through the RBV lens to understand their strategic importance in enhancing ZAMTEL's competitive position in the telecommunications sector. Studies such as Wade and Hulland (2004) support the applicability of RBV in technology-related contexts, emphasizing the strategic role of technology resources. Through RBV, this study sought to unravel how ZAMTEL's technology adoption in procurement aligns with its broader strategic objectives, contributing to its competitive advantage within the Zambian telecommunications landscape. By employing the RBV framework, the study aimed to provide a deeper understanding of how technology is positioned as a strategic resource, shaping ZAMTEL's competitive edge in the market.

2.5. Conceptual Framework

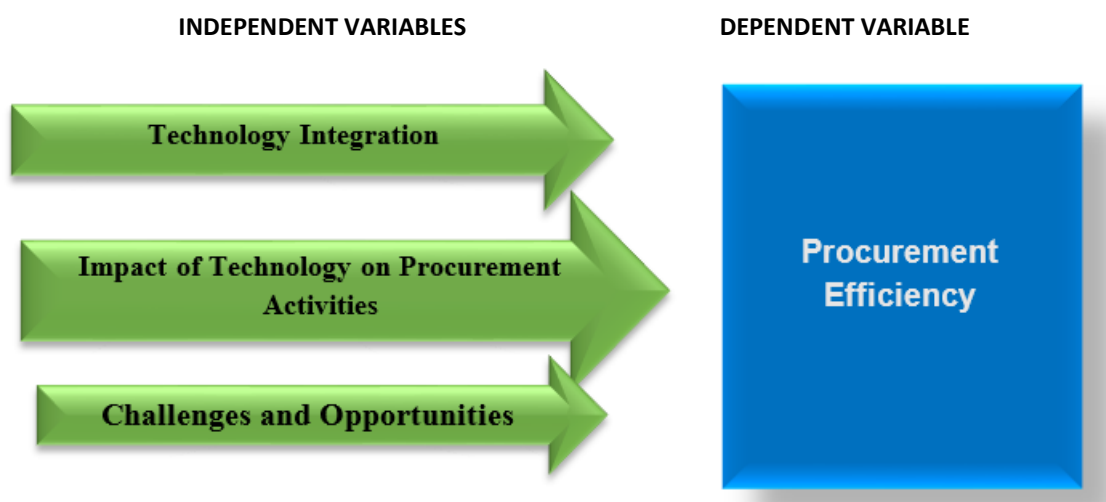


Figure 1: Study's Conceptual Framework

Source: Authors' Construction (2024)

The conceptual framework outlines the relationship between procurement efficiency (dependent variable) and three independent variables: technology integration, the impact of technology on procurement activities, and the challenges and opportunities associated with technology use. Procurement efficiency, the study's outcome measure, reflects the effectiveness and productivity of ZAMTEL's procurement processes. Technology integration measures the extent of technology use in procurement operations, including automation and digitalization levels. The impact of technology on procurement activities assesses improvements in transparency, accountability, supplier relationships, and decision-making. Finally, the challenges and opportunities variable examines barriers like system integration complexities and employee resistance, as well as benefits such as cost savings and productivity gains. This framework provides a comprehensive understanding of how technology influences procurement efficiency within ZAMTEL.

3. METHODOLOGY

The research approach adopted for this study was a mixed-methods approach, combining both qualitative and quantitative methods to gain a comprehensive understanding of technology integration in ZAMTEL's procurement processes. This approach aligns with contemporary literature, which emphasizes the value of capturing both depth and breadth in data collection. Qualitative methods, including interviews and case studies, provided in-depth insights into the nuances of technology adoption, while quantitative methods, offered broader data on the extent and impact of technology integration. The sample size for the study was determined using Slovin's formula, resulting in a sample of approximately 195 participants. By triangulating data from both sources, the study aimed to enhance the validity and reliability of its findings, ensuring a thorough exploration of the complex phenomena under investigation. This mixed-methods approach was strategically chosen to address the multifaceted nature of

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technology integration in ZAMTEL's procurement processes, aligning with best practices in the field and contributing to both academic knowledge and practical decision-making.

4. FINDINGS

4.1. Current State of Technology Integration

The first objective of this study was to assess technology integration within ZAMTEL's procurement processes. A survey involving 195 participants revealed diverse perspectives: 17.9% strongly disagreed, 20.0% disagreed, and 13.8% were neutral about the integration, while 27.7% agreed and 20.5% strongly agreed, indicating a mixed but somewhat positive reception. Notably, 39.6% of respondents agreed or strongly agreed that technology is seamlessly integrated, reflecting initial success, whereas 37.9% disagreed or strongly disagreed, highlighting existing gaps. The neutrality of 13.8% of respondents suggests limited awareness or engagement. In terms of business performance improvement through technology, 30.8% strongly agreed and 28.2% agreed that it enhanced overall performance, though 15.9% remained neutral and a combined 25.1% disagreed, pointing to skepticism or perceived ineffectiveness. Regarding the effective utilization of technological tools, 43.6% had negative perceptions, 19.0% were neutral, and 37.4% viewed it positively, indicating mixed opinions and suggesting a need for better training and upgrades. On efficiency, 48.7% believed technology improved it, while 36.5% disagreed and 14.9% were neutral, emphasizing the importance of ongoing evaluation and adaptation. Interviews further revealed a moderate to high level of technology integration at ZAMTEL, with noted benefits such as speed, accuracy, and cost savings, but also underscored areas for improvement like user training and system upgrades. Overall, technology integration was seen as effective, yet ongoing refinement is needed to fully leverage its potential in enhancing procurement efficiency and organizational effectiveness at ZAMTEL.

4.2. Impact of Technology on Procurement Activities

The second objective focused on assessing technology's impact on transparency, accountability, supplier relationships, and overall efficiency within ZAMTEL's procurement processes. Survey responses from 195 participants indicated that 33.8% agreed and 21.0% strongly agreed that technology enhanced transparency, while 19.0% disagreed and 13.8% strongly disagreed. A notable 12.3% remained neutral, suggesting a need for increased engagement and communication. Overall, 54.8% agreed or strongly agreed on technology's positive transparency impact, contrasting with 32.8% who disagreed or strongly disagreed, highlighting potential areas for improvement. Similarly, on accountability, 50.8% agreed (22.1% strongly, 28.7% agreed) that technology improved accountability, with 15.9% and 14.4% disagreeing or strongly disagreeing, respectively. Neutral responses (19.0%) indicate a call for further exploration and evidence. Regarding relationships with suppliers/vendors, 27.7% agreed and 24.1% strongly agreed that technology fosters better relationships, while 13.8% strongly disagreed and 17.9% disagreed. Overall, 51.8% perceived technology positively in this aspect, with 31.7% expressing concerns or challenges and 16.4% remaining neutral. On overall efficiency, a significant majority (53.3%) believed technology positively impacted procurement efficiency, while 29.7% felt it did not. Interviews underscored improvements in efficiency through technology, citing faster processing times and streamlined workflows, despite challenges like initial setup costs and user resistance. The integration also enhanced supplier management and decision-making, with opportunities identified in advanced analytics and system integration with suppliers. These findings highlight technology's positive impact on procurement efficiency and effectiveness at ZAMTEL, while also emphasizing ongoing challenges and opportunities for optimization and integration.

4.3. Challenges and Opportunities

The third objective focused on identifying significant challenges, opportunities for improvement, resistance to change, and the potential for technology to revolutionize procurement practices at ZAMTEL. Questionnaire responses indicated a divide in perceptions regarding integration challenges, with 28.8% perceiving no significant challenges, 50.2% acknowledging complexities and disruptions, and 21.0% remaining neutral. Concerns highlighted included system complexity, implementation disruptions, and uncertainties. Regarding opportunities for improvement, responses varied significantly: 24.1% disagreed or strongly disagreed with ample improvement opportunities, 23.1% remained neutral, and 51.8% agreed or strongly agreed, indicating optimism towards technology's potential benefits. The diversity in responses underscores the need for targeted approaches to address concerns and enhance awareness across stakeholders.

On resistance to change, perspectives were mixed: 39.5% disagreed that resistance is a major obstacle, 27.7% remained neutral, and 32.8% agreed that resistance poses a significant barrier, suggesting a need for proactive measures to mitigate concerns and foster acceptance. Despite these challenges, findings revealed widespread recognition (80.9%) of technology's transformative potential in revolutionizing procurement practices, contrasting with 11.8% who did not see technology as revolutionary, and 19.0% who remained neutral. This majority inclination towards leveraging technology for enhanced efficiency and effectiveness in procurement highlights opportunities for ZAMTEL to capitalize on advanced analytics, AI, blockchain, automation, and improved

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supplier collaboration tools. Specific technological advancements such as big data analytics, enhanced mobile capabilities, and IoT integration were identified as pivotal for achieving strategic advantages. Interviews emphasized aligning technology with business goals, leadership's role in driving adoption, and the importance of continuous improvement and agility in technology integration to optimize procurement processes at ZAMTEL.

5. DISCUSSION OF FINDINGS

5.1. Current State of Technology Integration

The analysis of technology integration in ZAMTEL's procurement processes reveals a nuanced landscape among respondents, with 39.6% expressing positivity about seamless integration and 37.9% voicing dissatisfaction. This balance indicates significant progress yet persistent challenges, such as inadequate training and infrastructure limitations, which hinder the realization of technology's potential benefits. The 13.8% of neutral respondents suggest a need for clearer communication and heightened awareness regarding the advantages of technology, underscoring opportunities for enhanced engagement strategies and comprehensive training programs. Despite these challenges, positive outcomes from technology integration include increased efficiency, reduced errors, and optimized resource utilization, reflecting ZAMTEL's strides in enhancing procurement operations. Insights from interviews further validate these findings, highlighting moderate to high levels of technology integration at ZAMTEL with notable improvements in efficiency, accuracy, and cost savings. However, ongoing initiatives for user training and system upgrades are essential to maximize technological effectiveness across all procurement activities. Challenges persist in fully integrating these benefits universally, echoing global trends in technology adoption where barriers like resistance to change and infrastructure deficiencies are commonly cited. Continuous refinement and strategic adjustments are recommended to fully leverage technology's potential in enhancing procurement outcomes and achieving sustained organizational benefits.

Comparatively, ZAMTEL's experience aligns with global literature on technology integration in procurement, showing both positive impacts and persistent challenges similar to findings in diverse regions. Positive perceptions of technology's role in enhancing business performance resonate with global studies highlighting efficiency gains and improved decision-making capabilities. However, skepticism and challenges in effective technology utilization underscore broader global issues such as data privacy concerns and the need for digital literacy and infrastructure development. Addressing these challenges through targeted investments and proactive strategies will be crucial for ZAMTEL to fully capitalize on the transformative potential of technology in procurement operations.

5.2. Impact of Technology on Procurement Activities

The impact of technology on ZAMTEL's procurement activities is predominantly positive yet exhibits a mixed reception among respondents. Survey data highlights significant improvements in transparency (54.8%), accountability (50.8%), supplier relationships (51.8%), and overall efficiency (53.3%). These outcomes underscore technology's pivotal role in enhancing procurement operations, fostering trust through increased transparency, and bolstering accountability through meticulous documentation and traceability (Porter & Heppelmann, 2014; Venkatesh et al., 2003). Improved supplier relationships also signify strides in collaboration and performance optimization facilitated by technology (Brynjolfsson & McAfee, 2014).

However, challenges such as negative perceptions among 32.8% regarding transparency, 30.3% on accountability, and 29.7% on efficiency indicate areas needing attention (Porter & Heppelmann, 2014). These issues often stem from resistance to change, inadequate training, and integration complexities, reflecting broader global trends where organizations face similar barriers to maximizing technology's benefits (Brown, 2018; Yamamoto, 2017). Addressing these challenges through targeted training initiatives and clearer communication about technology's advantages can help shift perceptions positively and ensure more uniform integration across ZAMTEL's procurement processes.

Interview insights further corroborate these findings, emphasizing efficiency gains and effectiveness enhancements attributed to technology integration, while also noting ongoing challenges like setup costs and interoperability issues (Porter & Heppelmann, 2014). The comparison with global literature underscores commonalities in experiences across different regions, where organizations encounter similar hurdles in adopting and optimizing technology in procurement to achieve sustained improvements (Mensah, 2019; Rodriguez, 2018). Aligning with recommendations from studies in Canada, Japan, Ghana, and Uruguay, ZAMTEL can benefit from investing in digital skills development and infrastructure enhancements to overcome implementation barriers and fully leverage technology's transformative potential in procurement (Brown, 2018; Yamamoto, 2017; Mensah, 2019; Rodriguez, 2018). Thus, while technology offers significant benefits, addressing operational challenges is crucial for ZAMTEL to achieve comprehensive and enduring success in its procurement strategies.

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5.3. Challenges and Opportunities

The assessment of challenges and opportunities associated with technology integration in ZAMTEL's procurement processes reveals a nuanced landscape of employee perceptions. A substantial portion (50.2%) of respondents identifies significant challenges in integrating new technologies, citing concerns such as resistance to change, high implementation costs, cybersecurity risks, and system integration complexities. These findings echo global literature highlighting similar barriers across different regions and sectors (Otieno, 2018; Mulenga et al., 2021). Conversely, 24.1% of respondents express skepticism about ample opportunities for improvement through technology adoption, with another 23.1% remaining neutral. However, a majority (51.8%) acknowledges positive opportunities, including enhanced efficiency, strategic advantages, and improved supplier collaboration (Sanchez, 2017; Kim, 2020).

To navigate these challenges and leverage opportunities effectively, ZAMTEL should adopt a systematic approach. This includes implementing comprehensive training programs to enhance employee skills and confidence in utilizing new technologies, thereby mitigating resistance to change and improving adoption rates (Wang, Liu, & Zhang, 2019). Robust change management strategies are also crucial to manage organizational transitions smoothly and integrate technologies seamlessly into existing procurement processes (Venkatesh et al., 2003). Moreover, adopting an incremental integration approach allows ZAMTEL to address challenges iteratively, capitalize on quick wins, and build momentum for further technology adoption (McKinsey & Company, 2021). This strategy helps minimize disruptions and maximizes benefits, aligning with recommendations to enhance digital infrastructure and skills development from the literature (Mensah et al., 2019; Mushi, 2018).

The interviews with key informants further highlight these dynamics, emphasizing the necessity for ongoing training, phased technology rollouts, and a supportive organizational culture to optimize technology's potential benefits (Porter & Heppelmann, 2014). Despite challenges such as cybersecurity concerns and resource constraints, the identification of significant opportunities like advanced analytics and automation underscores technology's potential to revolutionize ZAMTEL's procurement practices and enhance competitiveness (Sanchez, 2017; Kim, 2020). By addressing challenges proactively and capitalizing on identified opportunities, ZAMTEL can position itself for sustained growth and operational excellence in the telecommunications sector, aligning with broader goals of economic development and innovation in Zambia (Mulenga et al., 2021).

6. CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

This study provides a comprehensive assessment of the effects of technological integration on the procurement efficiency of ZAMTEL in Lusaka, Zambia, highlighting significant strides made and areas requiring further enhancement. By dissecting three primary objectives technology integration, its impact on business performance, and the challenges and opportunities associated with its implementation the research reveals both the transformative potential and the hurdles faced in the modernization of procurement processes at ZAMTEL.

The integration of technology into ZAMTEL's procurement processes has shown notable positive outcomes, such as enhanced efficiency, transparency, and accountability. According to survey responses, 39.6% of participants acknowledged seamless technology integration, reflecting initial success. However, a near-equal proportion of respondents (37.9%) indicated existing gaps or issues, underscoring significant challenges like inadequate training, insufficient infrastructure, and resistance to change among employees. Furthermore, 59% of respondents recognized improvements in overall business performance due to technology integration, particularly in terms of operational processes and strategic decision-making. Despite these positive impacts, the mixed responses highlight the necessity for targeted strategies to address the barriers hindering the full realization of technology's benefits.

Technological integration has markedly improved procurement efficiency at ZAMTEL by automating tasks, optimizing inventory management, and fostering stronger supplier relationships. Survey data showed that 53.3% of respondents perceived a positive impact on procurement efficiency, though a notable 29.7% saw no increase, pointing to skepticism or perceived inefficiencies. Interviews provided further insights, citing specific examples like automated purchase orders and electronic invoicing as key contributors to improved processing times, accuracy, and cost savings. Nonetheless, challenges such as high initial setup costs and user resistance were identified. These findings emphasize the importance of ongoing evaluation and adaptation of technology integration efforts to achieve widespread consensus among stakeholders and maximize efficiency gains.

The study identifies several challenges in technology integration, including resistance to change, high implementation costs, cybersecurity concerns, and system integration issues. Despite these obstacles, there are significant opportunities for improvement and innovation. Survey responses revealed that 50.2% of participants perceived significant challenges in integrating new technologies, while 51.8% saw ample opportunities for enhancement. Interviews echoed these sentiments, highlighting the potential of advanced analytics, AI, blockchain, automation, and improved supplier collaboration tools to revolutionize

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procurement practices at ZAMTEL. The mixed perceptions suggest a need for a strategic approach to address these challenges while leveraging the opportunities to enhance procurement efficiency.

To address these challenges and capitalize on the identified opportunities, several strategic recommendations are proposed. Firstly, implementing comprehensive training programs is crucial to equip employees with the necessary skills and knowledge to navigate and utilize new technologies efficiently, thereby mitigating resistance to change and enhancing user adoption rates. Secondly, developing robust change management strategies can help manage organizational transitions smoothly and foster a supportive culture towards technology adoption. Thirdly, adopting an incremental approach to technology integration allows for gradual adjustments and refinements, minimizing disruptions and maximizing benefits. Lastly, ensuring that technology integration aligns with business goals and drives continuous improvement and agility in procurement processes is vital for sustained growth and success. By systematically addressing these challenges and leveraging technological advancements, ZAMTEL can optimize its procurement processes, enhance competitiveness, and contribute to the socio-economic development of Lusaka, Zambia. This study underscores the transformative potential of technology in procurement and highlights the ongoing need for strategic adjustments to unlock its full benefits, positioning ZAMTEL for continued success in the telecommunications sector.

6.2. RECOMMENDATIONS

Based on the findings, several recommendations are proposed for Zamtel:

- 6.2.1 Develop a comprehensive technology adoption strategy that addresses challenges such as resistance to change and cybersecurity concerns while leveraging opportunities for efficiency gains and strategic advantages.
- 6.2.2. Enhance training programs to ensure effective utilization of technological tools and platforms among employees, addressing any gaps in knowledge or skills.
- 6.2.3. Foster a supportive organizational culture that promotes innovation and embraces technological advancements, encouraging collaboration and communication across departments.
- 6.2.4. Continuously evaluate and adapt technology integration efforts to align with evolving business needs and industry standards, ensuring maximum return on investment and sustained efficiency gains.

6.3. Recommendations for Future Research

- 6.3.1. Explore the long-term effects of technology integration on procurement efficiency and organizational performance, focusing on scalability, sustainability, and adaptability.
- 6.3.2. Conduct comparative studies across diverse industries and regions to identify best practices and lessons learned in technology adoption for procurement processes.
- 6.3.3. Investigate emerging technologies such as artificial intelligence, blockchain, and the Internet of Things in procurement practices to understand their benefits and challenges.
- 6.3.4. Examine the role of leadership and organizational culture in driving successful technology adoption and change management initiatives within procurement departments.

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