Scientific Research Publishing

Open Journal of Social Sciences, 2025, 13(11), 370-389
https://www.scirp.org/journal/jss
ISSN Online: 2327-5960
ISSN Print: 2327-5952

Staff and User Attitudes and Behaviors toward Digital Supply Chain Technology Adoption in Zimbabwe's Public Health Sector: Awareness, Acceptance, and Readiness

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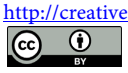
How to cite this paper: Kudai, T. (2025). Staff and User Attitudes and Behaviors toward Digital Supply Chain Technology Adoption in Zimbabwe's Public Health Sector: Awareness, Acceptance, and Readiness. *Open Journal of Social Sciences, 13,* 370-389.
https://doi.org/10.4236/jss.2025.1311023

Received: October 20, 2025
Accepted: November 18, 2025
Published: November 21, 2025



Abstract

This systematic review explores staff and user attitudes and behaviors towards the adoption of digital supply chain technologies within the public health sector in Zimbabwe, focusing on awareness, acceptance, and readiness. The adoption of digital solutions is crucial for enhancing healthcare resilience and resource management in the face of infrastructural and economic adversity typical of developing economies. Despite the potential benefits—like improved transparency, efficiency, and supply chain resilience—adoption remains hampered by challenges like low digital literacy, infrastructural deficits, financial resource scarcity, and resistance to change. The review synthesizes existing literature, highlighting the central role of human factors, organizational culture, and policy environments in shaping technology adoption. The Technology Acceptance Model, Diffusion of Innovations, and Unified Theory of Acceptance and Use of Technology frameworks guided an integrated conceptual framework for the Zimbabwean context, with reference to individual attitudes and organizational readiness. Recommendations allude to a requirement for large-scale capacity-development programs, infrastructure investment, and visionary leadership in order to create an enabling environment for digitalization. Constraints such as poor network infrastructure, high costs, and socio-economic inequalities exacerbate disparities in digital access, sabotaging effective implementation. Conversely, government and international efforts to strengthen health logistics present opportunities for the use of emerging technologies such as blockchain to promote supply chain transparency and efficiency. The review identifies addressing attitudinal barriers, enhancing digital literacy, and developing enabling policies as key to successful technology adoption. Lastly, a combined approach

comprising infrastructural development, targeted training, and stakeholder engagement is essential to unleash the transformational potential of digital supply chain solutions in the public health system in Zimbabwe to attain sustainable health outcomes in resource-limited settings.

Keywords

Transparency, Efficiency, Corruption, Procurement, Capacity, Attitudes

1. Introduction

The introduction of digital supply chain technologies is pivotal for enhancing the efficiency and resilience of public health systems, particularly in developing nations such as Zimbabwe, where access to essential medicines and health commodities is a strategic imperative (Lesego et al., 2023; Lesego et al., 2024). However, the successful integration of these technologies hinges significantly on the readiness, awareness, and acceptance levels of the healthcare workforce (Steenkamp et al., 2025). This systematic literature review aims to synthesize existing research on these factors, providing a comprehensive understanding of the human element in digital transformation within Zimbabwe's public health supply chain sector. Specifically, this review will examine the psychosocial barriers to healthcare technology adoption, such as perceived usefulness, trust, and organizational readiness, that often delay implementation despite the potential for improved human development and well-being (Lee et al., 2025). A critical assessment of current literature will therefore elucidate the multifaceted interplay between technological advancements and human factors, identifying key determinants influencing the effective deployment and sustained utilization of digital supply chain solutions in this specific context (Tagwireyi, 2020; Mollel et al., 2023). This inquiry will focus on identifying prevalent digital technologies within the healthcare supply chain, analyzing their perceived benefits and drawbacks from the perspective of public health sector staff and users (Marić et al., 2021; Borges do Nascimento et al., 2023). Furthermore, it will explore the educational and training initiatives necessary to bridge digital literacy gaps and foster a more receptive environment for technology adoption (Aboelmaged et al., 2020). The review will also consider the policy and regulatory frameworks that either facilitate or impede the adoption of digital health supply chain innovations, drawing parallels with other low-resource settings to contextualize findings for Zimbabwe (Ramanujapuram & Malemarpuram, 2020; Agarwal et al., 2020). The objective is to consolidate fragmented knowledge regarding digital technology adoption within humanitarian and public health supply chains, thereby addressing a critical gap in the literature (Marić et al., 2021; Mahroof et al., 2023).

2. Literature Review

This systematic literature review will critically analyze existing studies concerning

digital supply chain technology adoption, specifically focusing on the human dimensions of awareness, acceptance, and readiness within public health contexts (Altay et al., 2023; Shrivastav & Bag, 2023). The review aims to identify key facilitators and barriers to technology integration, drawing insights from both global literature and studies relevant to similar socio-economic environments (Leonardo & Santosa, 2024). This approach will involve a comprehensive search across multiple databases to capture a broad spectrum of research on digital transformation in humanitarian and health supply chains (Shrivastav & Bag, 2023; Chilicaus et al., 2025). The scarcity of adequately resourced supply chains in low- and middle-income countries underscores the importance of this investigation (Subramanian, 2020). Therefore, understanding the human factors influencing technology adoption in these settings is paramount for successful implementation and sustainable improvements in public health outcomes (Tadesse et al., 2021).

2.1. Conceptual Framework

This study's conceptual framework integrates established models of technology acceptance and diffusion, tailored to the specific characteristics of digital supply chain technologies within a developing economy context, to elucidate the complex interplay of individual and organizational factors influencing adoption. It specifically draws upon elements from the Technology Acceptance Model, Diffusion of Innovations theory, and the Unified Theory of Acceptance and Use of Technology to analyze user perceptions and organizational preparedness (Adjei-Bamfo et al., 2020). This integrated framework will enable a comprehensive examination of how factors such as perceived usefulness, ease of use, social influence, and facilitating conditions collectively shape the adoption trajectories of digital supply chain technologies in Zimbabwe (Tagwireyi, 2020). Furthermore, it incorporates the Technological, Organizational, and Environmental framework to account for the broader contextual influences impacting digital transformation within Zimbabwean logistics companies (Orji et al., 2020; Vu et al., 2025). This holistic approach will help to identify the specific barriers and enablers for widespread adoption, particularly considering the early stage of digital technology integration in many industrial sectors within developing economies (Orji et al., 2020). The framework will also consider the interplay between these theoretical constructs and the practical realities of infrastructural limitations, skill gaps, and regulatory environments prevalent in such regions (Singh, 2024; Attaran, 2020).

2.2. Factors Influencing Technology Adoption in Organizations

A multitude of factors, ranging from individual psychological traits to organizational culture and external environmental pressures, collectively shape the trajectory of technology adoption within an organizational setting (Díaz-Arancibia et al., 2024). These factors often include the perceived benefits of the technology, the availability of adequate training and support, and the alignment of the technology with existing organizational processes and goals (Tavana et al., 2024). Furthermore, the

Unified Theory of Acceptance and Use of Technology integrates several seminal models, specifying performance expectancy, effort expectancy, social influence, and facilitating conditions as core predictors of both intentions to use and actual system usage (Đula et al., 2024; Srivastava et al., 2021). The Technology Acceptance Model further elaborates on this by emphasizing the connection between users' perceived usefulness and ease of use in influencing their adoption behavior (Qawqzeh et al., 2025). These frameworks, however, often require adaptation and contextualization to fully capture the nuances of technology adoption in diverse operational environments, particularly concerning the interaction between humans and advanced technological systems (Toader et al., 2023; Qawqzeh et al., 2025). Moreover, organizational culture, leadership support, and effective communication strategies are pivotal in fostering an environment conducive to technology assimilation, thereby mitigating resistance to change and enhancing collective readiness (Cagno et al., 2024).

2.3. Employee Attitudes toward Technological Change

Employee attitudes are critically shaped by their perceptions of the benefits, risks, and personal impact of new technologies, directly influencing their willingness to engage with and integrate these advancements into their daily workflows. These perceptions are often mediated by factors such as job security concerns, skill obsolescence anxieties, and the perceived fairness of the implementation process (Barbu et al., 2025). However, perceived threats to job security are not uniform across all employees and can be influenced by individual and situational characteristics such as formal training, departmental roles, and the specific technology being introduced (Trenerry et al., 2021). Moreover, a supportive organizational culture that prioritizes employee well-being and provides opportunities for reskilling can significantly mitigate negative attitudes towards technological change (Muktamar & Nurnaningsih, 2024). Conversely, positive attitudes, often fostered through transparent communication, perceived organizational support, and opportunities for upskilling, can accelerate the adoption process and enhance the effective integration of new systems (Daly et al., 2025). The Unified Theory of Acceptance and Use of Technology further highlights that effort expectancy, particularly in the initial stages, and social influence are critical drivers of adoption, with age and work experience also moderating these effects (Kim et al., 2024). Ultimately, the user's attitude towards new technologies, significantly influenced by their comfort levels and perceptions of the innovation, plays a crucial role in their acceptance and integration within various operational contexts (Shata & Hartley, 2025). This underscores the necessity of investigating the specific psychological and social determinants influencing technology adoption within the unique socio-economic landscape of Zimbabwe (Schlicher et al., 2022). This research seeks to bridge this gap by examining the interplay of awareness, acceptance, and readiness among staff and users in Zimbabwe regarding digital supply chain technologies.

2.4. User Readiness for Digital Transformation

Digital transformation readiness encompasses the preparedness of individuals

and organizations to embrace, implement, and leverage new digital technologies to achieve strategic objectives. This readiness is not solely technical but also involves psychological dimensions, including employees' individual innovativeness and their intrinsic motivation to adapt to new tools and processes (Nguyen et al., 2023). It also encompasses the organizational capacity to provide adequate training, resources, and a supportive environment that facilitates the seamless integration of digital solutions (Noriega Del Valle et al., 2024). The propensity of individuals to embrace and utilize new technologies, known as technology readiness, is profoundly influenced by their levels of optimism and innovativeness, which serve as key motivational factors (Çetindamar et al., 2021). Conversely, feelings of discomfort and insecurity can act as significant inhibitors to technology adoption, necessitating targeted interventions to build confidence and alleviate apprehension among users (Noriega Del Valle et al., 2024). Understanding the digital divide, characterized by disparities in infrastructure and knowledge, is therefore crucial for assessing overall readiness and formulating effective adoption strategies (Mazwane et al., 2023). In Zimbabwe, despite a relatively high technological adoption rate of 3.7 out of 5, the actual technological readiness remains lower at 2.8 out of 5, suggesting a disconnect between perceived adoption and effective utilization (Maphosa & Maphosa, 2022). This disparity highlights the critical need for a deeper investigation into the underlying factors impeding genuine technological integration and optimal utilization within the Zimbabwean context (Mhlanga et al., 2014). This study therefore delves into the attitudes and behaviors of staff and users toward digital supply chain technologies in Zimbabwe, specifically gauging their awareness, acceptance, and readiness for these advancements.

2.5. Digital Supply Chain in Developing Economies

The unique challenges and opportunities within developing economies, particularly in Sub-Saharan Africa, significantly influence the adoption and integration of digital supply chain technologies (Kuteyi & Winkler, 2022). These challenges often include inadequate infrastructure, limited financial resources, and a lack of skilled personnel, while opportunities arise from the potential for leapfrogging traditional development stages and addressing inefficiencies in existing supply chains (Ogah & Onuoha, 2022). For instance, humanitarian logistics in developing regions frequently grapples with disruptions due to poor infrastructure, underscoring the potential for digital solutions to enhance resilience and efficiency (Baffoe & Luo, 2021).

Furthermore, the recent COVID-19 pandemic underscored the critical need for robust, technology-driven logistics solutions in developing economies to manage complex supply chains effectively (Sumbal et al., 2023). In this context, technologies like blockchain, despite facing adoption challenges at the individual level, offer considerable promise for enhancing transparency, traceability, and overall efficiency within these intricate supply networks (Queiroz & Wamba, 2018). The

increased demand for digital solutions, including Industry 4.0 and IoT-based cyber-physical systems, highlights the potential for digital supply chains and Logistics 4.0 to improve visibility, consumer responsiveness, and flexibility in these dynamic environments (Kuteyi & Winkler, 2022). However, the successful integration of digitalized logistics practices in low-income countries requires careful consideration of local contexts and infrastructure limitations (Tadesse et al., 2021).

2.6. Challenges and Opportunities in the Zimbabwean Public Health Sector Context

The Zimbabwean context presents a unique dichotomy, characterized by both significant barriers to digital technology adoption, such as macroeconomic instability and inadequate infrastructure, and nascent opportunities for leveraging digital supply chain technologies to foster economic growth and resilience (Mateko, 2024). This duality necessitates a thorough investigation into the specific challenges encountered and opportunities available for implementing advanced digital solutions within its distinct operational landscape (Mupemhi & Muposhi, 2018). For instance, despite the acknowledged benefits of information and communication technology in procurement processes, adoption rates in public entities in Zimbabwe are hindered by financial constraints and skill shortages, underscoring the need for committed leadership and adequate resources (Mabhodha & Choga, 2021). Such challenges are often compounded by insufficient digital infrastructure, which can impede the seamless integration and operation of advanced supply chain systems, alongside a lack of skilled personnel necessary to manage these sophisticated technologies (Habib et al., 2025). Furthermore, prevailing socio-economic factors like high social inequalities, informality, and corruption further complicate technology adoption in emerging economies such as Zimbabwe, impeding the effective deployment and utilization of digital tools (Mahroof et al., 2023). However, the proactive engagement of the Zimbabwean government and international organizations, as evidenced by initiatives to strengthen health sector supply chains, indicates a growing recognition of the strategic importance of technological advancement (Lesego et al., 2023). These efforts, encompassing improvements in infrastructure, training, and equipment, are crucial for overcoming existing limitations in public service supply chains within low-resource environments (Lesego et al., 2024; Ramanujapuram & Malemarpuram, 2020). This ongoing commitment to enhancing public sector logistics, particularly within the health sector, presents a unique opportunity to assess the prevailing attitudes and behaviors towards digital supply chain technologies among key stakeholders in Zimbabwe (Hove et al., 2024). This research, therefore, focuses on understanding the awareness, acceptance, and readiness for these technological advancements within this specific national context.

3. Methodology

To thoroughly investigate these aspects, a robust methodological framework was

employed to capture the nuanced perspectives of various stakeholders. This study utilized a systematic literature review approach, meticulously synthesizing existing research to identify key themes, gaps, and emerging trends related to digital supply chain technology adoption in developing economies like Zimbabwe (OBAZELE & Osuji, 2025; Munyede & Mapuva, 2020). The systematic literature analysis involved critical stages, including the precise definition of research questions and the formulation of a comprehensive search strategy with the following electronic databases systematically searched: PubMed, Scopus, Web of Science, and Google Scholar for grey literature. The search strategy incorporated a broad range of the following keywords: "('digital technology' OR 'e-health' OR 'm-health') AND ('supply chain' OR 'logistics management') AND ('public health' OR 'healthcare') AND ('Zimbabwe' OR 'developing country' OR 'low-income countr') AND ('adoption' OR 'awareness' OR 'acceptance' OR 'readiness')" (Díaz-Arancibia et al., 2024). This meticulous process ensured the inclusion of high-quality, relevant research that directly addressed the study's objectives regarding attitudes and behaviors towards digital supply chain technology adoption (Kshetri, 2021). This methodology mirrors established systematic review frameworks, ensuring a structured and transparent process for identifying, appraising, and synthesizing relevant literature (Taufiq et al., 2024; Selvanesan & Satanarachchi, 2023). This structured approach facilitated the extraction of pertinent data points concerning the drivers and barriers to digital technology integration in public health supply chains, especially in contexts analogous to Zimbabwe (Tadesse et al., 2021; Rafifing et al., 2025). The subsequent screening process involved title and abstract review, followed by full-text evaluation, to ensure that only studies directly addressing the research objectives were included in the final synthesis (Mugoni et al., 2022). This rigorous selection process aimed to minimize bias and enhance the reliability and validity of the synthesized findings.

4. Results

This section synthesizes the empirical findings from the systematic literature review, categorizing key barriers and facilitators influencing the adoption of digital supply chain technologies within the public health sectors of developing nations, with a specific focus on insights applicable to Zimbabwe. The analysis integrates findings on digital transformation, highlighting the complex interplay of technological, organizational, environmental, and human factors.

4.1. Identified Barriers to Digital Supply Chain Technology Adoption

The systematic review identified critical barriers to the adoption of digital supply chain technologies in Zimbabwe's public health sector, particularly in low-resource settings. Key obstacles include infrastructural limitations, such as inadequate digital infrastructure characterized by poor connectivity and unreliable electricity, alongside high costs for digital devices and internet access, which exacer-

bate the digital divide. Human capital deficits are also significant, with limited digital literacy among healthcare workers and resistance to change hindering technology deployment. Additionally, fragmented legacy systems and procurement inefficiencies complicate the integration process. Macroeconomic instability poses another challenge, restricting financial resources and strategic investments necessary for technology adoption. Financial constraints further limit public entities' ability to invest in digital technologies. Socio-economic factors like social inequalities, informality, and corruption also impede effective implementation. Finally, a notable concern is the high failure rate of digital transformation initiatives, with around 70% failing to achieve their objectives due to these multifaceted challenges in the healthcare sector.

4.2. Identified Facilitators and Opportunities for Digital Supply Chain Technology Adoption

The review highlights several facilitators and opportunities that can drive the successful adoption of digital supply chain technologies in Zimbabwe's public health sector. Key enablers include strong, collaborative leadership and effective change management, with an emphasis on committed leadership and adequate resources to address financial and skill-related barriers. Engagement from the government and international organizations is also crucial, demonstrating a commitment to strengthening health sector supply chains through technological advancement. Technological benefits such as enhanced efficiency, improved inventory management, and transparent systems are emphasized, with user-friendly designs facilitating adoption. A human-centric approach is vital, underscoring the need for comprehensive training programs to enhance digital literacy, promote perceived ease of use, and demonstrate the value of digital systems. Providing incentives for regular tool usage and fostering a culture of acceptance among staff are essential for overcoming resistance to change. Lastly, systemic improvements, including supply chain integration, agility, and robust digital reverse supply chains utilizing technologies like blockchain and IoT, are critical in enhancing overall performance and resilience in public health management. Collectively, these factors represent a path forward for integrating digital supply chain technologies effectively.

4.3. User Attitudes and Readiness Landscape

The review highlights that although staff and users in Zimbabwe show readiness to adopt digital technologies, actual acceptance and successful implementation depend on addressing key facilitators. User perceptions and organizational readiness play crucial roles in digital transformation. Employee attitudes toward change are influenced by their views on benefits, risks, and personal impact. Despite a relatively high perceived adoption rate, the country faces a lower level of technological readiness, indicating a gap between willingness and effective utilization, primarily due to infrastructural and human capacity challenges.

5. Discussion

This section delves into the interpretation of the synthesized findings regarding the awareness, acceptance, and readiness for digital supply chain technologies within Zimbabwe's public health sector. It elucidates the implications of these findings for successful implementation and sustained utilization, rigorously connecting them to the integrated conceptual framework comprising the Technology Acceptance Model, Diffusion of Innovations theory, the Unified Theory of Acceptance and Use of Technology, and the Technological, Organizational, and Environmental framework (Adjei-Bamfo et al., 2020).

The identified barriers and facilitators underscore a complex interplay of technological, organizational, environmental, and human factors, reaffirming the multifaceted nature of technology adoption in developing economies. This discussion highlights the critical need for a holistic approach that addresses not only procedural weaknesses but also underlying governance deficits, infrastructural limitations, and human-centric considerations to optimize resource allocation, improve public health outcomes, and strengthen the overall resilience of the healthcare system against future disruptions (Dolan et al., 2020).

5.1. Interpreting Barriers through the Conceptual Framework

The systematic review unveiled several critical barriers hindering the successful integration and sustained utilization of digital supply chain technologies. These obstacles are not merely practical challenges but reflect profound influences on the constructs within our integrated conceptual framework.

5.1.1. Infrastructural Limitations

The pervasive issues of inadequate digital infrastructure, including poor network connectivity and inconsistent electricity supply, alongside high costs of digital devices and internet, directly undermine the Facilitating Conditions construct of UTAUT (Orji et al., 2020; Vu et al., 2025). Facilitating conditions, defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system, are foundational for technology adoption. In Zimbabwe's public health sector, the absence of reliable infrastructure means that even if individuals perceive high Performance Expectancy or Effort Expectancy, the external conditions prevent actual use, leading to a gap between intention and behavior. This also strongly aligns with the Environmental Context of the TOE framework, where the external technological infrastructure and regulatory environment dictate the feasibility of adoption. From a DOI perspective, such infrastructural deficiencies heighten the Complexity of using digital tools, thereby hindering their Diffusion throughout the health system. The implication for Zimbabwe is that fundamental investments in national digital infrastructure are a prerequisite for any meaningful digital transformation in public health, as without them, user acceptance and readiness cannot translate into effective utilization (Vu et al., 2025).

5.1.2. Human Capital and Organizational Capacity Deficits

The findings of limited digital literacy, skill deficits, and resistance to change among healthcare workers are critical from the perspective of TAM and UTAUT. Limited literacy directly impacts Perceived Ease of Use and Effort Expectancy; if a system is perceived as difficult to learn or use, individuals will be less likely to adopt it, regardless of its perceived benefits (Vu et al., 2025). Resistance to change, as observed in similar regions, directly affects Attitude Toward Using and can diminish Behavioral Intention. This resistance may stem from a lack of Compatibility with existing practices or values, or a perceived threat to job security. The existence of fragmented systems and procurement inefficiencies speaks to the Organizational Context of the TOE framework, indicating internal structural and operational challenges that impede the seamless integration of new technologies and create a complex environment for their deployment. For Zimbabwe, this highlights an urgent need for comprehensive training programs tailored to different user groups, alongside robust change management strategies to foster a culture of acceptance and mitigate resistance by improving Effort Expectancy and demonstrating Perceived Usefulness.

5.1.3. Macroeconomic and Socioeconomic Factors

Macroeconomic instability, financial constraints, social inequalities, informality, and corruption largely fall under the Environmental Context of the TOE framework. These external conditions significantly constrain the resources available for technological investment and create an unpredictable operational environment. These factors also negatively impact Facilitating Conditions by limiting access to necessary resources and support for technology implementation. From a DOI perspective, financial constraints limit the Trialability and large-scale adoption of innovations. The implication is that even with strong political will and user readiness, the broader economic and governance landscape in Zimbabwe presents formidable hurdles that require high-level policy interventions and sustained investment beyond just the health sector to stabilize the Environmental Context for successful digital transformation (Heeres et al., 2023).

5.1.4. Implementation and Failure Rates

The documented high failure rate of digital transformation initiatives (70%) signifies a critical gap in achieving anticipated Perceived Usefulness or Performance Expectancy. If previous implementations have failed, it can erode trust and reduce future Behavioral Intention to adopt new systems, regardless of their theoretical benefits. This also speaks to a failure in managing the Organizational Context during implementation, suggesting inadequate change management, resource allocation, or strategic alignment (Vu et al., 2025). For Zimbabwe, this finding underscores the need for meticulous planning, realistic expectations, and adaptive implementation strategies that account for unique local challenges, rather than simply replicating models from developed contexts, to ensure that Performance Expectancy is met and to avoid negative Social Influence from past failures.

5.2. Interpreting Facilitators and Opportunities through the Conceptual Framework

Conversely, the identified facilitators offer clear pathways for successful adoption, reinforcing the importance of specific theoretical constructs in the Zimbabwean public health sector.

5.2.1. Strategic Leadership and Governance

Collaborative leadership, effective change management, committed leadership, and adequate resources are critical in fostering a conducive Organizational Context. Committed leadership and proactive engagement from the government and international organizations strongly influence Social Influence, where leaders' endorsement and resource allocation encourage adoption among staff (Heeres et al., 2023). This also creates positive Facilitating Conditions by ensuring the availability of resources and support. The implication for Zimbabwe is that strong, visible leadership from both within the health sector and governmental bodies is crucial to champion digital transformation, allocate necessary funds, drive policy alignment, and positively shape Social Influence for technology adoption.

5.2.2. Technological Benefits and System Design

The potential for enhanced efficiency and resilience, improved inventory management and information sharing, transparency, and traceability directly corresponds to Perceived Usefulness and Performance Expectancy. When users clearly perceive that a new technology will improve their job performance and achieve desired outcomes, their Behavioral Intention to use it increases. These benefits also represent the Relative Advantage of digital technologies over traditional methods. The emphasis on user-friendly system designs directly addresses Perceived Ease of Use and Effort Expectancy, making the technology less complex and thus more likely to be adopted. For Zimbabwe, focusing on demonstrating these tangible benefits and ensuring intuitive system designs is vital to garnering user acceptance and driving adoption by enhancing Perceived Usefulness and Perceived Ease of Use (Agarwal et al., 2020).

5.2.3. Human-Centric Approaches

The emphasis on adequate training and capacity building, the importance of perceived ease of use and demonstrated value, incentives for regular use, and fostering a culture of acceptance are all central to the individual-level constructs of the conceptual framework. Training directly improves Effort Expectancy and builds confidence, thereby enhancing Perceived Ease of Use. Demonstrated value reinforces Perceived Usefulness (TAM/UTAUT). Incentives act as strong Facilitating Conditions by providing resources or rewards that support technology use. Fostering a culture of acceptance impacts Social Influence and addresses issues of Compatibility. The implication is that a human-centered design approach to implementation in Zimbabwe, focusing on user needs, continuous support, and clear communication of benefits, will be more effective than a purely technology-driven approach, directly impacting individual Attitude Toward Using and Behavioral

Intention (Khumalo & Moloi, 2025; Hove et al., 2024).

5.2.4. Systemic Improvements

The focus on supply chain integration, agility, and resilience, as well as robust digital reverse supply chains, relates to the Technological Context and overall strategic capabilities. These are the desired organizational-level outcomes that digital technologies are meant to achieve, enhancing the Perceived Usefulness/Performance Expectancy at an organizational level. For Zimbabwe, strategically leveraging technologies like blockchain and IoT can not only improve specific supply chain functions but also contribute to the overall resilience and agility of the health system, which is a critical Relative Advantage in a challenging operating environment. This demonstrates how technological advancements within the TOE framework drive Performance Expectancy at a macro level.

5.3. Connecting User Attitudes and Readiness to the Conceptual Framework

The findings concerning user attitudes and readiness are particularly salient for validating and refining the conceptual framework within the Zimbabwean context (Heeres et al., 2023). The observation that staff and users express a general readiness to adopt new digital technologies, yet actual acceptance and successful implementation are contingent on facilitators being addressed, directly illustrates the gap between Behavioral Intention (readiness/willingness) and Use Behavior (actual implementation) as theorized in UTAUT. This gap is precisely where Facilitating Conditions (e.g., infrastructure, training, resources) play their crucial role. A high Behavioral Intention cannot translate into actual usage if the necessary Facilitating Conditions are absent (Lesego et al., 2024; Taruvinga et al., 2023).

The understanding that employee attitudes are shaped by their perceptions of the benefits, risks, and personal impact of new technologies aligns perfectly with TAM's Perceived Usefulness and Perceived Ease of Use, as well as UTAUT's Performance Expectancy and Effort Expectancy. If the perceived risks (e.g., job security, complexity) outweigh the perceived benefits, Attitude Toward Using will be negative, hindering acceptance.

Crucially, the disparity between Zimbabwe's relatively high perceived technological adoption rate (3.7/5) and lower actual technological readiness (2.8/5) due to infrastructural and human capacity limitations provides empirical evidence for the moderating role of Facilitating Conditions in UTAUT. Individuals may be optimistic and innovative (Technology Readiness Index components), thus having a high Behavioral Intention to adopt, but a lack of supporting infrastructure, skills, or resources (poor Facilitating Conditions, negative Environmental Context) prevents them from translating that intention into effective utilization. This highlights that simply desiring to use technology is not enough; the supporting ecosystem, encompassing the Technological, Organizational, and Environmental contexts, must be robust (Lesego et al., 2024; Taruvinga et al., 2023).

In summary, the empirical findings from Zimbabwe's public health sector

largely support the integrated conceptual framework. The identified barriers directly underscore weaknesses in Facilitating Conditions, adverse Environmental Contexts, and challenges to Effort Expectancy and Perceived Ease of Use. Conversely, facilitators highlight the importance of a strong Organizational Context, enhanced Perceived Usefulness/Performance Expectancy (TAM/UTAUT), positive Social Influence, and effective strategies to improve Effort Expectancy and Compatibility. The observed gap between perceived adoption and actual readiness vividly illustrates the critical mediating role of environmental and organizational factors in shaping individual technology adoption behaviors within a developing economy, emphasizing the need for a comprehensive, theoretically grounded approach to digital transformation.

6. Conclusion

This systematic review underscores the imperative for Zimbabwe's public health sector to strategically address attitudinal and behavioral factors influencing the adoption of digital supply chain technologies. The findings highlight that a lack of robust digital infrastructure, limited digital literacy, and insufficient training are significant barriers to successful implementation, impeding the potential for enhanced efficiency and resilience in the healthcare supply chain (Agarwal et al., 2020). Therefore, a multi-faceted approach incorporating infrastructure development, comprehensive training programs, and fostering a culture of acceptance is essential for realizing the transformative potential of these technologies within the Zimbabwean context (Karamagi et al., 2022; Kaboré et al., 2022). This includes overcoming challenges such as poor network infrastructure, inconsistent electricity supply, and high internet costs, which are prevalent in low- and middle-income countries like Zimbabwe (Mateko, 2024; Hove et al., 2024; Ahmed et al., 2025). Acceptance, readiness, and awareness among staff and users are critical, requiring ongoing engagement and education to bridge the gap between technological potential and practical application in resource-constrained environments (Karamagi et al., 2022; Chidhau et al., 2021).

6.1. Recommendations

Based on the critical barriers identified in the systematic literature review, the following recommendations are put forth to enhance awareness, acceptance, and readiness for digital supply chain technology adoption within Zimbabwe's public health sector.

6.1.1. Addressing Infrastructural Limitations through Strategic Investment

The review highlighted inadequate digital infrastructure, including poor network connectivity and inconsistent electricity supply, alongside the high costs of digital devices and internet as significant impediments. These pervasive issues limit access to essential digital services and hinder effective technology operation. A primary recommendation involves strategic investment in resilient and scalable dig-

ital infrastructure to ensure consistent connectivity and functionality across all public health facilities. This includes improving access to reliable electricity and affordable internet, which are fundamental prerequisites for supporting any digital health initiatives (Sylla et al., 2024). Such foundational improvements are vital for enabling the effective deployment of digital supply chain technologies, ensuring data integrity, and facilitating real-time information exchange across the health system (Chilunjika, 2024; Hove et al., 2024).

6.1.2. Mitigating Human Capital Deficits through Comprehensive Capacity Building

The literature identifies limited digital literacy among healthcare workers and a general lack of skilled personnel necessary to manage sophisticated technologies, including technical programming expertise, as a significant human capital deficit. Concurrently, developing local technical programming expertise is crucial for the initial setup and sustained maintenance of digital systems, ensuring their long-term viability and adaptability within the Zimbabwean context (Chilunjika, 2024; Hove et al., 2024). Furthermore, sustained efforts in capacity building and training programs are essential to equip healthcare professionals with the requisite digital literacy and technical skills for the effective utilization of these advanced systems. This training must be tailored to address the specific needs of diverse user groups, encompassing not only clinical staff but also logistics and administrative personnel. These initiatives should focus on practical application and problem-solving within the digital supply chain ecosystem, promoting a sense of ownership and competence among the workforce (Agarwal et al., 2020).

6.1.3. Overcoming Resistance to Change and Fostering Acceptance through User Engagement

The review noted resistance to change among healthcare workers and that despite readiness, actual acceptance and implementation hinge on perceived ease of use and demonstrated value. Fostering user engagement through proactive strategies is crucial for technology adoption and maximizing the impact of digital interventions. This approach can cultivate a culture of acceptance and readiness, critical for overcoming resistance to change and ensuring the sustainable integration of digital tools within routine operations. Providing incentives for regular use of new digital tools is also recommended to encourage sustained utilization in public health settings (Mogessie et al., 2021; Agarwal et al., 2020).

6.1.4. Address System Fragmentation and Inefficiencies with a User-Centric Approach Design

Underlying challenges such as fragmented legacy systems and existing procurement inefficiencies complicate the adoption process. Moreover, the effectiveness relies on user-friendly system designs. The recommendation is to prioritize the development and implementation of user-friendly system designs that are compatible with existing processes and integrate seamlessly where possible. This will directly address the complexity introduced by fragmented systems and improve

the perceived ease of use, thereby facilitating adoption and reducing the burden on users (Chilunjika & Uwizeyimana, 2024).

Conflicts of Interest

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

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