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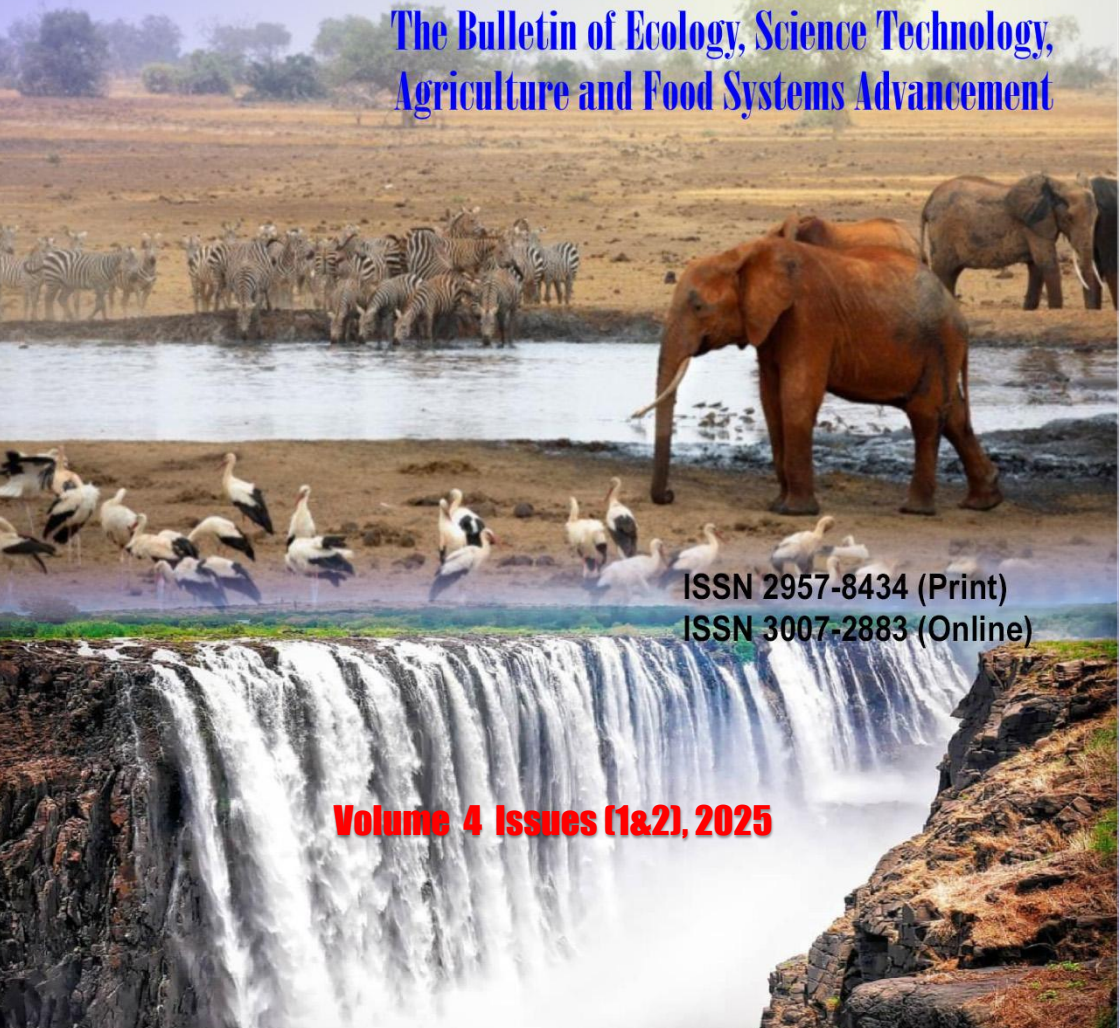

ISSN 2957-8434 (Print)
ISSN 3007-2883 (Online)

Volume 4 Issues (1&2), 2025

Published by the Zimbabwe Ezekiel Guti University Press
Stand No. 1901 Barrassie Rd,
Off Shamva Road
Box 350
Bindura, Zimbabwe

Typeset by Divine Graphics
Printed by Divine Graphics

SUBSCRIPTION AND RATES
Zimbabwe Ezekiel Guti University Press Office
Stand No. 1901 Barrassie Rd,
Off Shamva Road
Box 350
Bindura, Zimbabwe
Telephone: ++263 8 677 006 136 | +263 779 279 912
E-mail: zegupress@admin.uz.ac.zw
http://www.zegu.ac.zw/press

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Oikos - The Zimbabwe Ezekiel Guti University Bulletin of Ecology, Science Technology, Agriculture and Food Systems Review and Advancement

ISSN 2957-8434(Print)
ISSN 3007-2883(Online)

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Herald, 14 April 2020. Available online: https://www.herald.co.zw/harare-city-could-have-used-lockdown-to-clean-mbare-market/. Accessed on 24 June 2020.

LEVERAGING DIGITAL PROFICIENCY TO TRANSFORM SERVICE DELIVERY IN PRIVATE SECTOR HOSPITALS IN HARARE, ZIMBABWE

PAIDAMOYO MANDIZVIDZA[1], DENNIS NIKISI[2]

Abstract

The article examines the impact of digital proficiency on service delivery in private sector hospitals in Harare, Zimbabwe. It investigates how healthcare professionals' competence in using digital tools and technologies influences the effectiveness and transformation of healthcare services. Using a qualitative approach, data were collected through interviews with 32 participants, including healthcare professionals, administrative staff and patients. The study identified key competencies in digital literacy, such as the use of electronic health records (EHRs), digital appointment systems and telemedicine platforms and assessed their influence on operational effectiveness. Metrics used to evaluate service outcomes included reduced patient wait times; lower administrative error rates and higher patient satisfaction scores. Results reveal that higher levels of digital proficiency among hospital staff are associated with streamlined administrative processes, improved accuracy in patient data handling and enhanced communication with patients. Patients in digitally proficient hospitals reported greater satisfaction, citing efficient appointment scheduling and easier access to medical information as primary benefits. However, the study also uncovers several gaps. Limited training opportunities are noted, particularly in the use of advanced hospital management systems, data security protocols and telehealth platforms. Furthermore, resistance to

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technology adoption emerged as a significant barrier, with contributing factors including lack of understanding, fear of job displacement and generational differences in technology use. The study concludes with recommendations for targeted and continuous professional development programmes focused on bridging identified skill gaps. It also suggests implementing change management strategies to address resistance, including peer mentoring, inclusive training sessions and clear communication of the benefits of digital tools in enhancing care deliver.

Keywords: skill, knowledge, digitalisation, private healthcare sector, service delivery, healthcare professionals, digital literacy, patient satisfaction technology adoption

Introduction

In today's rapidly evolving technological landscape, the adoption of digital tools and technologies has become imperative across various sectors (Mesko *et al*., 2020), including healthcare. Service delivery in hospitals increasingly relies on digital systems to streamline operations, improve accuracy and enhance patient satisfaction. In Harare, Zimbabwe, private sector hospitals are progressively integrating these technologies into their operations (Mwansa and Phiri, 2021). However, the effectiveness of such digital transformations hinges largely on the digital competence of healthcare providers and administrative staff. Digital competence refers to the set of skills, knowledge and attitudes that enable individuals to effectively use digital technologies to perform tasks, solve problems, communicate and manage information. In the healthcare context, this includes proficiency in using electronic health records (EHRs), understanding data security protocols, operating hospital management systems and effectively utilising telemedicine platforms. These competencies directly impact service delivery by reducing administrative errors, enhancing patient communication and optimising workflow efficiency. According to Nyoni and Takawira (2022), the Zimbabwe healthcare sector continues to face challenges such as resource constraints, inefficiencies in service delivery and an increasing demand for quality care. In response, private sector hospitals have turned to digital technologies as a means to bridge service gaps and improve healthcare outcomes. Tools like EHRs, telemedicine and automation software, have shown promise in reducing manual errors,

facilitating communication and increasing operational efficiency (Nguyen, 2022).

Global research reinforces these benefits. For instance, Johnson *et al*. (2021) highlight the role of digital automation in minimising human errors and boosting process efficiency. Similarly, Martin *et al*. (2021) found that employees with strong digital skills such as email etiquette, use of instant messaging and video conferencing can communicate more effectively in real time. These findings are particularly relevant to Harare's private sector hospitals, where similar technologies are being adopted to improve service quality. By drawing on these global insights and applying them within the local context, this study seeks to explore how digital competence among healthcare staff influences service delivery outcomes in Harare's private hospitals.

The integration of digital technologies in healthcare has become increasingly essential in enhancing the quality, efficiency and accessibility of services. In private sector hospitals in Harare, Zimbabwe, digital tools such as EHRs, telemedicine platforms and automated administrative systems are being adopted to improve service delivery. However, the successful implementation and utilisation of these technologies depend heavily on the digital proficiency of healthcare professionals and administrative staff. Despite the growing availability of digital infrastructure, there is limited empirical understanding of how variations in digital skills and knowledge among healthcare workers influence service outcomes such as patient satisfaction, error reduction and workflow efficiency. Furthermore, inconsistencies in digital competence across staff may hinder the full realisation of technology's benefits, leading to suboptimal service delivery. This study seeks to address this gap by establishing the impact of digital proficiency on service delivery in private sector hospitals in Harare, thereby providing insights necessary for targeted capacity-building interventions and informed policy development.
The objective of this study is to establish the impact of digital proficiency on service delivery.

Conceptual and Analytical Framework

This study is guided by the Technology Acceptance Model (TAM) which provides a robust theoretical framework for understanding how users accept and use new technologies. The TAM includes two key parameters: perceived ease of use (PEOU) and perceived usefulness (PU), both of which are utilised in this study to explore how digital competence among healthcare staff influences service delivery outcomes in private sector hospitals in Harare. PEOU refers to the degree to which an individual believes that using a particular system would be free of effort, while PU is the degree to which a person believes that using the system would enhance their job performance. These two factors are essential in influencing attitudes toward technology adoption and, ultimately, actual usage behaviour. The relevance of the TAM to this research is supported by several empirical studies. For example, Agarwal and Prasad (2019) found that healthcare professionals with higher digital proficiency reported greater PU and PEOU of electronic health systems, leading to increased adoption rates. Venkatesh *et al*. (2023) demonstrate that user training significantly enhances perceptions of ease of use, especially in resource-constrained environments. Similarly, Liu *et al*. (2020) highlights that digital literacy positively affects PU and user satisfaction in telemedicine services. These findings affirm the applicability of the TAM in examining the relationship between digital skills and the effective adoption of healthcare technologies. Thus, the TAM offers a relevant lens through which to assess how healthcare workers' digital competence influences service delivery in Harare's private hospitals.

Literature Review

The TAM has gained increasing relevance in the healthcare sector, particularly for examining how digital skills and knowledge influence the acceptance and use of technology by healthcare workers. According to Yang *et al*. (2021), healthcare professionals' perception of the usefulness of telemedicine platforms significantly influences their willingness to learn and adopt these technologies. Similarly, Kuo *et al*. (2022) reveal that when professionals perceive mobile health applications as easy to use, they are more likely to engage in continuous digital learning, reinforcing the TAM's constructs of PU and PEOU.

Digital competence plays a critical role in shaping professionals' perceptions of digital tools. Stoumpos *et al*. (2023) argue that the successful adoption of digital technologies is not dependent solely on TAM constructs like PU and PEOU, but also heavily influenced by the level of digital skills and knowledge users possess. As healthcare professionals gain familiarity with technologies such as EHRs and telemedicine platforms, their confidence in using them improves, leading to higher acceptance and utilisation.

Zhao *et al*. (2019) highlight that improved knowledge of EHR systems contribute to better data management, reducing errors and enhancing the efficiency of healthcare delivery. These findings underscore the symbiotic relationship between digital literacy and PEOU, ultimately influencing technology adoption decisions.

Training and education play an essential role in enhancing healthcare workers' skills and knowledge in using digital health technologies. Many healthcare institutions have integrated structured training programmes to ensure their staff can effectively operate digital systems such as EHRs, telemedicine and mobile health applications. As the TAM suggests, the more healthcare professionals are exposed to user-friendly technologies, the more likely they are to perceive them as useful and easy to use. That, in turn, encourages them to adopt these technologies and refine their skills (Venkatesh *et al*. 2020).

McGinn *et al*. (2020) examine how structured telemedicine training programmes significantly improved healthcare professionals' ability to use telemedicine platforms, leading to enhanced service delivery and patient satisfaction. The study establishes that when healthcare workers re equipped with the necessary skills and knowledge, they are more likely to perceive telemedicine as useful and easy to use, increasing their willingness to incorporate it into their daily practice. Similarly, Yang *et al*. (2021) show that eHealth apps are easier to use for healthcare professionals after they receive proper training, further supporting the role of education and skills development in improving technology adoption in healthcare.

Ongoing training is essential for promoting digital proficiency and increasing technology acceptance. In the context of telemedicine, Kuo *et al*. (2022) observe how trained healthcare professionals exhibit higher confidence in their ability to deliver remote care, directly improving service delivery outcomes. This suggests that targeted training initiatives can foster more positive perceptions of digital tools and empower healthcare staff to use them more effectively.

Additionally, the World Health Organisation (WHO) (2020) has developed a Digital Health Workforce Toolkit that offers comprehensive guidelines for designing competency-based training programmes. The toolkit provides a framework for role-specific training tailored to healthcare environments, focusing on areas such as interoperability, user-centred design and data security. Utilising this framework, private hospitals in Harare could implement structured digital skills training that align with international standards, while remaining adaptable to local needs and existing infrastructure.

One notable example is the National Health Service (NHS) Digital Academy in the United Kingdom, designed to develop digital leadership among healthcare professionals by equipping them with advanced skills in digital health transformation, data analytics and health informatics (Topol, 2019). The programme employs a combination of online and blended learning approaches, offering flexibility and scalability. A similar initiative in Harare could focus on middle-management and frontline staff, delivering context-specific training in the use of hospital management systems, telemedicine platforms and EHRs, while promoting leadership in digital innovation within the healthcare sector.

The Smart Africa Digital Academy (SADA) is another relevant initiative that focuses on equipping public sector professionals across the continent with digital competencies. It emphasises partnerships with local institutions and delivers modular, scalable online training in areas such as cyber security, data governance and digital transformation (Smart Africa, 2022). Harare's private hospitals could benefit from collaborating with local universities and technology hubs to establish certified digital literacy programmes tailored for clinicians and

administrative staff. Such initiatives would not only build foundational digital skills, but also promote long-term capacity development in digital health systems.

Skills are defined as the abilities or expertise acquired through practice and education. In the healthcare context, skills can be categorised into clinical skills, for example, surgical techniques, patient assessment and soft skills such as communication and empathy (Vassilacopoulou *et al.,* 2020). Clinical skills are essential for direct patient care, while soft skills are crucial for patient interaction and teamwork.

Sood *et al*. (2022) define knowledge as the information, understanding and insights that individuals possess that can be derived from education, experience and training. In healthcare, knowledge encompasses both theoretical understanding, such as medical knowledge, pharmacology and practical knowledge (clinical guidelines, patient management). The relationship between skills and knowledge is symbiotic; effective skills development relies on a solid knowledge base. According to Benner (2019), nursing competence progresses through five stages, novice to expert, each characterised by increasing levels of knowledge and skill integration. A robust foundation of knowledge enhances a healthcare professional's ability to perform skills effectively, leading to improved patient outcomes.

A study by Agarwal and Prasad (2019) on electronic commerce systems found that users with higher digital expertise perceived technologies as easier to use and were more inclined to adopt them. These findings align with the TAM's assumptions and extend their relevance to healthcare, showing how foundational digital skills can act as enablers of technology adoption and operational efficiency.
Liu *et al*. (2020) confirm that digital literacy significantly influenced healthcare professionals' perception of both usefulness and ease of use of health information systems, emphasising the critical role of user competence in facilitating the adoption of digital tools in healthcare settings.

Digital proficiency not only promotes technology use, but also has tangible effects on service delivery. Healthcare professionals with

adequate digital knowledge can navigate digital systems more confidently, leading to streamlined processes, fewer errors and improved patient communication. The positive correlation between digital skills and service efficiency validates the application of the TAM as a framework for analysing service delivery transformations in the healthcare sector (Venkatesh *et al*., 2023).

According to Jackson (2019), a service is an intangible economic activity that cannot be stored and does not lead to ownership. He further asserts that it entails information exchange, knowledge and any other kind of assets. Service delivery entails components of a firm that define the manner in which different processes interact between clients and service providers in which the client finds value or loses as a result of the interaction (Kazmi, 2018). This indicates that a good service delivery method enhances the delivery of products to clients and increases the value. Schindler and Cooper (2017) consider service delivery as a set of activities undertaken within a business environment to perform a service. Ven and Poole (2020) allege that service delivery reflects a firm's coordinated activities and actions aimed at delivering effective services and products.

Recent studies highlight the relevance of the TAM the in the healthcare sector, particularly in understanding how healthcare workers' skills and knowledge influence the use of digital technologies. For example, Yang *et al*. (2021) found that healthcare professionals' perceptions of the usefulness of telemedicine platforms influenced their willingness to learn and apply these technologies. The more they perceived telemedicine as beneficial, the more motivated they were to acquire the necessary skills and knowledge to operate such platforms effectively. Similarly, Kuo *et al*. (2022) show that healthcare professionals who believe in the ease of use of mobile health applications are more likely to engage in continuous learning, thus improving their skills and enhancing service delivery.

The adoption of digital technologies in healthcare not only depends on PU and PEOU, but also on the skills and knowledge required for effective use. As healthcare professionals gain proficiency with technologies like EHR systems and telemedicine platforms, their

perceptions of these technologies change, often increasing their PU and (PEOU. Skills and knowledge directly influence the user's confidence in operating these systems. That, in turn, enhances the overall healthcare delivery process.

In the case of telemedicine, Kuo *et al*. (2022) argue that healthcare professionals trained to use telemedicine platforms, demonstrate higher confidence in their ability to provide quality care remotely, thereby improving service delivery. Similarly, Zhao *et al*. (2019) highlight that the knowledge of EHR systems not only improves the efficiency of healthcare delivery but also contributes to the reduced likelihood of errors in patient data management. These findings underscore that continuous skills development and knowledge acquisition are critical to the adoption and success of digital technologies in healthcare.

In the digital age, advancements in technology have permeated various aspects of society, significantly influencing service delivery across different industries. The ability to effectively utilise digital technologies has become imperative for organisations to maintain competitiveness and meet the increasing demands of customers. Johnson *et al*. (2019) provide valuable insights into the correlation between digital technology skills and customer satisfaction. They highlight that proficient employees who possess in-depth knowledge of digital technologies, can deliver efficient and personalised services to customers. By utilising digital tools and platforms, these employees can improve interactions, streamline processes and enhance overall customer experiences. Consequently, this skillset plays a pivotal role in influencing customer satisfaction within the service industry.

Venkatesh *et al*. (2023) extend the TAM by introducing the construct of "perceived behavioural control" which refers to users' perception of their ability to use the technology effectively. Their study focuses on understanding the factors that influence the acceptance and usage of web-based information systems. The results reveal that users' knowledge and skills in digital technologies positively influenced their perceived behavioural control, leading to increased utilisation of web-based systems. This finding emphasises the importance of skills and

knowledge in effectively delivering services through digital technologies.

Similarly, Liu *et al*. (2020) investigate the factors influencing the adoption and use of health information systems among healthcare professionals. The findings show that healthcare professionals' level of digital literacy and expertise significantly influence their PU and PEOU of the technology. The study concludes that adequate skills and knowledge in digital technologies are crucial for healthcare professionals to effectively utilise health information systems, consequently improving service delivery in the healthcare sector.

The TAM offers a valuable theoretical framework for understanding how healthcare professionals' digital skills and knowledge influence service delivery in private sector hospitals. The TAM posits that the acceptance and use of technology are primarily determined by two key constructs: PEOU) and PU (Nkhoma *et al*, 2021). In the context of this study, these constructs were are to assess how healthcare professionals in Harare's private hospitals evaluate digital technologies such as EHRs, telemedicine platforms and hospital management systems. Specifically, PEOU is measured by examining the extent to which staff found these systems intuitive and manageable, while PU is assessed by evaluating their perceptions of how digital tools improved efficiency, reduced administrative errors and enhanced patient care.

The study draws on the foundational work of Agarwal and Prasad (2019), who demonstrate that individuals with greater digital expertise are more likely to perceive technology as both useful and easy to use, resulting in higher levels of adoption. Venkatesh *et al*. (2023) further support this by showing that digital competence enhances users' confidence and positively shapes their attitudes toward new systems. Similarly, Liu *et al*. (2020) found that healthcare professionals' digital literacy significantly influences their acceptance and effective utilisation of health information systems. By applying the TAM, this research establishes a clear link between digital proficiency and improved service delivery outcomes such as streamlined workflows, faster administrative processes and increased patient satisfaction. Thus, the TAM not only provides a theoretical foundation for exploring the relationship between

digital skills and technology use, but also enables the study to systematically evaluate how these perceptions translate into measurable improvements in healthcare delivery.

High levels of digital skills and knowledge among healthcare professionals are closely associated with improved quality of care. Alshahrani *et al*. (2023) report that healthcare providers trained in both clinical and interpersonal competencies contribute significantly to enhanced patient safety, better treatment outcomes and reduced clinical errors. These findings underscore the importance of not only technical proficiency, but also the capacity to use digital tools to support diagnostic accuracy and clinical decision-making in complex scenarios. Common performance indicators used to measure these improvements include reduced medication errors, lower hospital re-admission rates and shorter patient recovery times.

Patient satisfaction is increasingly recognised as a critical performance indicator, reflecting the effectiveness of service delivery. Studies such as Andaleeb *et al*. (2021) and Li *et al*. (2021) reveal that healthcare professionals with strong communication skills and digital proficiency are better equipped to engage with patients, explain treatment options clearly and respond empathetically to concerns. These soft skills, when complemented by the ability to use digital systems such as EHRs and patient portals, enhance the transparency and responsiveness of care delivery. Notably andaleeb *et al*. (2021) found that effective provider-patient communication correlates with increased satisfaction scores, while Li *et al*. (2021) highlight that patients value personalised interactions facilitated by digital tools.

The personalisation of patient care enabled through digital technologies play a vital role in shaping patient experiences by leveraging patient data to provide tailored recommendations and timely follow-ups.

Research Methodology

This study adopts a qualitative research approach to explore the influence of digital competence on service delivery in private sector hospitals in Harare. The qualitative approach is selected for its ability to

provide in-depth insights into participants' experiences, perceptions and behaviours. Within this framework, an exploratory research design is employed. Exploratory research is particularly suitable when investigating under-researched or complex issues, as it seeks to uncover patterns, generate hypotheses and understand underlying reasons and motivations. In this context, the exploratory design complemented the qualitative approach by allowing the research to investigate the relatively unexplored link between digital skills and healthcare service outcomes in a local setting.

The study utilises a non-probability sampling design, specifically purposive sampling and due to its alignment with qualitative inquiry. Purposive sampling enables research to intentionally select individuals most likely to provide relevant and rich information related to the study objectives. A total of 32 participants, comprising healthcare professionals, administrative staff and patients, were chosen based on their direct involvement with or experience of digital technologies in private healthcare settings in the Harare Metropolitan area.

Data were collected using a semi-structured interview guide that allowed for both consistency across interviews and flexibility to probe deeper, based on participant responses. Interviews were audio-recorded (with consent), transcribed verbatim and analysed using thematic analysis. The analysis followed the six-phase process outlined by Braun and Clarke (2006): (1) familiarisation with the data; (2) generation of initial codes; (3) searching for themes; (4) reviewing themes; (5) defining and naming themes; and (6) producing the report. Themes were identified both deductively, based on the research questions and inductively, emerging directly from the data. Coding was done manually and no specialised software was used in the analysis.
This systematic approach to data analysis ensured that the findings were grounded in participants' experiences, enhancing both the credibility and trustworthiness of the study.

To uphold ethical standards throughout the study, informed consent was obtained from all participants prior to data collection. Participants were briefed on the purpose, scope and voluntary nature of the research. They were assured of their right to withdraw at any time without

consequence. Confidentiality and anonymity were strictly maintained by using pseudonyms and securing all data in password-protected files. No personally identifiable information was disclosed in the reporting of results. Ethical clearance for the study was obtained from the Ministry of Health and Child Care, ensuring that all research activities complied with ethical research guidelines in healthcare settings.

Findings

The findings of the study reveal a strong correlation between digital proficiency among healthcare professionals and improved service delivery outcomes in private sector hospitals in Harare. Participants consistently emphasised that digital competence significantly enhanced their efficiency, communication and ability to provide quality care.

The interview guide was completed for all 32 purposively selected participants in this study. However, data saturation was reached at 24 participants, representing 75% of the total sample. *Data saturation* refers to the point in qualitative research at which no new information, themes, or insights are emerging from additional interviews. In this study, saturation was identified when responses began to repeat and no novel concepts were being introduced, indicating that further interviews were unlikely to contribute additional value to the findings. This suggests that the perspectives of the 24 participants provided a sufficiently rich understanding of the central themes related to the impact of skills and knowledge of digital technologies on service delivery.

The thematic analysis for the study revealed four themes, which are improved digital competence, continuous training support, adequate time and support and implementation timing.

Improved Digital Competence

Participants emphasised that training significantly enhances the digital competence of healthcare professionals. Improved competence was consistently associated with more effective utilisation of digital health platforms and improved healthcare delivery. Participants 8 and 12 specifically highlighted that training not only built technical skills, but also increased confidence and independence in using digital tools. Participant 8 stated:

"After the training, I didn't have to ask for help every time. I could navigate the system on my own and it made my job a lot easier."
Similarly, Participant 12 explained:
"The training helped me understand how everything fits together. I now see how the system helps the patient and not just us staff."
Beyond technical skill development, participants emphasised the broader benefits of training, including reduced need for supervision, improved efficiency and better teamwork. These sessions also fostered a culture of continuous improvement and knowledge-sharing, enabling staff to develop self-efficacy and collaborate effectively in delivering quality care.

Figure 1 illustrates a word cloud generated from interview data, highlighting the most frequently mentioned concepts related to training. Prominent terms such as *"improved", "competence", "confidence", "supervision", "teamwork", "cost" and "development,"* reflect participants' perceptions of the transformative impact of training. The visual representation reinforces the thematic findings by emphasising key elements associated with increased digital competence and operational efficiency. A word cloud summarising the observed themes from the participants is shown in Figure 1.

Figure 1: Effects of training on digital health platforms usage (Mandizvidza, 2024).

Continuous Training Support
Participants 6 and 9 noted that continuous training was available, contributing to a more effective adaptation period. Ongoing support

helps users gradually become comfortable with the new technology. Participant 3 mentioned that the transition took time due to the extensive process of converting manual records to digital formats. This aspect of the transition required additional time and effort. Participants 4, 5, 7, 15 and 17 indicated that resistance to change from manual to digital systems affected the adaptation period. This resistance slowed down the process and made it challenging for some users to adjust quickly. Participants 23 and 24 expressed concerns that insufficient time was provided for adaptation, particularly for those who needed more time to grasp the new system. They noted that the system was often implemented soon after training, leaving little room for adjustment. Participant 19 also pointed out that the system's implementation occurred soon after training which did not allow enough time for users to adapt fully, especially for those struggling with the transition.

Time and Support Adequacy

Effective adaptation to e-health platforms requires adequate time and support following training. Transitioning from traditional methods to digital systems can be challenging, mainly when users are accustomed to manual processes. This section summarises responses from 24 individuals regarding whether sufficient time was provided for users to adapt to the e-health platform after training. Participants 1, 2, 12, 18, 19 and 21 observed how they were given sufficient time to adapt to the new technology. They appreciated the time allocated for acclimating to the e-health platform, facilitating a smoother transition. Participants varied in providing time for users to adapt to e-health platforms after training. While many observed how adequate time and continuous training were provided, others experienced challenges due to resistance to change and insufficient adaptation time. The transition from manual to digital records was particularly time-consuming for some, impacting their ability to adapt effectively. Ensuring ample time for adaptation and addressing resistance to change is crucial for a smooth transition to new e-health technologies. Figure 2 is a word cloud of the themes.

Figure 2: Adaptation time provided to users after training on e-health platforms (*ibid.*)

Integrated Discussion of Themes

The findings of this study underscore the centrality of digital competence in driving effective service delivery in Harare's private sector hospitals. While each of the four identified themes improved digital competence, continuous training support, adequate time and support and implementation timing represent a distinct aspect of the digital transformation process. They are closely interrelated and mutually reinforcing.

Improved digital competence emerged as the foundation upon which effective digital health service delivery rests. Participants repeatedly emphasised that higher levels of digital proficiency enable smoother navigation of digital platforms, leading to increased efficiency, accuracy and patient satisfaction. However, this competence does not emerge in isolation for it is cultivated and sustained through continuous training support. As noted by Participants 8 and 12, regular hands-on training significantly enhances users' confidence and ability to utilise digital tools. Participant 8 remarked,

"Without regular training, we forget the new updates or don't use them properly it's like trying to drive a car without ever practicing."

Theme 2 naturally feeds into Theme 3: adequate time and support, as training alone is insufficient if healthcare professionals are not given enough time to assimilate new knowledge or access to technical support when challenges arise. The availability of adequate time to learn and the

presence of supportive supervisors or IT staff greatly enhance the effectiveness of training programmes. This support system reinforces the learning process and strengthens digital competence. Moreover, the timing of implementation was found to influence all the other themes. When digital systems are rolled out without consideration for staff readiness or workload, the benefits of training and support are diminished. Timely implementation, aligned with staff capacity and accompanied by sufficient lead time for preparation, allows the benefits of Themes 2 and 3 to be fully realised.

These interconnected themes align closely with the findings of Venkatesh *et al*. (2023), who emphasise that PEOU and user support are critical for successful technology adoption. Similarly, McGinn *et al*. (2020) highlight that organisational readiness, including training and support structures, plays a pivotal role in enhancing healthcare professionals' willingness and ability to adopt digital solutions.

In summary, this study suggests that improving service delivery through digital technologies requires a holistic approach. Building digital competence is not just about skill acquisition, it also requires continuous support, sufficient time and strategic planning for implementation. Recognising the synergy among these factors can help stakeholders in Zimbabwe's healthcare sector implement more effective digital transformation strategies.

Discussion

The findings of this study highlight the pivotal role of digital proficiency in enhancing service delivery in private sector hospitals in Harare, Zimbabwe. The thematic analysis reveals four key areas influencing the adoption and effective use of digital technologies: improved digital competence, continuous training support, adequate time and support and appropriate implementation timing. Each of these factors significantly impacts the effectiveness and efficiency of healthcare service delivery. These findings align closely with the work of Venkatesh *et al*. (2023), who emphasise that users' digital skills strongly influence their perceived behavioural control and eventual acceptance of digital systems. In the present study, participants who had undergone

training reported greater confidence and autonomy in using digital platforms, echoing Venkatesh *et al.* (*ibid.*)'s assertion that competence enhances PEOE and PU. Similarly, the role of continuous training in maintaining and improving digital competence resonates with McGinn *et al*. (2020), who found that sustained training programmes in healthcare settings lead to improved system utilisation and reduced error rates. However, this study adds a contextual dimension by identifying implementation timing and time allocation as critical factors that are often under-emphasised in broader studies. This local insight underscores the importance of context-specific implementation strategies in resource-constrained settings such as Zimbabwe.

By clearly mapping these themes to prior literature while highlighting unique contextual contributions, this study not only validates existing models, but also extends the understanding of digital adoption in the specific socio-economic landscape of Harare's private healthcare sector. The results indicate that increased digital competence among healthcare professionals leads to more effective utilisation of digital health platforms. Participants acknowledged that training enhances their ability to navigate digital tools, ultimately improving operational efficiency, reducing supervision needs and minimising errors. These findings align with previous studies, such as Venkatesh *et al*. (2023) which emphasise that digital skills positively influence the PEOU and PU of healthcare technologies. Moreover, as McGinn *et al*. (2020) assert, structured training programmes significantly improve the adoption of telemedicine and other digital healthcare tools. Further, digital competence allows healthcare providers to perform administrative and clinical tasks more efficiently.

Participants noted that after receiving training, they could navigate EHR systems with greater ease, significantly reducing the time required for patient data entry and retrieval. This aligns with findings by Johnson (2021), who observe how digital proficiency among healthcare workers enhances workflow efficiency and minimises administrative bottlenecks. Digital tools also reduce dependency on manual record-keeping which is prone to errors and inefficiencies. Participants also noted that digital skills enabled them to correctly input and retrieve medical records, reducing cases of misplaced files and misdiagnosed

conditions. Research by Zhao *et al*. (2023) support this finding, showing that EHR adoption reduces prescription errors and enhances diagnostic accuracy when users have adequate digital literacy. Additionally, AI-based decision-support systems require a level of digital competence to interpret recommendations effectively and integrate them into patient care (Liu *et al*., 2023).

Healthcare workers with strong digital competencies demonstrate greater confidence in adopting new healthcare technologies. Participants indicated that digital training reduced anxiety about using new systems, allowing them to integrate technology into their daily workflow seamlessly. The Technology Acceptance Model supports this, suggesting that digital literacy enhances both PEOU and PU, key factors in technology adoption (Venkatesh *et al*., 2023). Moreover, the study by McGinn *et al*. (2020) found that telemedicine adoption rates are high among healthcare workers who receive structured training in digital health platforms.

The study reveals that ongoing training and support play a crucial role in ensuring healthcare professionals effectively transition to digital platforms. Participants observed how continuous training enabled them to gradually develop competence and confidence in using digital systems. However, some participants highlighted that resistance to change and the demanding process of converting manual records to digital formats slowed the adaptation process. These findings align with the TAM, which suggests that PU and PEOU technology adoption (Agarwal and Prasad, 2019). The results also support Yang *et al*. (2021), who found that healthcare professionals' willingness to engage with telemedicine platforms increased when they received sustained training and support.

The transition from manual to digital healthcare systems requires sufficient time for adaptation. While some participants reported receiving adequate time for training and adjustment, others felt that the rapid implementation of digital tools hindered their ability to adapt effectively. This challenge is well-documented in previous research, where successful digital adoption is often linked to phased implementation and ongoing mentorship (Liu *et al*., 2020). Stoumpos *et*

al. (2023) argue that without sufficient time for skill acquisition and reinforcement, digital transformation efforts in healthcare risk being underutilised or resisted by staff.

Conclusion and Recommendations

Conclusions drawn from the study results confirm that there is a positive correlation between digital skills/knowledge and service delivery in the healthcare sector in private sector hospitals in Harare Metropolitan Province, Zimbabwe. Digital skills or knowledge have significant effect on service delivery of private healthcare practitioners. Improving digital competence, providing continuous training support and allowing adequate time for adaptation can significantly enhance service delivery by healthcare practitioners. The recommendation proffered by the study are that the Government of Zimbabwe, through the Ministry Health and Child Care, should take greater initiative on supporting private healthcare practitioners with resources and technological infrastructure which is necessary for the availability of quality service and adopt the Digital Proficiency Model developed as a beacon to achieve National Development Strategy 1 (NDS1) goals, the UN Sustainable Development Goal 3 (SGG3) and Vision 2030 target roadmap.

The study recommends that providers should prioritise investments in robust digital infrastructure, including telemedicine platforms, EHR systems and AI technologies, to ensure ubiquity and reliability in service delivery. This enhances patient access and the overall effectiveness of care. There is need to establish continuous professional development programmes to ensure that healthcare workers are proficient in the latest digital tools and technologies. This maximises the potential of digital solutions and improve service delivery outcomes.

In addition, continuous monitoring and evaluation of digital tools' effectiveness should be conducted to assess their impact on service delivery. Feedback from healthcare professionals and patients should be used to refine and adapt technologies for better performance. It is recommended that continuous professional development programmes to ensure that healthcare workers are proficient in the latest digital tools

and technologies be established. This maximises the potential of digital solutions and improves service delivery outcomes.

Future research should delve deeper into the factors influencing healthcare professionals' and patients' acceptance and use of digital health technologies. This includes studying barriers such as resistance to technology, concerns about privacy, the perceived usability of digital tools and the trust patients place in AI and telemedicine. A focus on user-centred design could inform the development of more intuitive and widely accepted healthcare technologies.

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