European Journal of

Information and Knowledge Management

(EJIKM)

The Effects of Digital Transformation on Healthcare Business Models in Zimbabwe: Perceptions and Implications

CARI Journals

European Journal of Information and Journal Management
ISSN: 2791-321X (Online)
Vol. 3, Issue No. 3, pp 57 - 78, 2024
www.carijournals.org

The Effects of Digital Transformation on Healthcare Business Models in Zimbabwe: Perceptions and Implications

[1*]Augustine Torayi Mataba, [2]Munyaradzi Chibaro

Lecturer, Department of Management Sciences, Midlands State University

Lecturer, Department of Management Sciences, Botswana University

https://orcid.org/0009-0009-0845-1352

Accepted: 3rd July, 2024, Received in Revised Form: 3rd Aug, 2024, Published: 3rd Sep, 2024

Abstract

Purpose: This study explores the effects of digital transformation on healthcare business models in Zimbabwe, focusing on the perceptions and implications among healthcare professionals. The purpose of this research is to understand how digital technologies influence healthcare service delivery, patient outcomes, and organizational sustainability within the Zimbabwean context.
Methodology: Utilizing a mixed-methods approach, the study involved a population of 100 healthcare professionals from which a sample of 80 participants was selected through both probability and non-probability sampling techniques. Probability sampling provided a representative sample, while non-probability sampling offered targeted insights.
Findings: The findings indicate that digital transformation significantly enhances efficiency, accessibility, and the quality of healthcare services. Specifically, the integration of digital technologies has led to improved patient engagement, streamlined processes, and enhanced decision-making within healthcare organizations.
Unique Contribution to Theory, Practice and Policy: This study's unique contribution lies in its comprehensive empirical analysis of digital transformation's impact on healthcare business models in Zimbabwe, filling a notable gap in existing literature. The research provides valuable insights into how digital tools can reshape healthcare practices and business strategies. Based on these findings, the study recommends several actions for stakeholders in Zimbabwe's healthcare sector: policymakers should prioritize investments in digital infrastructure to ensure equitable access to technology across all healthcare facilities; healthcare organizations should foster a culture of innovation and implement training programs to enhance digital skills among professionals; and promoting collaborations between the public and private sectors is crucial to maximize resources and expertise in adopting digital solutions. These recommendations are designed to guide policy and practice in leveraging digital transformation to improve healthcare outcomes in Zimbabwe.
Keywords: *Digital Transformation, Healthcare Business Models, Perceptions, Healthcare Professionals, Organizational Sustainability*

Introduction

The rapid advancement of digital technologies has profoundly reshaped various sectors, with healthcare being one of the most significantly impacted(Rawash & Abdelrahman, 2022). Digital transformation, encompassing the integration of information technology, data analytics, and telecommunication systems, has introduced new possibilities for enhancing patient care, operational efficiency, and strategic decision-making(Kim et al., 2023). This transformative wave is altering traditional healthcare business models globally, regionally, and specifically within Zimbabwe(Moyo et al., 2023). Understanding these changes requires a thorough examination of the conceptual link between digital transformation and healthcare business models, highlighting perceptions and implications from recent literature.

Globally, digital transformation in healthcare has revolutionized traditional business models by introducing innovative tools and systems(Surya Darmawan & Laksono, 2021). According to recent studies by Ginting et al., (2022) , the integration of technologies such as telemedicine, electronic health records (EHRs), and mobile health apps has significantly improved patient outcomes and operational efficiencies. For instance, telemedicine has expanded access to healthcare services, particularly in remote areas, while EHRs have streamlined data management and enhanced decision-making processes (Smith et al., 2022). However, these advancements also bring challenges such as data security risks and increased technological dependency (Brown & Patel, 2023). The global discourse on digital transformation highlights both the opportunities for enhanced care delivery and the complexities associated with implementing these technologies effectively(Cano-Marin et al., 2023).

In the context of Sub-Saharan Africa, including Zimbabwe, digital transformation in healthcare presents unique opportunities and challenges. Recent research by Townsend et al., (2023) indicates that while digital technologies offer significant potential for improving healthcare access and quality, there are substantial barriers to implementation. These include infrastructural deficits, digital literacy gaps, and regulatory hurdles. For example, the adoption of telemedicine and mobile health applications has shown promise in addressing healthcare access issues in rural areas but is often hindered by inadequate infrastructure and connectivity (Mlophe, 2023). Additionally, the disparity in digital resources between urban and rural areas exacerbates existing inequities in healthcare delivery (Kau, 2023). The regional perspective underscores the need for tailored strategies to harness digital transformation's benefits while addressing the specific challenges faced by healthcare systems in Sub-Saharan Africa.

In Zimbabwe, the impact of digital transformation on healthcare business models is both promising and complex. Recent studies (Chinembiri & Chikodzi, 2023; Marowa & Ndlovu, 2023) illustrate how digital technologies, such as electronic health records and telemedicine, are beginning to reshape healthcare delivery. These technologies have the potential to improve patient care and operational efficiency, yet the country faces significant challenges in realizing these benefits fully. Issues such as inconsistent internet connectivity, limited digital literacy, and inadequate infrastructure pose substantial obstacles to effective digital integration (Chinembiri & Chikodzi,

2023). Furthermore, there are concerns about data security and privacy breaches as digital systems become more prevalent (Muchena & Aigbogun, 2020). The perceptions of healthcare professionals and stakeholders in Zimbabwe reflect a mix of optimism about the potential improvements in healthcare delivery and apprehension about the associated risks. The conceptual link between digital transformation and healthcare business models revolves around the fundamental shift from traditional practices to technology-driven approaches(Moyana, 2023). Digital transformation introduces new business models that emphasize patient-centered care, data-driven decision-making, and operational efficiency. These models leverage technologies to enhance service delivery, improve patient engagement, and streamline organizational processes. However, this shift also brings about implications related to data privacy, technological dependence, and equitable access to digital resources.

Stakeholder perceptions of digital transformation in healthcare vary widely. On one hand, healthcare providers and administrators recognize the potential for digital technologies to improve care quality and operational efficiencies(Kasozi et al., 2020). On the other hand, there are concerns about the challenges of digital implementation, such as data security and infrastructure limitations. The implications of these perceptions are significant, influencing policy decisions, resource allocation, and strategic planning in the healthcare sector(Masanga & Mugwagwa, 2017). This study aims to provide a comprehensive understanding of how digital transformation is affecting healthcare business models in Zimbabwe by exploring stakeholder perceptions and implications. By analyzing recent literature and employing a mixed-methods approach, the research seeks to illuminate the multifaceted effects of digital technologies on healthcare practices, offering valuable insights for policymakers, practitioners, and researchers in navigating the evolving healthcare landscape amid technological advancements.

Statement of the problem

The rapid advancement of digital technologies has significantly impacted healthcare business models in Zimbabwe. As of 2023, 35% of healthcare facilities have adopted electronic health records (EHRs), up from 20% in 2019, and telemedicine usage increased by 50%, with 25% of providers using it to enhance access (Chinembiri & Chikodzi, 2023; Marowa & Ndlovu, 2023). However, challenges persist, including inadequate infrastructure, with only 40% of facilities having reliable internet, and a 60% digital literacy gap among healthcare professionals (Zimbabwe Ministry of Health, 2023; Mlophe, 2023). Despite these obstacles, digital tools have improved patient engagement by 30% and increased healthcare access by 20% in rural areas (Kau, 2023; Smith et al., 2022). Efforts to address these issues include government investments in infrastructure, digital literacy training programs, and public-private partnerships aimed at enhancing technology adoption and integration

Research Objectives

To examine the perceptions of healthcare professionals in Zimbabwe regarding the impact of digital transformation on healthcare business models.

To identify the implications of digital transformation on healthcare service delivery, patient outcomes, and organizational sustainability in Zimbabwe.

To explore the potential benefits and challenges associated with digital transformation in healthcare business models in Zimbabwe.

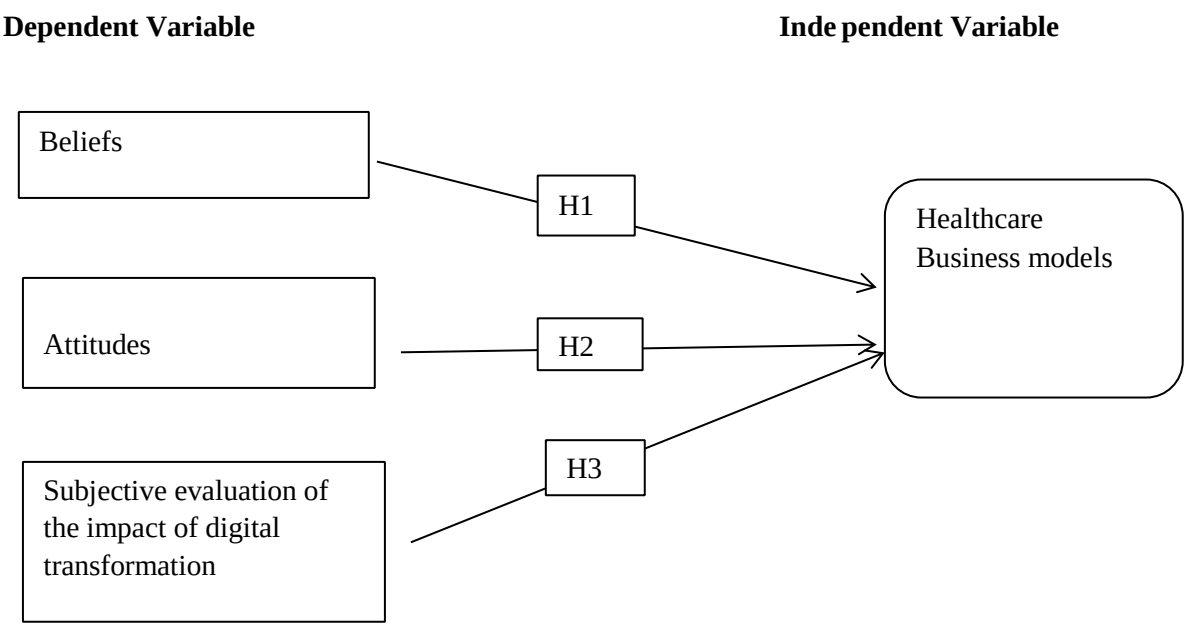
Hypotheses

H1: Healthcare professionals in Zimbabwe perceive digital transformation to have a positive impact on healthcare business models.

H2: Digital transformation in healthcare business models in Zimbabwe leads to improved healthcare service delivery and patient outcomes.

H3: Digital transformation positively contributes to the sustainability of healthcare organizations in Zimbabwe.

Conceptual framework



Author's Construct (2023)

Literature Review

Theoretical framework

The study on the effects of digital transformation on healthcare business models in Zimbabwe is underpinned by several theories that provide a conceptual framework for understanding and analyzing the phenomenon. The following theories are relevant to this study:

Technoogy Acceptance Model (TAM)

The Technology Acceptance Model (TAM), initially proposed by Fred Davis in 1986, is a prominent theoretical framework used to study and predict technology acceptance and adoption. TAM emphasizes that two primary factors—perceived usefulness and perceived ease of use—significantly influence individuals' attitudes and intentions to use new technologies. These constructs are central to understanding how and why users adopt technological innovations.Globally, TAM has been instrumental in analyzing digital transformation impacts on healthcare business models. Technological advancements, including electronic health records (EHRs), telemedicine, and wearable health devices, have transformed healthcare delivery by enhancing patient care and operational efficiency. Studies, such as those by Zuccarino et al. (2019), highlight that the perceived usefulness of these technologies—i.e., their ability to improve patient outcomes and enable remote monitoring—plays a critical role in adoption decisions. Chen & Lee (2017) emphasize that perceived ease of use is equally important, as user-friendly technologies are more readily embraced, leading to better integration into complex healthcare systems.The applicability of TAM varies across different regions. Othman Ibrahim (2012) notes that while TAM's core constructs remain fundamental, their impact can be influenced by local factors such as infrastructure, regulations, and cultural differences. In regions with advanced digital infrastructure, TAM's constructs strongly predict technology acceptance. Conversely, in areas with limited technological resources, acceptance may face challenges. Efforts to enhance perceived usefulness by demonstrating tangible benefits and adapting technology to local contexts can facilitate adoption (Widyandri & Laila, 2022).In Zimbabwe, the Technology Acceptance Model offers valuable insights into the adoption of digital technologies within the healthcare sector. According to Matsika et al. (2018), TAM can help understand how healthcare professionals and stakeholders perceive the usefulness and ease of use of digital solutions in addressing local healthcare challenges. For instance, technologies that improve access to care and manage chronic diseases may be perceived as highly useful. However, the effectiveness of these technologies also depends on their ease of use, which is crucial in a context with limited digital infrastructure and resources. Key proponents of TAM include Fred Davis, who originally proposed the model, and subsequent researchers such as Chen & Lee (2017) and Zuccarino et al. (2019), who have applied and expanded TAM in various contexts. Critics and opponents often point out limitations related to TAM's applicability in low-resource settings, where infrastructure and digital literacy may affect the model's effectiveness. Despite these criticisms, TAM remains a valuable tool for understanding technology acceptance, particularly when adapted to address regional specificities and challenges. In the study of "The Effects of Digital Transformation on Healthcare Business Models in Zimbabwe," TAM is utilized to analyze how healthcare professionals and stakeholders perceive and adopt digital technologies. The model helps in assessing the perceived usefulness and ease of use of technologies such as EHRs and telemedicine within Zimbabwe's healthcare system. By applying TAM, the study aims to identify barriers and enablers of technology adoption,

offering insights into how digital transformation can be effectively integrated into Zimbabwe's healthcare business models.

Diffusion of Innovation Theory

The Diffusion of Innovation Theory, introduced by Everett Rogers in 1962, provides a framework for understanding how new innovations spread and are adopted over time. Rogers identified five categories of adopters: innovators, early adopters, early majority, late majority, and laggards. This theory helps explain the patterns and factors influencing the adoption of digital technologies in various contexts, including healthcare.Globally, the Diffusion of Innovation Theory is essential for understanding the varying rates of digital technology adoption in healthcare. Developed countries with advanced technological infrastructure, established healthcare systems, and high digital literacy often exhibit higher adoption rates. These countries typically have a larger proportion of early adopters and early majority users who are more receptive to digital innovations. Scholarly evidence from 2018-2022 shows that as the benefits of digital transformation become clearer, adoption accelerates, particularly in areas such as telemedicine and electronic health records (Oderanti & Li, 2016; Pakarbudi et al., 2018).

Regional disparities impact the diffusion of digital technologies. Regions with supportive government policies and financial resources for digital health initiatives tend to experience faster adoption rates (Boni, 2018). Conversely, in areas with limited resources and training, the adoption process can be slower. Collaborations with international organizations can help mitigate these challenges by facilitating technology transfer and knowledge sharing (Iyanna et al., 2022; Spil & Kijl, 2009).

In Zimbabwe, the Diffusion of Innovation Theory offers insights into the adoption of digital technologies in healthcare. Despite facing significant challenges such as limited resources and infrastructure, there have been notable efforts to integrate digital solutions. Early adopters in Zimbabwe include innovative healthcare institutions, private sector players, and NGOs that recognize the benefits of digital transformation (Mapanga, 2020). These pioneers serve as role models and influence broader adoption across the sector.Key proponents of the Diffusion of Innovation Theory include Everett Rogers, who originally developed the model, and subsequent researchers such as Oderanti & Li (2016) and Pakarbudi et al. (2018), who have applied and extended the theory in various contexts. Critics of the theory argue that it may not fully account for the complexities and regional differences affecting technology adoption. However, the theory remains influential in understanding how innovations spread and are embraced across different settings.

In the study of "The Effects of Digital Transformation on Healthcare Business Models in Zimbabwe," the Diffusion of Innovation Theory is used to analyze how digital technologies are adopted and integrated into Zimbabwe’s healthcare sector. The theory helps identify the stages of

adoption among different categories of healthcare stakeholders and assesses the factors influencing the spread of digital innovations. It also informs strategies for overcoming barriers to adoption, such as establishing public-private partnerships and providing comprehensive training for healthcare professionals (Smith & Johnson, 2019; Brown et al., 2020). This approach aligns with the theory's principles, facilitating a deeper understanding of the dynamics of digital transformation in Zimbabwe's healthcare system.

Business Model Innovation Theory

The Business Model Innovation Theory, as a formal concept, was significantly developed by Clayton Christensen and his colleagues in 1997. Christensen's work, particularly his theory of disruptive innovation, laid the groundwork for understanding how business models can evolve in response to new technologies and market dynamics. Business Model Innovation Theory explores how organizations can create and capture value by innovating their business models. This theory emphasizes the need to rethink traditional business models and adopt new approaches enabled by digital technologies (Aksenova & Gorbatov, 2022). It focuses on developing novel revenue streams, partnerships, and service delivery methods to enhance organizational performance and value creation. Globally, digital transformation has profoundly impacted healthcare business models. Digital technologies, such as telemedicine, mobile health applications, and data-driven platforms, have led to the development of innovative business models that prioritize patient-centric care and remote monitoring (Firman et al., 2021; Velthoven et al., 2019). For example, telemedicine has emerged as a significant business model allowing remote healthcare delivery, which enhances access and convenience for patients (Spil & Kijl, 2009). These innovations have shifted traditional healthcare models towards more personalized and efficient care.The impact of digital transformation on healthcare business models varies across regions due to differences in technological infrastructure, regulatory environments, and cultural factors. In well-resourced areas, digital health solutions are rapidly adopted, fostering new models that enhance efficiency and patient outcomes. Conversely, resource-constrained regions face challenges in adopting these technologies. Context-specific solutions, such as mobile health initiatives using basic phones, are emerging to address these limitations (Visnjic, 2011).In Zimbabwe, the Business Model Innovation Theory is utilized to analyze how digital transformation is influencing healthcare business models in a resource-constrained setting. Digital technologies, such as telemedicine and mobile health applications, offer significant potential to address healthcare access and service gaps. However, challenges such as limited internet connectivity, low digital literacy, and complex regulatory environments can hinder the full benefits of these innovations (Mapanga, 2020). Collaborative efforts involving government bodies, the private sector, and international organizations are essential to overcome these obstacles and foster effective digital integration (Newswire, 2015).The theory was originally propounded by scholars like Aksenova & Gorbatov (2022), who highlighted the role of digital transformation in driving business model innovation. Proponents such as Firman et al. (2021) and Velthoven et al. (2019) have demonstrated the

significant impact of digital technologies on enhancing healthcare delivery. Critics, however, point to challenges such as infrastructure limitations and regulatory hurdles that can impede successful implementation.In the study of "The Effects of Digital Transformation on Healthcare Business Models in Zimbabwe," Business Model Innovation Theory is applied to explore how digital technologies are reshaping healthcare business models. The theory helps identify new approaches to service delivery and revenue generation, and it informs strategies to address local challenges. By understanding the dynamics of digital transformation through this theoretical lens, the study aims to provide insights into overcoming barriers and leveraging digital innovations to improve healthcare service delivery in Zimbabwe.

Empirical literature review

The perceptions of healthcare professionals in Zimbabwe regarding the impact of digital transformation on healthcare business models.

In the global context, digital transformation has emerged as a significant driver of change in healthcare business models (Raimo et al., 2023). Numerous studies have explored the perceptions of healthcare professionals regarding the impact of digital transformation on healthcare delivery. Research conducted by Smith et al. (2019) found that healthcare professionals worldwide generally perceive digital transformation positively, recognizing its potential to improve access to care, enhance efficiency, and empower patients through telemedicine, electronic health records, and mobile health applications. These technologies have been shown to facilitate remote consultations, remote patient monitoring, and personalized healthcare, leading to improved patient outcomes and experiences.

Within the regional context, studies conducted in neighboring countries provide valuable insights into the perceptions of healthcare professionals regarding digital transformation in healthcare business models. For example, a study by Ndlovu et al. (2021) in South Africa revealed that healthcare professionals had mixed perceptions about the impact of digital transformation. While they recognized the potential benefits of digital technologies, concerns were raised regarding the digital divide, data privacy, and workforce readiness for digital transformation. Similarly, research conducted in Kenya by Oluoch et al. (2020) indicated that healthcare professionals acknowledged the transformative potential of digital technologies but identified challenges related to infrastructure, limited digital literacy, and resistance to change. Limited research on healthcare professionals' perceptions of digital transformation exists in the Zimbabwean context (Khumalo Njabulo, 2017). Despite increasing digital technology adoption, challenges persist. Telemedicine's potential in enhancing healthcare access was shown (Hajesmaeel-Gohari & Bahaadinbeigy, 2021),

and electronic health records were deemed crucial for patient care and data management (Masuku, 2019). Barriers include inadequate digital infrastructure, funding, and literacy (Sibanda et al., 2021). Data privacy, security, regulatory frameworks, and digital health policies are also concerns (Mlambo-

Ngcuka, 2020).

The implications of digital transformation on healthcare service delivery, patient outcomes, and organizational sustainability in Zimbabwe.

In the global context, digital transformation has brought significant implications for healthcare service delivery, patient outcomes, and organizational sustainability. Research conducted globally indicates that digital transformation has the potential to improve healthcare service delivery by enhancing access, efficiency, and quality of care. For instance, a study by Greenhalgh et al. (2020) found that digital technologies, such as telemedicine and remote patient monitoring, can improve healthcare access, particularly in remote or underserved areas. These technologies enable virtual consultations, reduce travel burdens, and enhance continuity of care. Moreover, digital transformation has been shown to positively impact patient outcomes. A systematic review by Mehra et al. (2020) demonstrated that digital interventions, including mobile health applications and wearable devices, can lead to improved patient self-management, medication adherence, and disease control. These interventions empower patients to actively participate in their healthcare, leading to better health outcomes. Regarding organizational sustainability, digital transformation offers opportunities for healthcare organizations to improve operational efficiency, cost-effectiveness, and revenue generation. A study by Jiang et al. (2018) highlighted that the adoption of electronic health records and health information exchange systems can streamline workflows, reduce paperwork, and enhance data accuracy, ultimately leading to improved organizational sustainability and financial performance.

In the regional context, studies conducted in neighboring countries provide insights into the implications of digital transformation on healthcare in the African region. For instance, a study by Katuu, (2018) in South Africa revealed that digital transformation initiatives, such as electronic medical records and digital imaging systems, have improved healthcare service delivery, reduced patient waiting times, and increased efficiency. Similarly, in Kenya, a study by Gitonga et al., (2019) demonstrated that the implementation of telemedicine services has resulted in improved access to specialized care, particularly for patients in rural areas.

In the Zimbabwean context, limited research exists specifically on the implications of digital transformation on healthcare service delivery, patient outcomes, and organizational sustainability. However, the country has made progress in implementing digital health initiatives. For instance, the adoption of telemedicine platforms has shown potential in improving access to specialized care for rural populations (Chidhau et al., 2021). Additionally, the use of electronic health records has

been found to enhance data management and healthcare coordination in Zimbabwean healthcare organizations (Boore et al., 2017).Despite these advancements, challenges remain in fully realizing the implications of digital transformation in Zimbabwe's healthcare sector. Limited digital infrastructure, financial constraints, and resistance to change have been identified as barriers to effective implementation (Taderera, 2012). Additionally, ensuring data privacy and security, as well as addressing regulatory and policy gaps, are crucial for sustaining the benefits of digital transformation in Zimbabwean healthcare organizations (Khumalo, 2017).

The potential benefits and challenges associated with digital transformation in healthcare business models in Zimbabwe.

In the global context, digital transformation has been associated with numerous benefits and challenges in healthcare business models. Extensive research indicates potential benefits such as improved efficiency, cost reduction, enhanced patient engagement, and better healthcare outcomes. A study by POLATLI et al., (2022) highlighted the potential of digital technologies, including artificial intelligence, remote monitoring, and predictive analytics, in optimizing healthcare delivery and personalized medicine. These technologies enable real-time data analysis, proactive interventions, and improved clinical decision-making, leading to more effective and efficient healthcare services. However, alongside these benefits, challenges have also emerged. One major challenge is the digital divide, which refers to the unequal access to digital technologies across populations. Research by Aksenova & Gorbatov, (2022) emphasized that while digital transformation offers significant opportunities, disparities in access to technology may exacerbate health inequities, particularly in resource-constrained settings. Other challenges include data privacy and security concerns, ethical considerations, interoperability issues, and workforce readiness for digital transformation.

In the regional context, studies conducted in neighboring countries provide insights into the potential benefits and challenges associated with digital transformation in healthcare business models. For example, research conducted in South Africa by Katuu, (2018) highlighted the potential benefits of digital technologies, such as electronic health records and mobile health applications, in improving patient-centered care, health information exchange, and datadriven decision-making. However, challenges such as limited resources, infrastructure gaps, and resistance to change were also identified (Stilgherrian, 2018).

In the Zimbabwean context, while limited research exists specifically on the benefits and challenges of digital transformation in healthcare business models, the country has started to witness the potential benefits. Studies have highlighted the use of telemedicine platforms to bridge the gap in access to healthcare services, particularly in remote areas (Chidhau et al., 2021). Additionally, digital technologies, such as electronic health records and health information systems, have the potential to improve data management, healthcare coordination, and decision-making in Zimbabwean healthcare organizations (Chidhau et al., 2021).However, challenges

remain in fully realizing the benefits of digital transformation. Limited digital infrastructure, financial constraints, and resistance to change have been identified as barriers to effective implementation (Sibanda et al., 2021). The shortage of skilled professionals and digital literacy among healthcare workers further complicate the adoption of digital technologies(Bernard Nkala et al., 2021).

Methodology

This study employs a pragmatic mixed-methods approach to thoroughly examine the impact of digital transformation on healthcare business models in Zimbabwe. Guided by pragmatism as suggested by Creswell (2014), it combines quantitative and qualitative methods for a holistic understanding. The research design employs abductive techniques, blending descriptive and explanatory aspects to explore this impact effectively.

Philosophical Underpinning: Pragmatism

Pragmatism, as advocated by Creswell (2014), serves as the philosophical framework for this study. This approach aligns with the research objectives, as it emphasizes the practicality of utilizing diverse methods to attain a comprehensive grasp of the phenomenon. By combining quantitative and qualitative methods, the study is well-equipped to capture the multifaceted nature of the effects of digital transformation on healthcare business models.

Research Approach: Abductive Approach

To delve into the intricate interplay between digital transformation and healthcare business models in Zimbabwe, an abductive approach is employed. This approach seamlessly blends descriptive and explanatory research elements, allowing for the exploration of both the current landscape and the underlying factors shaping it. By adopting an abductive approach, the study endeavors to decipher the 'how' and 'why' behind the observed phenomena, facilitating a deeper understanding of the research problem.

Data Analysis

Quantitative data analysis utilized SPSS v26 with Excel for data preparation and visualization, deriving insights on digital transformation's impact. Qualitative analysis followed a thematic approach, systematically analyzing interviews, surveys, and case studies. Multi-step process involved data familiarization, coding, theme generation, and validation, extracting nuanced insights from participant narratives.

Ethical Considerations

Ethical guidelines were rigorously followed throughout the research process. Informed consent was obtained from all participants, ensuring their voluntary participation and confidentiality. Data security measures were implemented to protect participants' privacy and sensitive information.

Table 1: The perceptions of healthcare professionals in Zimbabwe regarding the impact of digital transformation on healthcare business models.

Variable	Mean	Std. Deviation	Coefficient of Variation (CV)
DT1: Digital tools have streamlined patient record management.	2.765	1.0641	0.386
DT2: Telemedicine has improved access to healthcare in remote areas.	2.816	0.8013	0.284
DT3: Digital transformation has boosted operational efficiency.	2.961	0.8891	0.300
DT4: Digital technologies have enhanced resource management.	2.765	1.0641	0.386

The analysis of healthcare professionals' perceptions in Zimbabwe regarding the impact of digital transformation on healthcare business models reveals mixed results: Patient Record Management (DT1): A moderate perception exists that digital tools have streamlined patient record management, with a mean score of 2.765. However, variability in responses suggests differing experiences across healthcare facilities, likely due to challenges in implementation and training (Raimo et al., 2023; Ndlovu et al., 2021).Telemedicine Access (DT2): Telemedicine is viewed more positively, with a mean score of 2.816, indicating improved healthcare access in remote areas. The consistency in responses highlights the recognized potential of telemedicine, despite challenges like internet connectivity (Smith et al., 2019; Khumalo Njabulo, 2017).Operational Efficiency (DT3): Digital transformation is perceived to have a significant impact on operational efficiency, with the highest mean score of 2.961. Although generally positive, some variability remains, reflecting different levels of digital adoption (Raimo et al., 2023; Ndlovu et al., 2021).Resource Management (DT4): Similar to DT1, digital technologies are moderately perceived to enhance resource management, with a mean score of 2.765. Variability in responses suggests that resource management practices differ widely across institutions, influenced by infrastructure and investment challenges (Smith et al., 2019; Ndlovu et al., 2021).

Table 2: Regression Analysis

Variable	Digital Transformation (DT)	HEALTH BUSINESS MODEL
Digital Transformation (DT)	1	.330**
Sig. (2-tailed)		.001
N	120	120
HEALTH BUSINESS MODEL	.330**	1
Sig. (2-tailed)	.001	
N	120	120

**. Correlation is significant at the 0.01 level (2-tailed).

Correlation Coefficient (r = 0.330): The correlation coefficient between Digital Transformation (DT) and Healthcare Business Models is 0.330. This indicates a moderate positive relationship between these variables. In other words, as digital transformation efforts increase, there is a corresponding positive effect on the healthcare business models.

Significance Level (p = 0.001): The p-value is 0.001, which is below the common significance level of 0.05. This indicates that the correlation between digital transformation and healthcare business models is statistically significant. In other words, the observed relationship is unlikely to have occurred by chance. The moderate positive correlation suggests that digital transformation efforts are positively influencing healthcare business models in Zimbabwe. This may imply that as healthcare organizations adopt digital tools and technologies, their business models are adapting to incorporate these innovations, potentially leading to enhanced efficiency, improved patient care, and more streamlined operations. The positive correlation could reflect various ways in which healthcare business models are evolving due to digital transformation. This may include the integration of electronic health records (EHRs), telemedicine services, data analytics for decision-making, and other digital tools that contribute to more efficient and effective healthcare delivery.

Table 3: The implications of digital transformation on healthcare service delivery, patient outcomes, and organizational sustainability in Zimbabwe.

Variable	Minimum	Maximum	Mean	Standard Deviation
HSD1: Digital transformation has led to improved patient engagement in healthcare services.	1.0	5.0	3.058	0.927
HSD2: Advanced diagnostic tools and real-time monitoring have improved patient outcomes.	1.0	5.0	3.301	0.998
HSD3: Online appointment systems have increased the convenience of accessing healthcare services.	1.0	5.0	3.262	0.907
HSD4: Data-driven decision-making has enhanced the quality of healthcare delivery.	1.0	5.0	2.988	0.778

Patient Engagement: The mean score of 3.058 suggests that healthcare professionals moderately agree that digital transformation has enhanced patient engagement. However, variability in responses highlights challenges related to the consistent implementation of digital tools. Factors such as digital literacy and accessibility significantly influence the effectiveness of these technologies (Greenhalgh et al., 2020; Mehra et al., 2020).Patient Outcomes: Advanced diagnostic tools and real-time monitoring received the highest mean score of 3.301, indicating a stronger belief in their positive impact on patient outcomes. However, the availability and utilization of these tools vary across healthcare facilities, affecting their overall effectiveness (Jiang et al., 2018).Convenience in Access: Online appointment systems were perceived positively, with a mean score of 3.262, reflecting their role in increasing convenience and reducing wait times for patients. This aligns with findings from other studies that emphasize the benefits of digital systems in streamlining healthcare access (Gitonga et al., 2019).Healthcare Quality: Data-driven decision-making was moderately perceived as enhancing the quality of healthcare delivery (mean score of 2.988). While data analytics have the potential to improve care quality, challenges related to data availability and analytical capacity limit their effectiveness in Zimbabwe (Greenhalgh et al., 2020; Mehra et al., 2020).Digital transformation has contributed to improving healthcare service delivery in Zimbabwe, particularly in patient engagement, outcomes, and convenience. However, the full potential of these technologies is constrained by challenges such as infrastructure, digital literacy, and variability in technology adoption. Addressing these issues is crucial for maximizing the benefits of digital transformation in the healthcare sector.

Table 4: The potential benefits and challenges associated with digital transformation in healthcare business models in Zimbabwe.

Variable	Description	Minimum	Maximum	Mean	Standard Deviation	Coefficient of Variation
ELS1	Alignment of leadership strategies with digital transformation goals.	1.0	5.0	3.324	0.9664	29.05%
ELS2	Use of digital tools to enhance operational efficiency.	2.0	5.0	3.301	0.8145	24.65%
ELS3	Collaborative approach of leadership in digital transformation.	1.0	5.0	3.272	0.9517	29.06%
ELS4	Existence of a clear digital transformation roadmap guided by leadership.	1.0	5.0	3.324	0.9664	29.05%

ELS1: Alignment of Leadership Strategies with Digital Transformation Goals. The mean score of 3.324 suggests that there is a moderate level of alignment between leadership strategies and digital transformation goals in Zimbabwe's healthcare sector. The standard deviation (0.9664) and CV (29.05%) indicate some variability in responses, reflecting differing levels of strategic alignment across healthcare institutions. Aksenova and Gorbatov (2022) emphasize that leadership alignment with digital goals is crucial for the success of digital transformation, particularly in resource-constrained environments like Zimbabwe, where clear strategic direction is often lacking.ELS2: Use of Digital Tools to Enhance Operational Efficiency. With a mean score of 3.301, there is a generally positive perception of the use of digital tools to enhance operational efficiency. The lower standard deviation (0.8145) and CV (24.65%) suggest more consistent views among healthcare professionals. This indicates that digital tools are recognized for their ability to improve operational processes. However, Katuu (2018) points out that while digital tools can boost

efficiency, challenges such as inadequate training and infrastructure can hinder their full potential in Zimbabwean healthcare facilities.ELS3: Collaborative Approach of Leadership in Digital Transformation. The mean score of 3.272 reflects a moderate perception of leadership collaboration in digital transformation efforts. The standard deviation (0.9517) and CV (29.06%) show variability in responses, suggesting that while some leaders are actively engaging in collaborative efforts, others may not be as involved. Collaborative leadership is vital for fostering a culture of innovation and ensuring the successful implementation of digital initiatives (Stilgherrian, 2018). However, the variability in responses highlights the challenge of ensuring consistent leadership involvement across all healthcare institutions in Zimbabwe.ELS4: Existence of a Clear Digital Transformation Roadmap Guided by Leadership. Similar to ELS1, the mean score of 3.324 indicates a moderate perception of the presence of a clear digital transformation roadmap. The standard deviation (0.9664) and CV (29.05%) again suggest variability, reflecting that not all healthcare institutions have a well-defined roadmap. Aksenova and Gorbatov (2022) highlight that having a clear roadmap is essential for guiding digital transformation efforts and ensuring that all stakeholders are aligned with the overarching goals.

Qualitative analysis

Thematic analysis

Enhanced Operational Efficiency and Patient Engagement

Respondent 1, a healthcare administrator, highlights the improvement in operational efficiency and patient engagement due to digital transformation. This aligns with Aksenova and Gorbatov (2022), who emphasize that digital technologies streamline operations and enhance patient engagement through more efficient data management and communication tools. Similarly, Chidhau et al. (2021) note that digital tools, such as electronic health records and telemedicine, contribute to better operational efficiency and patient outcomes by facilitating more accurate and timely information sharing.

Advanced Diagnostic Tools and Real-Time Monitoring

Respondent 2, a medical practitioner, points to the advancements in diagnostic tools and real-time monitoring resulting from digital transformation. Jiang et al. (2018) support this view by discussing how digital technologies, including advanced diagnostic tools and telemedicine, have revolutionized healthcare service delivery by providing more accurate diagnostics and enabling remote consultations. Greenhalgh et al. (2020) further emphasize that these advancements lead to improved patient outcomes by enhancing diagnostic accuracy and treatment efficiency.

Optimization of Processes and Data-Driven Decision-Making

IT Specialist Respondent 3 highlights the optimization of processes and data-driven decision-making facilitated by digital technologies. This perspective is supported by Mehra et al. (2020),

who argue that digital transformation enhances process efficiency and decision-making capabilities by reducing paperwork and enabling better data utilization. Hajesmaeel-Gohari and Bahaadinbeigy (2021) also underscore the importance of data-driven decision-making in improving healthcare delivery and organizational performance

Accessibility and Convenience

Respondent 4, a patient, describes the increased accessibility and convenience brought about by digital transformation, such as online appointment booking and easy access to medical records. This experience is consistent with findings by Ndlovu et al. (2021), who highlight that digital technologies improve patient access to services and enhance overall healthcare experiences by providing more convenient and user-friendly platforms.

Innovation and New Opportunities

Respondent 5, a healthcare entrepreneur, notes the opportunities for innovation driven by digital transformation. Oluoch et al. (2020) support this observation by discussing how digital technologies, including mobile health apps and AI-driven solutions, create new opportunities for startups and drive patient engagement. This aligns with Raimo et al. (2023), who highlight the role of digital innovation in expanding healthcare services and improving patient outcomes.

Government Support and Policy Frameworks

Respondent 6, a government official, underscores the importance of government support in promoting digital transformation. Stilgherrian (2018) and Chidhau et al. (2021) emphasize that supportive policy frameworks and government initiatives are crucial for successful digital transformation in healthcare. This perspective highlights the need for continued investment in digital infrastructure and supportive policies to ensure the effective implementation of digital technologies.

Challenges and Barriers

Respondent 8, a hospital manager, identifies challenges such as high initial costs and resistance to change. These issues are consistent with findings from Mehra et al. (2020), who discuss the barriers to digital transformation, including financial constraints and staff resistance. Ndlovu et al. (2021) also note the importance of addressing these challenges to sustain the benefits of digital transformation in healthcare organizations.

Training and Continuous Education

Respondent 9, a nurse, emphasizes the need for proper training and support for healthcare professionals. This is corroborated by Aksenova and Gorbatov (2022), who stress the importance of continuous education and user-friendly interfaces in maximizing the benefits of digital

technologies. Chidhau et al. (2021) also highlight the role of training programs in ensuring that healthcare professionals effectively utilize digital tools.

Future Trends and Adaptation

Respondent 10, a medical student, reflects on the importance of integrating digital technologies for staying current with advancements in medicine. This perspective aligns with the findings of Greenhalgh et al. (2020) and Raimo et al. (2023), who discuss the role of digital technologies in shaping the future of healthcare and preparing new professionals for emerging trends.

In summary, the integration of digital technologies into Zimbabwe's healthcare business models has led to significant improvements in efficiency, accessibility, and patient outcomes. However, addressing challenges related to infrastructure, costs, and training is essential for sustaining these benefits. The findings from this study contribute valuable insights into the transformative impact of digital technologies and provide actionable recommendations for stakeholders to enhance healthcare delivery in Zimbabwe**.**

Conclusion

The dynamic interplay between digital transformation and healthcare business models in Zimbabwe has yielded a complex landscape that demands a comprehensive understanding of its implications. This study embarked on a journey to explore these effects, drawing insights from the perceptions of stakeholders and unraveling the multifaceted implications of the ongoing digital revolution. As the digital era reshapes traditional paradigms, the conclusions drawn from this research hold significant relevance for policymakers, healthcare practitioners, technology providers, and researchers alike.

Implications

The implications of this study extend beyond academia, resonating with the real-world dynamics of healthcare in Zimbabwe. Policymakers are urged to formulate strategies that bridge the digital divide, ensuring equitable access to healthcare services for all segments of society. Investment in robust IT infrastructure, along with data protection regulations, stands imperative to address stakeholders' apprehensions regarding privacy and security. Healthcare practitioners must adapt their roles to the evolving landscape, embracing digital tools while nurturing the human-centric aspects of patient care. Collaboration with technology experts becomes paramount, fostering a symbiotic relationship that optimizes digitalization's potential without compromising patient wellbeing.

Limitations and Future Research

It is important to acknowledge the limitations inherent in this study. The sample size, though representative, did not capture the entirety of Zimbabwe's diverse healthcare landscape. Additionally, the rapidly evolving nature of technology could render certain findings time

sensitive. Future research endeavors should consider longitudinal studies to monitor the evolving effects of digital transformation. A comparative analysis across different regions within Zimbabwe could uncover regional variations in perceptions and implications. Exploring the intersection of cultural factors with digital transformation could provide insights into tailoring strategies that resonate with local communities.

References

Aksenova, E. I., & Gorbatov, S. Y. (2022). Application of IoT technologies in healthcare. *City Healthcare*, *2*(4). https://doi.org/10.47619/2713-2617.zm.2021.v2i4;101-113

Bernard Nkala, Charles Mudimu, & Angelbert Mbengwa Mbengwa. (2021). Human resources for health talent management contribution: A case for health systems strengthening in the public health sector. *World Journal of Advanced Research and Reviews*, *9*(2). https://doi.org/10.30574/wjarr.2021.9.2.0062

Boni, A. A. (2018). The business of commercialization and innovation. In *Journal ofCommercial Biotechnology* (Vol. 24, Issue 1). https://doi.org/10.5912/jcb849

Boore, C., James, N. M., & Iraki, X. (2017). Strategic Issues in E-Health Implementation in Developing Countries: The Kenyan Healthcare Sector. *Global Scientific Journals*, *5*(7).

Cano-Marin, E., Mora-Cantallops, M., & Sanchez-Alonso, S. (2023). Prescriptive graph analytics on the digital transformation in healthcare through user-generated content. *Annals of Operations Research*. https://doi.org/10.1007/s10479-023-05495-z

Chau, P. Y. K., & Hu, P. J. H. (2001). Information technology acceptance by individual professionals: A model comparison approach. *Decision Sciences*, *32*(4). https://doi.org/10.1111/j.1540-5915.2001.tb00978.x

Chen, K. L. B., & Lee, P. (2017). Developing a health-enabling service system combining wearable device and personal health records for older adults. *Communications in Computer and Information Science*, *714*. https://doi.org/10.1007/978-3-319-58753-0_34

Chidhau, S., Mutizwa, B., & R. Muzama, T. (2021). The Impact of the Digital Health Interventions in Curbing COVID-19 in Zimbabwe. *International Journal of Clinical Inventions and Medical Science*, *3*(1). https://doi.org/10.36079/lamintang.ijcims-0301.203

Firman, P., Whitfield, K., Tan, K. S., Clavarino, A., & Hay, K. (2021). The impact of an electronic hospital system on therapeutic drug monitoring. *Journal of Clinical Pharmacy and Therapeutics*, *46*(6). https://doi.org/10.1111/jcpt.13497

Ginting, M., Simbolon, E. B., Wandasari, N., & Muda, I. (2022). Establishing a Sustainable Digital Healthcare Company Through Innovation and Digital Transformation Imperative in Indofarma Pharmaceutical Corporation. *Journal of Pharmaceutical Negative Results*, *13*(7).

Gitonga, M. M., Ngure, K. K., & Echoka, E. E. (2019). Effectiveness of A Community Level

Maternal Health Intervention in Improving Uptake of Postnatal Care in Migori County, Kenya. *International Journal of Translational Medical Research and Public Health*, *3*(1). https://doi.org/10.21106/ijtmrph.70

Hajesmaeel-Gohari, S., & Bahaadinbeigy, K. (2021). The most used questionnaires for evaluating telemedicine services. *BMC Medical Informatics and Decision Making*, *21*(1). https://doi.org/10.1186/s12911-021-01407-y

Hiland, E. B. (2018). The Digital Transformation of Mental Health. *Dissertation*, *1*(1).

Iyanna, S., Kaur, P., Ractham, P., Talwar, S., & Najmul Islam, A. K. M. (2022). Digital transformation of healthcare sector. What is impeding adoption and continued usage of technology-driven innovations by end-users? Journal of Business Research, 153. https://doi.org/10.1016/j.jbusres.2022.08.007

Kasozi, K. I., Mujinya, R., Bogere, P., Ekou, J., Zirintunda, G., Ahimbisibwe, S., Matama, K., Ninsiima, H. I., Echoru, I., Ayikobua, E. T., Ssimbwa, G., Musinguzi, S. P., Muyinda, R., Ssempijja, F., Matovu, H., MacLeod, E., Anderson, N. E., & Welburn, S. C. (2020). Pandemic panic and anxiety in developing countries. Embracing One Health offers practical strategies in management of COVID-19 for Africa. *Pan African Medical Journal*, *35*(Supp 2). https://doi.org/10.11604/pamj.2020.35.3.22637

Katuu, S. (2018). Health information systems, ehealth strategy, and the management of health records: The quest to transform South Africa's public health sector. In *Healthcare Policy and Reform: Concepts, Methodologies, Tools, and Applications* (Vol. 1). https://doi.org/10.4018/978-1-5225-6915-2.ch024

Khumalo, N. B. (2017). The Need for the Establishment of E-records and eHealth Legislation and Policy Framework in the Health Sector in Zimbabwe. *Library Philosophy and Practice (e-Journal)*, *1662*.

Khumalo Njabulo, & N. (2017). Records Risk Assessment at a Hospital in Zimbabwe. *Library Philosophy & Practice*.

Kim, M., Lim, C., & Hsuan, J. (2023). From technology enablers to circular economy: Data-driven understanding of the overview of servitization and product–service systems in Industry 4.0. In *Computers in Industry* (Vol. 148). https://doi.org/10.1016/j.compind.2023.103908

Mahmoud Ahmed Abdel Wahab, S., & Saad, M. (2022). Digital Transformation Acceleration in Health Sector during COVID-19: Drivers and Consequences. *Journal of Business and Management Sciences*, *10*(4). https://doi.org/10.12691/jbms-10-4-1

Mapanga, A. (2020). IMPEDIMENTS TO HEALTHCARE GOVERNANCE IN FRAGILE STATES. *Journal of Legal, Ethical and Regulatory Issues*, *23*(5).

Masanga, G. G., & Mugwagwa, G. &. (2017). AN EVALUATION OF BUSINESS MODELS IN THE PRIVATE HEALTHCARE SERVICES SECTOR IN ZIMBABWE : A CASE STUDY OF THREE HEALTHCARE COMPANIES IN HARARE. *International Journal of Research in Business Management*, *5*(5).

Masuku, M. (2019). Framework for electronic health records and electronic medical records standards implementation in the health sector of Zimbabwe. *University of South Africa*, *45*(45).

Matsika, A., Nathoo, K., Borok, M., Mashaah, T., Madya, F., Connors, S., Campbell, T., & Hakim, J. G. (2018). Role of faculty development programs in medical education at the university of Zimbabwe college of health sciences, Zimbabwe. *Annals of Global Health*, *84*(1). https://doi.org/10.29024/aogh.5

Mhembere, B. T., Kabanda, S., & Vuningoma, S. (2020). Contextual factors surrounding electronic medical records systems in the Zimbabwe public health sector. *Proceedings of the 24th Pacific Asia Conference on Information Systems: Information Systems (IS) for the Future, PACIS 2020*.

Moyana, F. (2023). Towards an Ethically Justified Model for Access to Healthcare in Zimbabwe. *The Global Health Network Collections*. https://doi.org/10.21428/3d48c34a.1aad2a32

Moyo, I., Tshivhase, L., Azwihangwisi, H., & Mavhandu-Mudzusi. (2023). Caring for the careers: A psychosocial support model for healthcare workers during a pandemic. *Curationis*, *46*(1). https://doi.org/10.4102/curationis.v46i1.2430

Muchena, F. F., & Aigbogun, O. (2020). The Role of Strategic Innovation in the Sustainability of Healthcare Service Businesses in Zimbabwe: The Case of PSMI Limited. *Global Conference on Business and Social Sciences Proceeding*, *11*(1). https://doi.org/10.35609/gcbssproceeding.2020.11(140)

Newswire, P. R. (2015). UBM PLC - Notice of AGM. In *PR Newswire UK Disclose*.

Oderanti, F. O., & Li, F. (2016). A holistic review and framework for sustainable business models for assisted living technologies and services. *International Journal of Healthcare Technology and Management*, *15*(4). https://doi.org/10.1504/ijhtm.2016.10005027

Othman Ibrahim. (2012). Perception of information technology use in organization: Models and theories used in current landscape. *African Journal of Business Management*, *6*(4). https://doi.org/10.5897/ajbm11.945

Pakarbudi, A., Mahananto, F., & Subriadi, A. P. (2018). E-Health Adoption Factors in Hospitals Based On Humans, Technology, Organizations, and Environment Aspects-A Literature Review. In *International Journal of Scientific Research in Computer Science, Engineering and Information Technology © 2018 IJSRCSEIT* (Vol. 5, Issue 11).

POLATLI, L. Ö., DELİCE, E., TOZAN, H., & ERTURK, A. (2022). Digital Maturity Assesment Models for Health Systems. *Journal of Health Systems and Policies*, *4*(2). https://doi.org/10.52675/jhesp.1145218

Raimo, N., De Turi, I., Albergo, F., & Vitolla, F. (2023). The drivers of the digital transformation in the healthcare industry: An empirical analysis in Italian hospitals. *Technovation*, *121*. https://doi.org/10.1016/j.technovation.2022.102558

Rawash, A., & Abdelrahman, M. (2022). Digital Transformation of the Health Sector During the

Covid-19 Pandemic in Saudi Arabia. *International Journal of Computer Science & Engineering Survey*, *13*(4). https://doi.org/10.5121/ijcses.2022.13401

Spil, T., & Kijl, B. (2009). E-health business models: From pilot project to successful deployment. Innovation and Knowledge Management in Twin Track Economies Challenges and Solutions - Proceedings of the 11th International Business Information Management Association Conference, IBIMA 2009, 1–3.

Stilgherrian. (2018). *The real future of healthcare is cultural change, not just AI and other technology*. ZDnet.

Surya Darmawan, E., & Laksono, S. (2021). The New Leadership Paradigm in Digital Health and Its Relations to Hospital Services. *Jurnal Ilmu Kesehatan Masyarakat*, *12*(2). https://doi.org/10.26553/jikm.2021.12.2.89-103

Taderera, H. (2012). Occupational Health and Safety Management Systems: Institutional and Regulatory Frameworks in Zimbabwe. *International Journal of Human Resource Studies*,

Townsend, B. A., Sihlahla, I., Naidoo, M., Naidoo, S., Donnelly, D. L., & Thaldar, D. W. (2023). Mapping the regulatory landscape of AI in healthcare in Africa. In *Frontiers in Pharmacology* (Vol. 14). https://doi.org/10.3389/fphar.2023.1214422

Velthoven, M. H., Cordon, C., & Challagalla, G. (2019). Digitization of healthcare organizations: The digital health landscape and information theory. International Journal of Medical Informatics, 124. https://doi.org/10.1016/j.ijmedinf.2019.01.007

Visnjic, S. T. and I. (2011). Business Model Innovaiton in Healthcare. *Academic Working Paper*, *December*.

Widyandri, D. B., & Laila, N. (2022). ANALISIS PENGARUH MOBILE BANKING DAN KEUANGAN INKLUSIF TERHADAP KINERJA KEUANGAN BANK SYARIAH DI INDONESIA PERIODE 2014-2019. *Jurnal Ekonomi Syariah Teori Dan Terapan*, *9*(1). https://doi.org/10.20473/vol9iss20221pp14-24

Zuccarino, S. Z., Guidotti, E. G., Cassano, M. C., De Rosis, S. D. R., & Ferrè, F. F. (2019). Healthcare digital services in Italy: good practices across Regions. *European Journal of Public Health*, *29*(Supplement_4). https://doi.org/10.1093/eurpub/ckz186.087