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FACULTY OF COMMERCE, INNOVATION AND TECHNOLOGY

DEPARTMENT OF IT

TITLE:

**THE STRATEGIC INTEGRATION OF HEALTH INFORMATION SYSTEMS AT
PARIRENYATWA HOSPITAL.**

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This research proposal is submitted to the department of Commerce in partial fulfillment of the requirements of the Masters Degree in Business Management and Information Technology at the Catholic University of Zimbabwe.

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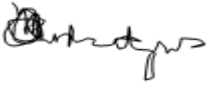
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The undersigned certify that they recommend to the Catholic University of Zimbabwe for the acceptance of this research project. The project was submitted in partial fulfilment of the requirements of the master of Business Management and Information Technology Honors Degree.

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To God be the glory.

ABSTRACT

The integration of Health Information Systems (HIS) has increasingly become a critical requirement for strengthening service delivery, improving administrative coordination, and enhancing evidence-based decision making within modern healthcare institutions. Despite this growing importance, many public hospitals in developing countries continue to experience fragmented digital systems due to infrastructural limitations, institutional constraints, and governance challenges.

This study examined the strategic integration of HIS at Parirenyatwa Hospital to evaluate integration maturity, identify influencing factors, and propose enhancement strategies.

A qualitative-dominant case study design was adopted. Data were collected from executive management, clinicians, ICT personnel, and health information officers using interviews and questionnaires. Thematic analysis guided interpretation.

Results indicate that while multiple HIS platforms exist, integration maturity is limited by fragmented architecture, infrastructure constraints, and organisational readiness gaps. Institutional policy pressures drive adoption but do not ensure interoperability.

The study demonstrates that HIS integration is a socio-technical transformation requiring alignment between technological infrastructure, governance structures, institutional pressures, and human capability.

Enterprise interoperability frameworks, workforce capacity development, and strengthened ICT governance are necessary to achieve sustainable integration.

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CHAPTER 1 - INTRODUCTION

1.0 Introduction

The strategic integration of Health Information Systems (HIS) represents a critical transformation within contemporary healthcare environments, particularly in resource-constrained public-sector contexts where digital systems must simultaneously support clinical operations, administrative efficiency, and public health governance. As healthcare systems increasingly rely on data-driven decision-making, the ability to integrate disparate digital platforms into a cohesive enterprise architecture has emerged as a defining determinant of organisational performance and health system resilience. Within Zimbabwe's evolving digital health landscape, understanding how institutional pressures, technological infrastructure, and organisational capacity intersect to shape HIS integration outcomes is essential. This study therefore investigates the strategic integration of HIS at Parirenyatwa Group of Hospitals as a contextually grounded case through which broader insights into digital transformation within public healthcare institutions can be generated.

Health Information Systems (HIS) have become a fundamental part of modern health systems, supporting clinical service delivery, public health surveillance, health resource management, and evidence-based policymaking. The World Health Organization (WHO, 2020) defines HIS as integrated mechanisms for collecting, processing, analysing, and using health information to guide policy formulation, programme implementation, and research. In an environment characterised by increasing disease burdens, limited public resources, and higher demands for accountability, effective HIS integration is essential for boosting health system performance.

Globally, healthcare systems are transitioning from fragmented, paper-based processes to interoperable digital ecosystems. Integrated HIS enables continuity of care, real-time disease surveillance, coordinated supply-chain management, and timely reporting to national and international stakeholders. High-income countries such as the United Kingdom, Canada, and Singapore have achieved significant efficiencies through interoperable electronic health records (EHRs) and health information exchanges. However, low- and middle-income countries (LMICs) continue to experience challenges related to infrastructure, funding, skills shortages, and governance.

Zimbabwe's health sector reflects many of these realities. Historically, the adoption of information and communication technologies (ICTs) within public institutions has been slow

due to economic constraints, limited infrastructure, and capacity challenges (Ministry of ICT, 2022). Despite this, the Government of Zimbabwe has demonstrated commitment to digital transformation through Vision 2030, the National ICT Policy (2022–2027), and sector-specific eHealth initiatives.

1.1 Background to the study

Within the health sector, several HIS platforms have been implemented, including the District Health Information Software 2 (DHIS2), electronic Pharmaceutical Management System (ePMS), Laboratory Information Management Systems (LIMS), electronic Logistics Management Information Systems (eLMIS), telemedicine platforms, and electronic medical records. A major milestone was the introduction of the national electronic medical record system, Impilo, in 2015. Impilo is a standards-based, interoperable, patient-centred EHR designed to improve service delivery, reduce reliance on paper records, and enhance data-driven decision-making (MoHCC, 2023; Global Fund, 2025).

Despite these advances, evidence indicates that HIS implementation in Zimbabwe remains fragmented, particularly at the facility level (publication_zimbabwe-digital-health_casestudy_en.pdf, August 2025). Systems are often introduced as standalone solutions aligned to specific programmes or donor requirements rather than as components of an integrated national architecture. This fragmentation undermines effective data use for public health management.

Parirenyatwa Hospital is the largest and oldest government-run public hospital in Zimbabwe, serving as the country's primary referral and teaching medical facility. It is located in Harare and forms part of the broader Parirenyatwa Group of Hospitals, which includes specialised units such as Mbuya Nehanda Maternity Home, Sekuru Kaguvi Eye Hospital, and psychiatric services, reflecting its role as a comprehensive health services provider in the country's capital city. (East African Medical Journal Vol. 98 No. 7 July 2021).

The hospital's origins date back to 1890, when it began as a small healthcare facility in what was then Salisbury. Over the decades, it expanded through a series of satellite clinics and specialised units, and by the mid-20th century included multiple hospital branches within the complex. In 1974, the Andrew Fleming Hospital was commissioned as part of the Parirenyatwa Group of Hospitals (Parirenyatwa Group of Hospitals, n.d.). Following Zimbabwe's independence in 1980, the facility was renamed Parirenyatwa Group of Hospitals in honour of

Tichafa Samuel Parirenyatwa, the first black Zimbabwean to qualify as a medical doctor, symbolising both national identity and the transformation of public institutions in the post-colonial era.

Today, Parirenyatwa Hospital operates under the Health Services Act (2004) and has grown into a large, multidisciplinary referral institution with approximately 1,800 beds and over 2,000 staff, providing a broad range of medical, surgical, and specialist services to patients across Zimbabwe. It also serves as a key teaching hospital for the University of Zimbabwe's College of Health Sciences, offering clinical training for medical, nursing, and allied health students, and plays an important role in research and postgraduate education (Parirenyatwa Group of Hospitals, n.d.).

Parirenyatwa Hospital, Zimbabwe's largest public referral and teaching hospital, exemplifies both the opportunities and challenges of digital health transformation. While the hospital operates multiple HIS platforms, the lack of strategic integration and interoperability limits their collective contribution to public health surveillance, governance, and decision-making. This study, therefore, examines how the strategic integration of HIS at Parirenyatwa Hospital can strengthen public health management within government health institutions in Zimbabwe.

1.2 Statement of the Problem

Despite sustained investments in digital health infrastructure, Zimbabwe's public health sector continues to face inefficiencies in health data management, duplication of reporting processes, delayed decision-making, and limited responsiveness to public health emergencies (Furusa & Coleman, 2018; Global Fund, 2025). While systems such as DHIS2 and Impilo EHR are operational, their strategic integration at the hospital level remains weak.

At Parirenyatwa Hospital, multiple HIS platforms coexist without effective interoperability. This results in fragmented data flows, parallel reporting systems, inconsistent data quality, and underutilisation of information for management and policy purposes. Clinical, laboratory, pharmaceutical, and administrative data are often captured in separate systems that do not communicate seamlessly, increasing the risk of errors and inefficiencies.

Existing studies in Zimbabwe have largely focused on HIS adoption and user acceptance rather than strategic integration and management use (Furusa & Coleman, 2018). There is limited empirical research examining how HIS integration at large government hospitals influences

public health management, governance, and decision-making. This gap limits the development of context-specific strategies for maximising the value of digital health investments.

1.3 Research Objectives

Main Objective

To evaluate the strategic integration of Health Information Systems in strengthening public health management at Parirenyatwa Hospital.

Specific Objectives

- i. To assess the contribution made by Health Information Systems currently deployed at Parirenyatwa Hospital, to public health management.
- ii. To examine technological, organisational, and institutional factors influencing HIS integration.
- iii. To propose strategies for enhancing HIS integration in government health institutions in Zimbabwe.

1.4 Research Questions

In order to achieve the stated objectives, the research sought to address the following questions:

- i. How do existing implementation practices of Health Information Systems at Parirenyatwa Hospital shape the design of a strategic integrated HIS framework?
- ii. How do technological, organisational, and institutional factors influence HIS integration at the hospital?
- iii. How does HIS integration affect decision-making in public health institution management?
- iv. How can an integrated strategic framework be developed to enhance the effective integration of Health Information Systems (HIS) at Parirenyatwa Hospital?

1.5 Significance of the Study

This study is significant at multiple levels, including academic scholarship, public policy formulation, hospital management practice, and researcher development. By examining the strategic integration of Health Information Systems (HIS) within a large public-sector hospital, the study responds to both theoretical and practical gaps in digital health and information systems research in low- and middle-income country contexts such as Zimbabwe.

1.5.1 Academia

From an academic perspective, this study contributes to the growing body of literature on Health Information Systems by shifting the analytical focus from system adoption and user acceptance to strategic integration and management utilisation of HIS within public healthcare institutions. While existing studies in Zimbabwe and similar contexts largely examine barriers to adoption or technical implementation, there is limited empirical research that explores how multiple HIS platforms are strategically integrated to support public health management and decision-making at institutional level. The findings are therefore expected to provide a valuable reference for future research on digital transformation, information systems governance, and public health management in developing countries.

1.5.2 Policymakers and Government Institutions

For policymakers, particularly within the Ministry of Health and Child Care (MoHCC) and related government agencies, the study provides evidence-based insights into how strategic HIS integration can enhance public health governance, surveillance, and resource allocation. By identifying institutional, organisational, and technological barriers to integration at a major referral hospital, the study highlights policy gaps and implementation challenges that may not be visible at national planning level.

The findings can inform the development and refinement of national eHealth strategies, interoperability standards, and digital health governance frameworks, ensuring better alignment between policy intentions and facility-level realities. Additionally, the study offers practical recommendations that can guide the scaling of integrated HIS solutions across other government health institutions, supporting Zimbabwe's broader health system strengthening and digital transformation agenda.

1.5.3 Hospital Management and Health Institutions

At institutional level, the study is significant to Parirenyatwa Hospital management and other public health facilities by providing a structured assessment of how existing HIS platforms

contribute to, or hinder, effective public health management. The findings will assist hospital leadership in understanding the strategic value of integrating clinical, administrative, laboratory, and reporting systems rather than operating them as isolated platforms.

By highlighting governance, workflow, and capacity challenges associated with fragmented HIS implementation, the study can support improved decision-making, data quality management, and accountability within the hospital. The recommendations generated are expected to guide hospital-level strategies for strengthening HIS coordination, improving information flows, and maximising the return on investment in digital health systems, with potential applicability to other referral hospitals in Zimbabwe.

1.5.4 Development Partners and Implementing Agencies

For development partners, donors, and implementing agencies involved in digital health initiatives, the study provides practical insights into how donor-supported HIS interventions interact with institutional structures and national policies. The findings can help development partners better align system design, funding mechanisms, and implementation approaches with existing health system architectures, thereby reducing fragmentation and improving sustainability.

The study also offers evidence on the importance of coordination and interoperability when introducing new digital health solutions, which can inform more harmonised and system-wide approaches to digital health investments in Zimbabwe and comparable contexts.

1.5.5 Researcher and Future Practitioners

For the researcher, this study provides an opportunity to apply theoretical knowledge in business management and information technology to a real-world public-sector health context. It enhances the researcher's analytical, methodological, and practical skills in areas such as case study research, qualitative data analysis, digital health governance, and strategic information systems management.

Furthermore, the study contributes to the researcher's professional development by generating practical knowledge and competencies relevant to careers in health informatics, public-sector ICT management, digital transformation, and policy advisory roles. The insights gained may also serve as a foundation for future postgraduate research or professional practice in the field of health information systems and public health management.

The study contributes academically by shifting focus from HIS adoption to strategic integration and management use within a public-sector hospital context. Practically, the findings will inform hospital management, policymakers within the Ministry of Health and Child Care (MoHCC), and development partners on how to strengthen digital health governance and data-driven decision-making. The study also supports Zimbabwe's broader digital transformation and health system strengthening agenda.

1.6 Scope and Delimitations of the Study

1.6.1 Scope of the Study

The scope of this study encompasses an in-depth examination of the strategic integration of Health Information Systems (HIS) at Parirenyatwa Hospital, Zimbabwe's largest government referral and teaching hospital. The study focuses on how existing digital health platforms such as electronic medical records, routine health information systems, laboratory and pharmaceutical information systems, and administrative reporting tools are strategically aligned and integrated to support public health management, governance, and decision-making.

The study covers the period 2020 to 2025, a timeframe marked by significant digital health reforms in Zimbabwe, including the scaling of DHIS2, the rollout of the Impilo electronic medical record system, and increased emphasis on digital health governance following the COVID-19 pandemic. Within this period, the study examines organisational structures, leadership practices, data governance arrangements, interoperability efforts, and institutional influences affecting HIS integration.

The scope further includes perspectives from hospital management, departmental heads, health information officers, ICT personnel, clinicians, and selected officials from the Ministry of Health and Child Care (MoHCC) who are directly involved in the implementation, management, and use of HIS. By adopting a qualitative case study approach, the research seeks to generate rich, context-specific insights that inform strategic improvements in public health information management within government health institutions.

1.6.2 Delimitations of the Study

This study is deliberately delimited in several ways to ensure focus, feasibility, and alignment with the MBMIT programme orientation.

Firstly, the study is delimited to a single institution, Parirenyatwa Hospital, rather than multiple hospitals or a nationwide comparative analysis. This allows for in-depth exploration of strategic and organisational dynamics but does not attempt to measure national HIS performance.

Secondly, the study concentrates on strategic, organisational, and institutional aspects of HIS integration rather than on detailed technical system design, software engineering, or system performance testing. The emphasis is on how HIS are managed, governed, and utilised to support public health management, consistent with a business management and information technology perspective.

Thirdly, the study focuses on internal stakeholders involved in HIS implementation and use, excluding patient and community perspectives. While patient outcomes are important, the study prioritises management-level and system-level insights relevant to governance and decision-making.

Fourthly, the research is delimited to qualitative and descriptive methods, including interviews, document review, surveys, and system observation, and does not employ experimental designs or advanced quantitative modelling.

Finally, the study does not seek to evaluate the clinical effectiveness of individual health interventions or disease-specific programmes, but rather examines how integrated information systems support public health planning, monitoring, and management across the institution.

1.7 Limitations of the study and mitigation

1.7.1 Single Case Study Focus

The study is limited to Parirenyatwa Hospital as a single case, which allows for in-depth analysis but may limit the generalisability of findings to other government health institutions. To mitigate this, analytical generalisation will be enhanced through rich contextual description and explicit linkage of findings to established theoretical frameworks, namely the Technology–Organization–Environment (TOE) framework and Institutional Theory enabling the findings to be conceptually transferable to other large government health institutions with similar organisational and policy contexts.

1.7.2 Restricted Access to Institutional Data

Limited access to certain strategic documents and system reports may constrain a comprehensive assessment of HIS governance and integration processes. Limited access to certain strategic documents or system reports will be mitigated through methodological triangulation, combining document review with in-depth interviews, surveys, and system observation. Where direct documentation is unavailable, insights from multiple stakeholders will be used to corroborate institutional practices and decision-making processes.

1.7.3 Reliance on Self-Reported Data

Data collected through interviews and surveys may be subject to respondent bias, as participants may provide socially desirable or cautious responses. To reduce the impact of respondent bias, the study will ensure anonymity and confidentiality for all participants, encouraging honest and open responses. In addition, data will be collected from diverse stakeholder groups (management, clinicians, ICT staff, and health information officers) to cross-validate perspectives and reduce reliance on any single viewpoint.

1.7.4 Time and Resource Constraints

The limited timeframe and resources associated with postgraduate research may restrict the sample size and depth of longitudinal analysis. The mitigants for these will include a clearly defined research scope, focused sampling and structured data collection schedule which will prioritise information rich documents and participants to maximise data quality.

1.7.5 Evolving Digital Health Environment

Ongoing changes in digital health policies and systems may affect the long-term applicability of the study's findings. To mitigate this, findings will be within the 2020 – 2025 policy and implementation context and recommendations will be framed as flexible and adaptive to allow for adjustments and technologies and policies evolve.

By applying triangulation, ethical safeguards, theoretical grounding, and focused methodological design, the study minimises the impact of its limitations and ensures that the findings remain credible, relevant, and valuable to both academic and practical audiences.

1.8 Summary

The introductory chapter establishes the foundation for the study by examining the growing importance of Health Information Systems (HIS) integration in improving healthcare delivery, data governance, and decision-making in public health institutions. Zimbabwe's digital health transformation initiatives, including the implementation of DHIS2 and electronic medical records, are discussed to provide national context. Despite these developments, fragmentation of information systems remains a challenge in many healthcare facilities. Parirenyatwa Hospital, Zimbabwe's largest referral hospital, therefore serves as the focal case for examining how strategic integration of HIS can strengthen public health management. The chapter outlines the research problem, objectives, research questions, significance of the study, scope, limitations, and dissertation structure.

CHAPTER 2 - LITERATURE REVIEW

2.1 Introduction to Key Concepts

Health Information Systems (HIS) integration at Parirenyatwa Hospital centres on the unification of fragmented digital and paper-based systems into a coherent, interoperable platform that supports clinical care, administration, and public health reporting. Key concepts include interoperability, data standardization, and system alignment across departments such as patient registration, laboratory services, pharmacy, radiology, finance, and human resources. Effective integration enables seamless data flow, reduces duplication, improves data accuracy, and supports timely clinical decision-making. At Parirenyatwa Hospital, Zimbabwe's largest tertiary referral institution, HIS integration is particularly critical due to high patient volumes, complex referral pathways, and the need to coordinate care across multiple specialties and external health programs.

Another central concept is governance and strategic alignment, where HIS integration is guided by institutional leadership, national eHealth policies, and resource realities within the public health sector. This includes addressing challenges such as limited infrastructure, skills gaps, system incompatibility, and resistance to change, while ensuring data security, patient confidentiality, and system sustainability. When strategically implemented, integrated HIS strengthens hospital management by enhancing performance monitoring, resource planning, and reporting to the Ministry of Health and Child Care. Ultimately, HIS integration at Parirenyatwa Hospital is viewed as a transformative tool for improving service efficiency, accountability, and the overall quality of healthcare delivery in Zimbabwe's public health system.

Health systems are defined as activities that primarily promote, restore, and maintain health by considering indirect factors that advocate for improvement. These activities are classified as integrated health services that aim to manage the delivery of health services for the continuation of health promotion, disease prevention, diagnosis, treatment, disease management, rehabilitation, and palliative care services across all levels of care. However, achieving these goals is challenging because of the fragmentation of modern health systems. This is further exacerbated in developing nations owing to the inherent challenges that reduce health system efficacy.

These challenges are caused by a lack of cohesion in digital data derived from health practices, an increase in communicable and non-communicable diseases, a high turnover rate of medical professionals, limitations in health and insurance policies that impede service provision, dispersed health information technology networks, inadequate quality management frameworks, and a limited ability to control population health hazards. Combined, these challenges inevitably contribute to an increase in health expenditure, which prevents accessibility to quality healthcare, which is exacerbated in developing nations. Currently, health systems within developing nations are reactionary, as the system of practice is focused on the clinical manifestation of illness, resulting in root cause mismanagement, which stifles the growth and evolution of the health system. This polarized system of practice carries inherent hazards and substantial expenses, owing to the absence of accurate medical remedies to avert unfavourable consequences stemming from trial-and-error practices.

Health Information Systems are central to effective public health management, providing the informational foundation for surveillance, planning, monitoring, and evaluation (WHO, 2020). Integrated HIS enable health systems to move beyond data collection toward meaningful data use, supporting proactive management approaches (AbouZahr & Boerma, 2005).

Therefore, there is a dire need for a paradigm shift in health systems in developing nations that prioritizes meticulous and anticipatory health outcomes in creating a robust system of practice to alleviate stress on the health system and ultimately advance patient health and well-being. To achieve this, a well-structured Health Information System (HIS) architecture is required for the implementation of a coherent IHS that integrates health practices within a socioeconomic context to achieve universal health coverage.

2.1.1 The Current State

Current progress towards implementing an IHS is slow, and attempts to achieve integrative medicine by combining self-care, traditional complementary medicine with conventional medical practices in Africa and Latin America have not been successful. This is attributed to the granular approach, as the challenge of implementing an IHS is not merely the theoretical integration of health practices but also the notable disparity between technological applications, health practices, and socioeconomic factors. It is imperative to realize that, within the context of developing nations, disparities in the implementation of an IHS are exacerbated due to the lack of healthcare funding, shortage of professionals, rapid population growth, insufficient

diagnostic capacity, political instability, insecurity, and technological limitations. Thus, in developing nations, there is a critical requirement for a practical IHS that seamlessly translates and integrates valid scientific information into a well-structured HIS. This integration is essential to surmount the barriers prevalent within the contextual influence of the environment and establish widely accepted health practices.

2.2 Theoretical Framework

This study integrates the Technology–Organization–Environment (TOE) framework and Institutional Theory. TOE explains technological readiness and organisational capacity, while Institutional Theory explains policy, normative, and mimetic pressures shaping HIS integration (DiMaggio & Powell, 2019). Together, these frameworks provide a robust lens for analysing HIS integration in Zimbabwe’s public health sector.

Figure 1

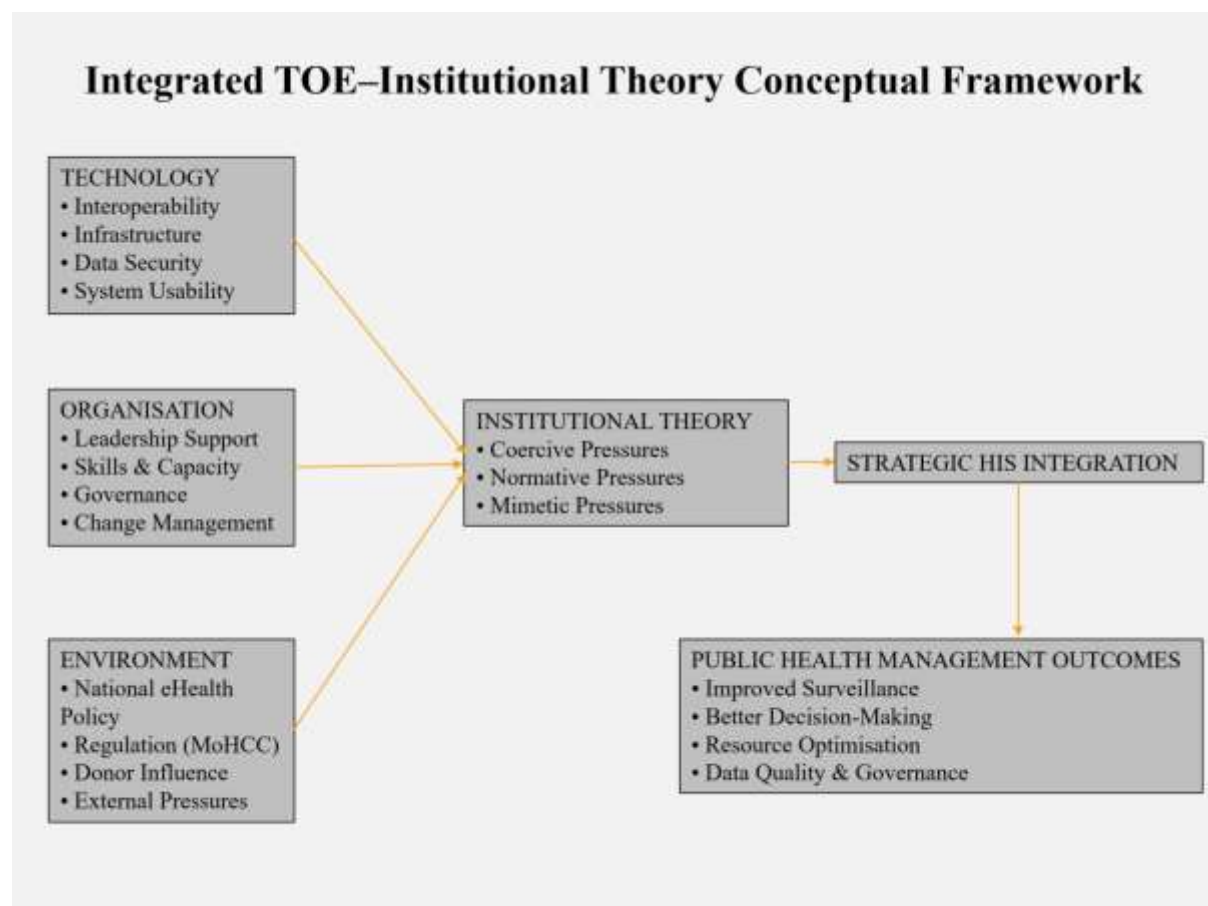


Figure 1 - Theoretical Framework

Figure 1 illustrates the integrated conceptual framework underpinning this study. The Technology–Organization–Environment (TOE) dimensions represent the internal and external contextual factors influencing HIS integration, while Institutional Theory highlights the coercive, normative, and mimetic pressures shaping organisational behaviour. Technological readiness, organisational governance capacity, and environmental policy forces interact to influence the strategic integration of Health Information Systems at Parirenyatwa Hospital, ultimately affecting public health management outcomes such as data quality, decision-making efficiency, and service delivery performance.

This study adopts an integrated conceptual framework that combines the Technology–Organization–Environment (TOE) framework and Institutional Theory to examine the strategic integration of Health Information Systems at Parirenyatwa Hospital. The TOE framework explains how technological readiness (such as interoperability and infrastructure), organisational factors (including leadership support, governance, and skills capacity), and environmental influences (such as national eHealth policy, regulation, and donor pressures) shape HIS integration. Institutional Theory complements this by highlighting coercive, normative, and mimetic pressures that influence organisational behaviour in public-sector health institutions. Together, these frameworks explain how internal capabilities and external institutional forces interact to drive strategic HIS integration, which in turn influences public health management outcomes such as improved surveillance, data quality, decision-making, and resource optimisation.

2.2.1 Expanding on the Technology-Organization-Environment Framework

The Technology–Organization–Environment (TOE) framework, developed by Tornatzky and Fleischer (2017, revised), provides a comprehensive model for understanding the adoption and implementation of technological innovations within institutions. The framework posits that three contextual dimensions — technological, organizational, and environmental; influence how and why organizations adopt new technologies. In the context of integrating Health Information Systems (HIS), the technological dimension refers to both the internal and external technologies available to a healthcare institution. This includes the compatibility of existing systems, perceived relative advantage of integration, system complexity, interoperability standards, cybersecurity infrastructure, and data management capabilities. Successful HIS integration depends heavily on whether current digital platforms; such as electronic medical records (EMRs), laboratory information systems, pharmacy systems, and billing platforms; can

communicate seamlessly. Issues such as system scalability, user-friendliness, and technical support availability also determine the feasibility and sustainability of integration efforts.

The organizational dimension of the TOE framework focuses on the internal characteristics and resources of the institution implementing the technology. In healthcare settings, this includes leadership commitment, organizational culture, staff competencies, financial capacity, size of the institution, and governance structures. Effective HIS integration requires strong executive support, clear strategic alignment with institutional goals, and adequate investment in infrastructure and training. Resistance to change, limited ICT skills among health professionals, and fragmented departmental workflows can significantly hinder integration efforts. Conversely, organizations with structured change management processes, continuous professional development programs, and clearly defined data governance policies are more likely to achieve successful system integration. Therefore, the readiness of the hospital or health institution plays a critical role in determining the pace and effectiveness of HIS implementation.

The environmental dimension encompasses external factors that influence technological adoption, including regulatory requirements, government policies, competitive pressures, technological infrastructure at national level, and partnerships with vendors or donors. In the integration of Health Information Systems, environmental factors may include national e-health strategies, data protection legislation, funding mechanisms, and interoperability standards set by health authorities. In many public health institutions, government mandates and donor-driven digital health initiatives significantly shape the direction and scope of integration projects. Additionally, the availability of reliable internet connectivity, electricity supply, and vendor support ecosystems affects long-term sustainability. The TOE framework thus provides a structured lens for analysing how internal capabilities and external pressures collectively shape the strategic integration of Health Information Systems within healthcare organizations (Tornatzky & Fleischer, 2017).

2.2.2 Expanding on the Institutional Theory Framework

Institutional Theory provides a useful framework for understanding the integration of Health Information Systems (HIS) within healthcare organizations. Rooted in organizational sociology, Institutional Theory submits that organizations are influenced not only by technical efficiency but also by social, cultural, and regulatory pressures within their institutional

environments (Scott, 2014). In the context of HIS integration, hospitals and public health institutions adopt and align information systems in response to formal rules (such as government policies and regulatory requirements), normative expectations (professional standards and ethical obligations), and cultural-cognitive beliefs (shared understandings about modernization and digital transformation). Thus, integration efforts are often shaped as much by the need for legitimacy and compliance as by operational efficiency or technological advancement.

DiMaggio and Powell (2019) identify three mechanisms of institutional isomorphism; coercive, normative, and mimetic; that are particularly relevant to HIS integration. Coercive pressures arise from government mandates, funding requirements, and health sector policies that compel institutions to implement interoperable and standardized systems. Normative pressures stem from professional bodies, accreditation agencies, and healthcare practitioners who advocate for evidence-based practices and data-driven decision-making. Mimetic pressures occur when hospitals model their systems after leading or technologically advanced institutions, especially under conditions of uncertainty. In developing country contexts, these pressures may be intensified by donor requirements, global digital health initiatives, and international reporting standards, which collectively influence how and why HIS integration is pursued.

When Institutional Theory is applied to Health Information Systems integration, it highlights that successful implementation is influenced not only by technological capacity but also by the ability of organisations to align digital initiatives with regulatory requirements, professional norms, and stakeholder expectations. Organisations that respond proactively to institutional pressures by strengthening governance structures, developing staff capabilities, and encouraging a culture that supports digital innovation are more likely to achieve sustainable health information system integration. Furthermore, institutional legitimacy enhances stakeholder trust, facilitates funding opportunities, and strengthens public accountability. Therefore, Institutional Theory offers a comprehensive lens for analysing both the drivers and constraints of HIS integration, emphasizing that technological change in healthcare is deeply embedded within broader social and regulatory systems.

This study combines the Technology–Organisation–Environment (TOE) framework with Institutional Theory to provide a comprehensive analytical basis for examining the organisational, technological, and environmental factors influencing Health Information

Systems integration. The TOE framework informs the identification of key variables examined during data collection, including technological readiness, organizational governance, and environmental policy influences. Institutional Theory complements this by guiding the exploration of coercive, normative, and mimetic pressures affecting HIS integration decisions within Parirenyatwa Hospital. Together, these frameworks shape the research instrument design by structuring interview questions and survey themes around technological capacity, leadership support, regulatory compliance, and professional norms. This theoretical alignment ensures that the study's methodological approach remains grounded in established scholarly frameworks while capturing the contextual realities of HIS integration within Zimbabwe's public health sector.

2.3 Review of Relevant Literature

2.3.1 Business Management Principles

2.3.1.1 Introduction

Within large public hospitals, the integration of Health Information Systems is increasingly viewed as a strategic organisational transformation that extends beyond technical implementation to include leadership coordination, institutional governance, and operational change management. Literature from healthcare management, information systems, and organizational theory consistently highlights that successful HIS integration depends on the application of sound business management principles. In complex institutions such as Parirenyatwa Hospital, where clinical, administrative, and policy environments intersect, these principles provide a framework for aligning technology with organizational goals, managing change, optimizing processes, strengthening governance, and sustaining performance improvement.

2.3.1.2 Strategic Alignment

Research in information systems and healthcare management consistently emphasises that the alignment between organisational strategy and digital technology initiatives plays a crucial role in determining the success of Health Information Systems integration. The Strategic Alignment Model developed by John C. Henderson and N. Venkatraman emphasises the need for coherence between organisational strategy, information technology (IT) strategy, organisational

infrastructure, and technological infrastructure to enhance institutional performance (Henderson & Venkatraman, 2013). In healthcare institutions, effective strategic alignment ensures that digital systems support clinical operations, administrative coordination, and national reporting requirements rather than operating as disconnected technological platforms. Studies have shown that hospitals with strong alignment between IT governance structures and organisational goals are more likely to achieve improved patient outcomes, operational efficiency, and data quality (Tallon, 2010; Luftman, Lyytinen, & Zvi, 2017).

However, the literature also highlights significant challenges in achieving strategic alignment within public health institutions, particularly in low- and middle-income country contexts. While alignment frameworks were initially developed within private-sector environments, scholars argue that public hospitals operate under complex regulatory, political, and resource constraints that reshape alignment processes (Braa, Hanseth, Heywood, Mohammed, & Shaw, 2007). For example, externally funded digital health initiatives may introduce technologies that align with donor priorities rather than institutional strategies, resulting in fragmented systems and limited sustainability. This suggests that alignment in public hospitals must extend beyond internal organisational planning to include national health policies, donor ecosystems, and infrastructural realities.

In addition, recent research emphasises that strategic alignment is not a static achievement but a dynamic and iterative process shaped by institutional pressures and organisational learning (Chan & Reich, 2007). In highly regulated healthcare environments, alignment must balance efficiency goals with compliance obligations, data protection requirements, and professional norms. Within Zimbabwe's public health sector, where national digital health strategies and resource limitations influence technology adoption, HIS integration at Parirenyatwa Hospital requires adaptive alignment mechanisms that evolve alongside policy shifts and technological advancements. Consequently, strategic alignment should be conceptualised not merely as technological integration but as a governance-driven process that synchronises leadership priorities, clinical needs, and external institutional expectations.

In public health institutions, strategic alignment extends beyond internal goals to include national health policies and regulatory frameworks. Literature from low- and middle-income countries (LMICs) indicates that HIS initiatives aligned with national health strategies are more sustainable and scalable. At Parirenyatwa Hospital, HIS integration must therefore align with Zimbabwe's national digital health strategy, hospital service delivery priorities, and public sector accountability requirements. Strategic alignment ensures that HIS supports clinical decision-making, patient flow management, resource utilization, and reporting obligations rather than operating as a fragmented standalone system

2.3.1.3 Change Management and Stakeholder Engagement

Change management is consistently identified in the literature as a central determinant of successful Health Information Systems (HIS) integration, particularly within complex public healthcare environments. Foundational organisational change theories emphasise that technological transformation requires deliberate leadership action, stakeholder engagement, and the institutionalisation of new practices to achieve sustainable outcomes. John P. Kotter argues that effective transformation depends on creating a sense of urgency, building guiding coalitions, and embedding change into organisational culture (Kotter, 1996). In healthcare contexts, these principles are particularly relevant because digital transformation often disrupts established clinical workflows and professional norms.

However, empirical studies indicate that traditional linear models of change management may not fully capture the socio-technical complexity of HIS integration. Research in low- and middle-income countries shows that change initiatives frequently encounter resistance due to staff shortages, limited training resources, and competing service delivery priorities (Heeks, 2002; Braa et al., 2007). While structured change frameworks emphasise communication and leadership alignment, scholars argue that public hospitals operate within institutional environments where professional autonomy and hierarchical governance structures influence adoption behaviour (Greenhalgh et al., 2004). Consequently, HIS implementation challenges are often rooted not in technological limitations but in organisational culture and workforce readiness.

Literature on digital health transformation further suggests that stakeholder engagement must extend beyond consultation to include active participation in system design and workflow redesign. Studies demonstrate that clinician involvement in decision-making processes enhances system acceptance and reduces implementation failure (Cresswell & Sheikh, 2013). Yet, engagement strategies alone may be insufficient if institutional incentives and governance structures do not reinforce behavioural change. This has led some scholars to advocate for adaptive change management approaches that integrate formal governance mechanisms with informal peer influence and professional learning networks.

Within Zimbabwe's public health sector, where resource constraints and regulatory expectations shape organisational behaviour, HIS integration at Parirenyatwa Hospital requires a contextualised approach to change management that balances global best practices with local operational realities. Rather than viewing change as a one-time implementation phase, contemporary literature conceptualises digital transformation as a continuous process of organisational learning and institutional adaptation (Leonardi & Barley, 2010). Therefore, effective change management in this context involves aligning leadership commitment, workforce capacity building, and institutional governance structures to support sustained digital innovation while maintaining service delivery continuity.

2.3.1.4 Process Optimization and Workflow Management

Business management literature emphasizes that technology should support optimized processes rather than automate inefficiencies. Business Process Reengineering (BPR) advocates for the fundamental redesign of workflows to achieve dramatic improvements in performance. In healthcare, Lean Management principles have been increasingly applied to reduce waste, enhance patient flow, and improve service quality prior to HIS implementation. Lean management literature further emphasises eliminating waste and improving workflow efficiency prior to digital system integration (Womack & Jones, 2003).

Studies indicate that hospitals that integrate HIS without reviewing existing processes often embed inefficiencies into digital systems, leading to user frustration

and system underutilization. For Parirenyatwa Hospital, workflow analysis of patient registration, laboratory services, pharmacy management, and billing is critical. Literature suggests that aligning HIS functionality with redesigned workflows improves data quality, reduces duplication, and enhances interdepartmental coordination, thereby maximizing the return on investment in HIS.

2.3.1.5 Governance and Decision-Making Structures

Governance is a fundamental business management principle that defines decision rights, accountability, and oversight mechanisms. IT governance frameworks such as COBIT emphasize aligning IT investments with organizational objectives while managing risks and ensuring value delivery. In healthcare, governance structures that integrate clinical leadership with administrative and technical expertise are associated with more effective HIS implementation.

Public hospitals face additional governance challenges, including bureaucratic decision-making, budget constraints, and regulatory oversight. Literature highlights that weak governance leads to fragmented systems, vendor-driven decisions, and lack of accountability. Establishing a dedicated HIS governance structure at Parirenyatwa Hospital; such as an HIS Steering Committee; can support coordinated decision-making, policy compliance, data security, and sustainability of integrated systems.

IT governance literature further emphasises that clearly defined decision rights and accountability structures enhance alignment between technology investments and organisational objectives, particularly in complex public-sector environments (Weill & Ross, 2004; De Haes & Van Grembergen, 2015).

2.3.1.6 Performance Measurement and Continuous Improvement

Performance measurement is essential for evaluating whether HIS integration achieves its intended objectives. The Balanced Scorecard framework emphasizes the use of financial, operational, customer, and learning indicators to assess organizational performance. In healthcare, performance metrics often include

system usability, data accuracy, patient outcomes, service efficiency, and staff satisfaction.

Literature supports continuous improvement approaches where HIS performance data is routinely analysed to inform corrective actions. Donabedian's structure–process–outcome model provides a useful lens for assessing how HIS infrastructure influences clinical processes and patient outcomes. For Parirenyatwa Hospital, continuous performance monitoring ensures that HIS integration remains responsive to evolving healthcare demands and supports evidence-based decision-making.

2.3.1.7 Summary of Literature and Research Gap

The reviewed literature demonstrates strong consensus that successful HIS integration depends on the application of business management principles rather than technical considerations alone. Strategic alignment, change management, process optimization, governance, and performance measurement emerge as interdependent factors influencing HIS success. However, limited empirical research exists on how these principles are applied in large public hospitals in Zimbabwe. This study therefore seeks to bridge this gap by examining how business management principles can guide the strategic integration of HIS at Parirenyatwa Hospital.

2.3.2 Information Technology Trends

2.3.2.1 Introduction

The rapid evolution of information technology continues to reshape health information systems (HIS) globally, influencing how healthcare institutions manage data, deliver services, and support clinical decision-making. For referral hospitals such as Parirenyatwa Group of Hospitals in Zimbabwe, aligning with contemporary IT trends is essential for strengthening service delivery, improving patient outcomes, and enhancing operational efficiency. This section reviews five current information technology trends relevant to the integration and modernization of health information systems: telemedicine, artificial intelligence and predictive analytics, Internet of Medical Things (IoMT), interoperability and health data exchange, and cybersecurity.

2.3.2.2 Telemedicine and Remote Health Services

Telemedicine has emerged as a transformative component of modern health information systems. Defined as the delivery of healthcare services through digital communication technologies, telemedicine facilitates remote consultations, diagnosis, treatment, and patient monitoring (World Health Organization [WHO], 2021). Globally, the COVID-19 pandemic accelerated telehealth adoption, prompting healthcare institutions to invest in virtual care platforms integrated with electronic health records (EHRs). Research indicates that telemedicine enhances healthcare accessibility, particularly for rural and underserved populations, while reducing congestion in tertiary facilities (Keesara et al., 2020).

Within developing country contexts, telemedicine presents opportunities to address specialist shortages and geographical disparities in service access. Zimbabwe has increasingly recognized telemedicine as a strategic tool for expanding healthcare outreach and improving referral systems. For a national referral institution such as Parirenyatwa Hospital, telemedicine platforms can facilitate specialist consultations across provinces, support clinical mentorship, and strengthen collaboration between central and peripheral facilities.

From a systems integration perspective, telemedicine requires seamless interoperability with existing hospital information systems, secure data transmission protocols, and reliable ICT infrastructure. Its effectiveness depends on integrating patient data from virtual consultations into centralized databases, thereby ensuring continuity of care. Consequently, telemedicine represents both a technological advancement and a structural reform in the management of health information systems at Parirenyatwa Hospital.

2.3.2.3 Artificial Intelligence and Predictive Analytics

Artificial Intelligence (AI) and predictive analytics are increasingly embedded within health information systems to enhance clinical and administrative decision-making. AI applications in healthcare include medical imaging analysis, disease risk prediction, automated triage systems, and resource optimization

(Jiang et al., 2017). Predictive analytics enables healthcare institutions to analyse large datasets and identify patterns that inform proactive interventions, thereby improving patient outcomes and operational efficiency.

In resource-constrained health systems, AI offers the potential to bridge diagnostic and planning gaps by supporting evidence-based decision-making. For Parirenyatwa Hospital, which manages high patient volumes and complex referrals, AI-driven tools could assist in patient risk stratification, bed management forecasting, and outbreak prediction. Such capabilities are particularly relevant in strengthening public health surveillance and hospital preparedness.

However, effective implementation depends on the availability of high-quality digitized data, skilled personnel, and robust ICT infrastructure. Literature emphasizes that AI integration must be accompanied by governance frameworks addressing ethical considerations, algorithmic bias, and data protection (Topol, 2019). Therefore, AI represents both an opportunity and a strategic challenge for advancing health information systems in Zimbabwe's tertiary healthcare sector.

2.3.2.4 Internet of Medical Things (IoMT) and Wearable Technologies

The Internet of Medical Things (IoMT) refers to interconnected medical devices and wearable technologies that collect and transmit real-time patient data into centralized information systems. IoMT devices include smart monitors, glucose sensors, wearable ECG devices, and connected infusion pumps. These technologies support continuous monitoring and facilitate timely clinical interventions (Islam et al., 2015).

Globally, IoMT adoption has improved chronic disease management and post-discharge monitoring by enabling remote tracking of patient health indicators. For Parirenyatwa Hospital, integrating IoMT devices into its health information system could enhance critical care monitoring, reduce hospital readmissions, and strengthen follow-up care for patients with non-communicable diseases such as hypertension and diabetes.

Nevertheless, IoMT integration demands reliable connectivity, scalable data storage infrastructure, and cybersecurity safeguards. The literature underscores that without appropriate system architecture and interoperability standards, IoMT data may remain fragmented and underutilized (Lee & Lee, 2020). Thus, while IoMT offers significant potential for modernizing patient monitoring at Parirenyatwa Hospital, strategic planning and investment are essential for its sustainable implementation.

2.3.2.5 Interoperability and Health Data Exchange

Interoperability is widely regarded as a foundational requirement for effective health information systems. It refers to the ability of different digital systems and software applications to exchange, interpret, and use shared data coherently (HIMSS, 2022). Interoperable systems reduce duplication of services, enhance care coordination, and improve data accuracy across departments and institutions.

In many developing health systems, fragmented information platforms hinder efficient service delivery. Zimbabwe utilizes national health data platforms such as DHIS2 for reporting and surveillance, reflecting efforts toward integrated health information management. For Parirenyatwa Hospital, achieving interoperability between laboratory systems, pharmacy databases, radiology systems, and patient records is critical to enhancing workflow efficiency and ensuring comprehensive patient profiles.

Literature suggests that interoperability also facilitates broader innovations such as telemedicine and AI, which rely on accessible and standardized datasets (Adler-Milstein & Jha, 2017). Therefore, strengthening interoperability at Parirenyatwa Hospital is central to achieving strategic integration of health information systems and improving institutional performance.

2.3.2.6 Cybersecurity and Data Privacy

As health information systems become increasingly digitized, cybersecurity has emerged as a major priority. Healthcare institutions are prime targets for cyberattacks due to the sensitivity and value of patient data (Kruse et al., 2017).

Common threats include ransomware, phishing attacks, and unauthorized access to electronic health records.

For Parirenyatwa Hospital, expanding digital systems such as telemedicine platforms and interconnected databases heightens the need for robust cybersecurity frameworks. Effective measures include encryption protocols, multi-factor authentication, staff training, and regular system audits. Inadequate cybersecurity can undermine patient trust, disrupt operations, and compromise clinical decision-making.

The literature emphasizes that cybersecurity is not merely a technical issue but a governance concern requiring institutional policy development and compliance mechanisms. Therefore, integrating strong data protection strategies into the hospital's health information system modernization process is essential for sustainable digital transformation.

Collectively, these emerging information technology trends reinforce the need for strong governance structures, strategic alignment, and institutional readiness as highlighted in the preceding literature. The integration of telemedicine, artificial intelligence, interoperability frameworks, and cybersecurity measures therefore underscores the importance of aligning technological innovation with organisational and environmental capabilities within Parirenyatwa Hospital.

2.4 Gap in the Literature

Despite the recognized importance of Health Information Systems (HIS) integration in strengthening healthcare delivery, there is limited empirical research specifically examining HIS integration at Parirenyatwa Hospital. National frameworks such as Zimbabwe's National Health Strategy emphasize digital transformation and improved health information management; however, these policy documents provide broad strategic direction without offering institution-specific analysis of integration processes within tertiary hospitals (Ministry of Health and Child Care [MoHCC], 2021). Existing literature largely addresses national HIS reforms or district-level data systems, leaving a significant contextual gap regarding how integration is operationalized within Zimbabwe's largest referral hospital. Consequently, there

is insufficient scholarly understanding of how national HIS objectives translate into institutional practice at Parirenyatwa Hospital.

Additionally, available studies on digital health initiatives in Zimbabwe tend to focus on system adoption rather than system integration. Research often evaluates the implementation of electronic medical records (EMRs), laboratory systems, or mobile health (mHealth) interventions as isolated innovations (World Health Organization [WHO], 2016). While such studies provide insight into technological uptake, they rarely assess interoperability between systems, data harmonization, or cross-departmental information exchange. HIS integration requires seamless coordination among clinical, administrative, financial, and diagnostic systems; yet, the literature does not adequately examine whether these subsystems function cohesively within Parirenyatwa Hospital. This narrow focus on adoption rather than interoperability represents a critical gap in understanding integrated digital ecosystems.

Furthermore, the socio-technical dimensions of HIS integration remain underexplored in the context of Parirenyatwa Hospital. The success or failure of integrated systems is strongly influenced by organizational culture, governance structures, user competencies, and change management practices (Heeks, 2002). However, there is limited empirical evidence investigating how healthcare professionals at Parirenyatwa perceive and interact with integrated digital systems, or how leadership structures facilitate or hinder integration efforts. The absence of localized socio-technical analysis limits understanding of design-reality gaps that may emerge when imported technological models are implemented in resource-constrained public hospital settings.

Another significant gap concerns evaluation and performance measurement. Existing literature provides minimal assessment of the outcomes of HIS integration in terms of service delivery efficiency, data quality, clinical decision-making, or patient outcomes within Parirenyatwa Hospital. International studies highlight that integrated HIS can improve reporting accuracy, reduce duplication, and enhance patient continuity of care (WHO, 2016). However, there is little empirical evidence demonstrating whether similar benefits have been realized at Parirenyatwa. Without systematic monitoring and evaluation studies, it is difficult to determine the effectiveness, sustainability, and return on investment of HIS integration initiatives at the institution.

Finally, there is a lack of longitudinal and comparative research examining the evolution of HIS integration at Parirenyatwa Hospital over time. Most available discussions are descriptive and cross-sectional, offering limited insight into how integration efforts adapt to infrastructural constraints, funding challenges, or policy reforms. Comparative studies involving other central hospitals in Zimbabwe or tertiary institutions in similar low- and middle-income country contexts are also scarce. This absence of longitudinal and benchmarking research constrains the development of evidence-based strategies tailored to the operational realities of Parirenyatwa Hospital, thereby underscoring the need for comprehensive, context-sensitive research in this area.

2.5 Summary

The literature on the integration of Health Information Systems (HIS) at Parirenyatwa Hospital reflects a broader national effort in Zimbabwe to modernize health information management through digital transformation, while highlighting persistent structural and operational challenges. Studies indicate that Zimbabwe's national HIS framework, including the adoption of DHIS2 and e-health strategies, provides a policy foundation for integration aimed at improving data quality, timeliness, and decision-making. Within Parirenyatwa Hospital, partial digital systems such as Laboratory Information Management Systems (LIMS), Picture Archiving and Communication Systems (PACS), Human Resources Information Management Systems (HRIMS), and emerging Electronic Health Records (EHRs) demonstrate progress toward digitization. Literature suggests that these systems have improved access to patient data, reduced paperwork, enhanced diagnostic turnaround times, and strengthened administrative efficiency. However, integration remains largely departmental rather than hospital-wide, limiting interoperability and the seamless flow of clinical information across units.

The review further highlights key barriers affecting full HIS integration at Parirenyatwa Hospital, including inadequate ICT infrastructure, inconsistent network connectivity, limited financial resources, and insufficient technical expertise. Fragmented implementation, heavy workloads, and documentation inconsistencies also constrain optimal system utilization. Broader research on Zimbabwean public hospitals emphasizes that weak coordination between clinical and administrative systems undermines real-time data use for strategic decision-making and public health surveillance. Despite these challenges, the literature identifies significant opportunities for strengthening integration through strategic leadership, capacity building, standardization of data protocols, alignment with national e-health policies, and

investment in interoperable platforms. Overall, the evidence suggests that while foundational digital systems exist at Parirenyatwa Hospital, achieving comprehensive and fully interoperable HIS integration requires coordinated institutional reform, sustained funding, and strong governance mechanisms.

CHAPTER 3 – RESEARCH METHODOLOGY

3.1 Research Philosophy

This study was underpinned by a pragmatist research philosophy, selected due to its suitability for addressing complex, practice-oriented problems within institutional environments characterised by technological, organisational, and policy interdependencies. Pragmatism prioritises the research problem and practical outcomes over strict adherence to a single epistemological or ontological stance, allowing researchers to draw on multiple methodological traditions where appropriate (Creswell & Plano Clark, 2018). Given that the strategic integration of Health Information Systems (HIS) in public-sector hospitals involves intertwined technical infrastructures, governance processes, human behaviour, and institutional regulations, a singular positivist or interpretivist approach would have risked oversimplifying the phenomenon.

Pragmatism acknowledges that organisational realities are both objectively structured and socially constructed. HIS integration at Parirenyatwa Hospital is influenced simultaneously by measurable system characteristics (such as interoperability standards, data flow efficiency, and system usage metrics) and subjective human factors including leadership attitudes, professional culture, institutional norms, and user perceptions. By embracing methodological pluralism, the pragmatist paradigm allowed the study to explore both dimensions concurrently, enabling richer insights into how technological systems function within real-world healthcare contexts.

Within the Zimbabwean public health sector, institutional constraints such as resource limitations, regulatory mandates from the Ministry of Health and Child Care (MoHCC), and legacy system infrastructures create a dynamic environment where theoretical models must be adapted to contextual realities. The pragmatist stance therefore facilitated the integration of multiple data sources and analytical perspectives to generate actionable knowledge capable of informing policy and operational decision-making.

Furthermore, pragmatism aligned closely with the applied orientation of the MBIT programme, which emphasises problem-solving, innovation management, and evidence-based decision

support. The philosophical position strengthened the study's ability to bridge theoretical constructs—including the Technology–Organisation–Environment (TOE) framework and Institutional Theory—with operational realities observed in practice. By prioritising utility, relevance, and impact, the research philosophy ensured that findings could contribute meaningfully to strategic planning, system governance, and future digital health transformation initiatives within Zimbabwe's public healthcare institutions.

3.2 Research Design

A qualitative-dominant case study design was adopted to enable an in-depth, context-sensitive examination of HIS integration within its real-life institutional setting. The case study approach was appropriate because the phenomenon under investigation was bounded by organisational structures, regulatory frameworks, technological infrastructures, and operational workflows specific to Parirenyatwa Hospital. As articulated by Yin (2018), case studies are particularly effective for investigating contemporary phenomena within complex real-world environments where the boundaries between phenomenon and context are intertwined.

The qualitative orientation allowed for a nuanced exploration of leadership practices, governance structures, institutional pressures, user experiences, and organisational culture influencing system integration. HIS integration is fundamentally a socio-technical transformation rather than merely a technological implementation; therefore, understanding stakeholder perceptions, informal processes, and contextual constraints was critical to uncovering underlying drivers of success or resistance. Semi-structured inquiry enabled participants to articulate lived experiences and practical challenges, providing insight into how systems are enacted within everyday clinical and administrative practices.

By focusing on a single, information-rich case, the study prioritised analytical depth over breadth, allowing for detailed examination of complex interrelationships among technological capabilities, organisational readiness, and environmental pressures. This approach enhanced construct validity through methodological triangulation across multiple data sources and strengthened analytical generalisation by linking empirical findings to established theoretical frameworks rather than statistical representativeness.

In addition to qualitative inquiry, limited quantitative elements were incorporated to complement and enrich the analysis. Descriptive quantitative data derived from system usage

statistics, structured questionnaire responses, and institutional performance indicators provided measurable insights into adoption patterns, system functionality, reporting efficiency, and perceived integration outcomes. The integration of qualitative and quantitative strands supported a mixed-method logic within a pragmatist framework, enabling the corroboration of narrative findings with empirical indicators.

Furthermore, the case study design facilitated examination of HIS integration from multiple stakeholder perspectives, including hospital leadership, IT personnel, clinicians, health information officers, and administrative staff. This multi-perspective lens was essential for capturing the interplay between technological infrastructure, organisational culture, policy directives, resource constraints, and institutional legitimacy pressures. By situating findings within broader theoretical lenses such as the TOE framework and Institutional Theory, the study moved beyond descriptive analysis toward explanatory and theory-informed insights. This design ensured that conclusions were contextually grounded while remaining transferable to similar public health institutions operating within comparable regulatory and resource environments.

3.3 Population and Sample Selection

The study population comprised key stakeholders directly involved in the implementation, governance, and operational use of Health Information Systems at Parirenyatwa Hospital. Participants included executive management, departmental heads, clinicians, ICT personnel, health information officers, and selected officials from the Ministry of Health and Child Care responsible for health information governance and policy oversight. These individuals were strategically positioned to provide both strategic-level and operational-level perspectives on system integration processes.

Purposive sampling was employed to select participants with demonstrable knowledge and experience relevant to HIS implementation and integration. This non-probability sampling strategy was appropriate for qualitative inquiry because it prioritises depth of understanding and information richness over statistical representativeness. Selection criteria included direct involvement in HIS usage or governance, experience with system implementation or policy decision-making, and representation across diverse functional roles.

A sample size of 25 participants was targeted and achieved, consistent with qualitative research standards suggesting that thematic saturation typically occurs within this range (Guest et al., 2006). Data saturation was reached when additional interviews produced minimal new conceptual insights or themes. To enhance analytical depth, participants were drawn from varied professional backgrounds and hierarchical levels, enabling triangulation across clinical, administrative, managerial, and technical perspectives.

The sampling strategy strengthened credibility and transferability by ensuring inclusion of multiple viewpoints on interoperability challenges, governance processes, institutional readiness, resource allocation constraints, and user adoption dynamics. Collectively, this approach aligned with the study's pragmatist philosophy by prioritising relevance, expertise, and practical insight.

3.4 Data Collection Methods

Data was collected using a multi-method approach comprising semi-structured interviews, structured surveys, document analysis, and non-participant system observation. The use of multiple data sources supported methodological triangulation, enhancing credibility, dependability, and confirmability of findings. The following methods were used:

- i. Semi-structured interviews served as the primary data collection method, allowing in-depth exploration of stakeholder experiences, organisational dynamics, governance structures, and perceived barriers or facilitators to HIS integration. The flexible interview format enabled probing of emerging themes while maintaining consistency across participants through a structured interview guide aligned with research objectives.
- ii. Structured surveys complemented qualitative insights by capturing descriptive quantitative data regarding system usage patterns, integration challenges, perceived efficiency gains, and user satisfaction. Survey instruments incorporated both closed-ended and scaled questions to generate measurable indicators supporting cross-case comparison within the institutional context.
- iii. Documentary analysis involved systematic review of organisational policies, strategic plans, HIS governance frameworks, integration protocols, and Ministry of Health records. This method provided historical and regulatory context, enabling comparison between formal policy intentions and operational realities.

- iv. Non-participant observation of system usage within clinical and administrative environments offered direct insight into workflow integration, user interaction patterns, and practical constraints affecting system utilisation. Observational data enriched understanding of real-world implementation beyond self-reported perceptions.

Together, these methods reflected the pragmatist emphasis on methodological complementarity, ensuring that findings were supported by diverse evidence sources and reducing the risk of single-source bias.

The use of multiple data collection methods also supports methodological triangulation. By combining interviews, document analysis, system observation, and survey responses, the study is able to compare and corroborate evidence from different sources. Triangulation strengthens the credibility of the findings by reducing reliance on a single data source and enabling the researcher to identify consistent patterns in stakeholder perspectives and institutional practices relating to Health Information Systems integration.

3.5 Data Analysis Techniques

Data analysis combined thematic analysis for qualitative data with descriptive statistical techniques for survey data. Interview recordings were transcribed verbatim to ensure analytical accuracy. Thematic analysis followed a structured multi-stage process including familiarisation with the data, open coding, categorisation of concepts, axial coding to identify relationships, and development of higher-order themes.

Emerging themes were analysed both inductively and deductively. Deductive coding was informed by theoretical constructs from the Technology–Organisation–Environment (TOE) framework and Institutional Theory, enabling alignment between empirical findings and established scholarly models. Inductive coding allowed context-specific insights to emerge organically from participant narratives, ensuring sensitivity to local institutional realities.

Descriptive statistical analysis, including frequency distributions and percentages, was applied to survey data to summarise patterns related to system adoption, perceived integration success, and operational challenges. Triangulation between qualitative themes and quantitative indicators enhanced interpretive validity by verifying convergence or divergence across data sources.

To further strengthen the trustworthiness of the research findings, several strategies were employed to enhance reliability and validity. Credibility was improved through methodological triangulation by comparing data obtained from interviews, document analysis, system observation, and survey responses. Dependability was supported through the use of structured interview guides and a clearly documented research procedure. Confirmability was enhanced by grounding interpretations in empirical evidence and participant responses, while transferability was strengthened through detailed contextual description of Parirenyatwa Hospital and its Health Information Systems environment.

3.6 Ethical Considerations

Ethical compliance was central to maintaining research integrity and protecting participant rights. Ethical approval was obtained from relevant institutional authorities, including Parirenyatwa Hospital management and the Ministry of Health and Child Care, and where applicable, an institutional research ethics committee.

Informed consent was secured from all participants prior to data collection. Participants received detailed information outlining the purpose of the study, voluntary nature of participation, procedures involved, confidentiality assurances, and their right to withdraw without penalty. No coercion or undue influence was applied during recruitment.

Confidentiality and anonymity were maintained through the use of pseudonyms, coded identifiers, and removal of identifiable organisational or personal details from transcripts and reporting outputs. Importantly, no patient-identifiable data were accessed, ensuring compliance with ethical standards governing health information research.

Data security protocols included encrypted digital storage, password-protected devices, restricted access to research materials, and secure backup procedures. Findings were reported responsibly and objectively to avoid misrepresentation or reputational harm to individuals or the institution. The study adhered to established ethical principles of beneficence, non-maleficence, respect for persons, and justice within public-sector research contexts.

3.7. Summary

An explanation of the methodological approach used to investigate Health Information Systems integration at Parirenyatwa Hospital is presented in this chapter. The study is guided

by a pragmatist research philosophy that focuses on generating practical solutions to real-world organisational challenges. A qualitative-dominant case study design was adopted to allow detailed exploration of HIS integration within its institutional context. Data were collected using semi-structured interviews, structured surveys, document review, and system observation involving hospital management, clinicians, ICT personnel, and health information officers. Thematic analysis was applied to qualitative data while descriptive statistics supported interpretation of survey responses. Ethical considerations, including informed consent, confidentiality, and secure data handling, were maintained throughout the study.

CHAPTER 4 - FINDINGS

4.1 Introduction

This chapter presents a rigorous analysis, interpretation, and critical synthesis of empirical findings relating to the strategic integration of Health Information Systems (HIS) at Parirenyatwa Group of Hospitals. Consistent with the pragmatist research philosophy outlined in Chapter 3, the analysis prioritises practical understanding of institutional challenges and actionable insights rather than purely theoretical abstraction. Moving beyond descriptive reporting, the chapter interrogates the dynamic interaction between technological infrastructure, organisational governance, and institutional pressures in shaping integration outcomes.

The analytical framing is grounded in institutional theory and socio-technical systems theory. Institutional theory explains how regulatory, normative, and mimetic pressures influence digital adoption behaviours within public-sector organisations (Scott, 2020; Currie & Guah, 2020). Socio-technical systems theory emphasises the interdependence of technological artefacts and human systems in determining performance outcomes (Baxter & Sommerville, 2021; Sittig & Singh, 2020).

Data were derived from semi-structured interviews, structured questionnaires, and organisational documentation. Methodological triangulation enhanced credibility by allowing convergence across multiple data sources and strengthened construct validity (Creswell & Creswell, 2022). Qualitative data were analysed using thematic analysis following Braun and Clarke's six-phase framework (2021 update), while quantitative responses were used to contextualise patterns rather than for statistical generalisation.

4.2 Presentation of Data (Graphs, Tables) and Findings

Twenty-two responses were obtained from a targeted sample of twenty-five stakeholders, resulting in an 88% response rate. In qualitative institutional case research, response rates

above 80% significantly enhance credibility and reduce non-response bias (Saunders et al., 2023).

Participants represented executive management, ICT leadership, clinicians, health information officers, and departmental heads. This vertical representation enabled cross-level comparison between strategic policy framing and operational execution realities.

From an analytical standpoint, triangulation across professional roles strengthened interpretive validity. Divergences between managerial narratives and frontline experiences were not treated as inconsistencies but as analytically valuable indicators of structural misalignment — a phenomenon widely observed in digital health transformation literature (WHO, 2021; Greenhalgh et al., 2020).

Table 2: Participant Demographics Table

Category	Frequency (n=25)	Percentage
Executive Management	4	16%
Clinicians	8	32%
ICT Personal	5	20%
Health Information Officers	6	24%
MoHCC Officials	2	8%
Total	25	100%

Figure 2 - Participant Demographics

4.2.1 Participant Characteristics and Analytical Significance

i. Professional Distribution

The diversity of participants enabled a multi-dimensional assessment of integration.

Evidence: Executive leadership emphasised regulatory compliance, reporting accuracy, and strategic alignment with national health policy. Clinicians emphasised workflow disruption, usability limitations, and system response delays. ICT personnel focused on infrastructure, interoperability, and system maintenance challenges.

ii. Interpretation:

This divergence illustrates the classic socio-technical tension between system design and clinical workflow realities (Sittig & Singh, 2020). While strategic actors frame HIS

integration as governance enhancement, frontline users assess it through the lens of efficiency and patient care continuity.

Implication:

Strategic integration requires vertical alignment mechanisms to reconcile policy objectives with operational usability.

iii. **Experience Levels**

Most participants possessed over five years of professional experience. This enhanced analytical depth, as respondents could compare pre-digital workflows with current digital processes.

Experienced participants provided insight into transformation trajectory rather than static system assessment. This longitudinal perspective strengthens the study's explanatory capacity regarding digital maturity progression (HIMSS, 2023; WHO, 2021).

Table 2: Thematic Analysis Summary Table

Theme	Sub-Themes	Frequency of Mentions	Strategic Implication
Fragmented Systems	Standalone billing, lab system	18	Interoperability
Governance Gaps	No HIS steering committee	14	Weak oversight
Infrastructure Constraints	Bandwidth issues	21	Integration delays
User Resistance	Limited training	16	Change management failure

Figure 3 - Thematic Analysis Summary

4.2.2 Current HIS Architecture and Integration Status

Parirenyatwa Hospital operates multiple digital subsystems, including:

- Electronic Medical Records (EMR)
- Laboratory Information Systems (LIS)

- Pharmacy Management Systems
- Billing Systems
- National reporting platforms linked to the Ministry of Health and Child Care

Evidence:

Participants consistently reported manual data transfers between systems, duplication of patient identifiers, and parallel paper documentation.

Interpretation:

The organisation demonstrates functional digitisation without enterprise-wide interoperability. This aligns with literature describing “digital islands”, isolated systems lacking integrated architecture (WHO, 2021; Keesara et al., 2020).

Implication:

The transition from digitisation to integration maturity requires enterprise architecture governance frameworks rather than incremental procurement of standalone solutions (OECD, 2021).

The hospital appears to be positioned within an intermediate integration maturity stage characterised by partial automation but limited semantic and technical interoperability.

Table 3: HIS Integration Maturity Table

Dimension	Current State	Maturity Level (1–5)
Technical Interoperability	Partial	2
Data Standardisation	Weak	2
Governance	Informal	1
Strategic Alignment	Moderate	3
Analytics Capability	Limited	2

Figure 4 - HIS Integration Maturity Table

4.3 Further Analysis of Findings

4.3.1 Strategic Alignment of HIS Integration

i. Alignment with Organisational Objectives

Participants broadly agreed that HIS initiatives support efficiency, transparency, auditability, and improved patient outcomes. However, analysis revealed variability in departmental implementation.

Evidence: Leadership commitment was acknowledged. Integration depth varied across units.

Interpretation: Institutional theory explains this as decoupling — symbolic adoption to satisfy external expectations while internal operationalisation progresses unevenly (Scott, 2020).

Implication: Strategic alignment requires measurable integration benchmarks, performance indicators, and accountability mechanisms.

ii. **Contribution to Public Health Management**

Integrated systems were perceived to improve reporting accuracy, disease surveillance, and planning capacity. However, delays in data consolidation limit real-time analytics capacity.

Recent global digital health research emphasises that integration effectiveness depends on interoperability standards rather than system quantity (WHO, 2021; Global Digital Health Monitor, 2023). Thus, integration quality — not digital presence — determines strategic value.

4.3.2 Technological Determinants of HIS Integration

i. **Infrastructure Capacity**

Connectivity instability, hardware shortages, and server downtime were frequently reported.

ii. **Interpretation:**

Infrastructure fragility undermines user confidence and encourages fall back to manual processes. Literature shows that perceived system unreliability significantly reduces adoption sustainability (Greenhalgh et al., 2020).

Implication:

Infrastructure investment is a prerequisite, not a supplementary factor, in digital transformation.

iii. **Interoperability Limitations**

Participants highlighted absence of standardised data exchange protocols. The lack of enterprise APIs, shared data dictionaries, and structured interoperability frameworks constrains seamless information flow. International standards such as HL7 FHIR have emerged as dominant interoperability enablers globally (HL7 International, 2023; WHO, 2021). From a socio-technical perspective, technical fragmentation generates organisational inefficiencies that reinforce resistance and duplication behaviours.

iv. **Data Security and Governance**

Awareness of cybersecurity risks was evident. However, governance structures remain developing. The rise in global healthcare cyber incidents underscores the necessity of robust security frameworks (OECD, 2021; WHO, 2022). Strengthened governance would likely enhance trust and institutional confidence in digital systems.

4.3.3 Organisational Influences on Integration

i. **Leadership and Governance Structures**

Leadership commitment emerged as a key enabling factor. However, procurement rigidity, bureaucratic approval cycles, and funding constraints slowed innovation. Public-sector digital transformation literature identifies administrative inertia as a common structural barrier (OECD, 2021). This indicates misalignment between traditional administrative models and agile digital governance needs.

ii. **Human Resource Capacity and Change Management**

Training gaps and workflow resistance were repeatedly identified. Evidence suggests technology implementation frequently precedes adequate user capacity development, generating friction (Greenhalgh et al., 2020). Socio-technical systems theory emphasises co-evolution of human capacity and technical infrastructure. Continuous professional development and structured change management frameworks are therefore critical

4.3.4 Institutional and Policy Environment

National policy frameworks and reporting mandates significantly influence HIS adoption. Regulatory requirements act as coercive institutional pressures encouraging digital uptake (Scott, 2020). However, compliance-driven adoption does not guarantee integration maturity. Participants highlighted funding sustainability concerns, particularly where modules rely on

donor support. This reflects the macro-micro tension in digital health ecosystems, where policy ambition exceeds operational financing stability (WHO, 2021).

4.3.5 Cross-Theme Analysis: Systemic Barriers

Synthesising findings across themes reveals interconnected structural constraints:

- Fragmented system architecture
- Limited interoperability standards
- Skills shortages and training gaps
- Funding instability
- Change management deficiencies

These factors operate interactively rather than independently. For example, infrastructure instability exacerbates user resistance; funding gaps constrain interoperability development; governance fragmentation weakens accountability.

Digital transformation literature consistently demonstrates that integration failure results from systemic misalignment rather than singular technical defects (OECD, 2021; WHO, 2021).

4.3.6 Strategic Implications Emerging from Findings

Participants proposed systemic rather than isolated technical solutions:

- Development of enterprise interoperability architecture
- Adoption of HL7 FHIR standards
- Continuous professional development programmes
- Strengthened ICT governance frameworks
- Dedicated digital transformation funding models

These recommendations signal cognitive shift from software acquisition to enterprise governance orientation — a hallmark of integration maturity progression.

4.4 Discussion of Results

The findings demonstrate that HIS integration at Parirenyatwa Hospital is evolving within a complex institutional ecosystem shaped by technological constraints, organisational readiness, and policy-driven imperatives.

Integration must therefore be conceptualised not as an ICT deployment exercise but as a multi-layered organisational transformation.

Sustainable integration requires synchronised development of:

- Technical infrastructure
- Interoperability architecture
- Governance accountability mechanisms
- Human capacity
- Institutional financing stability

This aligns with contemporary digital health transformation frameworks (WHO, 2021; Global Digital Health Monitor, 2023).

The results indicate that successful HIS integration is strongly influenced by organisational culture, leadership commitment, and change management strategies. Participants highlighted that resistance to system adoption, workflow disruptions, and varying levels of digital literacy among healthcare professionals remain critical barriers to achieving seamless integration. This reflects broader findings in digital health transformation literature, which emphasise that technological innovation alone does not guarantee improved health system performance unless accompanied by structured governance, stakeholder engagement, and continuous capacity-building initiatives (Boonstra & Broekhuis, 2021; Kruse et al., 2022).

In resource-constrained settings such as public tertiary hospitals, leadership-driven change management and clear communication strategies become essential enablers for aligning clinical, administrative, and technological processes toward unified digital objectives. Consequently, the integration process at Parirenyatwa Hospital demonstrates characteristics of a socio-technical transformation, where human factors and institutional dynamics are as critical as system functionality.

Additionally, the findings suggest that interoperability maturity remains a key determinant of strategic HIS effectiveness, particularly regarding data sharing across departments and

alignment with national health information strategies. Fragmented systems and inconsistent data standards were identified as limiting factors in achieving real-time decision support and integrated service delivery. Contemporary research underscores that interoperability frameworks, standardized data governance protocols, and national digital health architectures play a pivotal role in enabling scalable integration and improving health system resilience (WHO, 2021; OECD, 2022; Global Digital Health Monitor, 2023).

Strengthening policy alignment between institutional implementation and national eHealth strategies is therefore essential to ensure sustainability and long-term value creation. In this regard, Parirenyatwa Hospital's experience illustrates the broader challenges faced by health systems transitioning from fragmented digital initiatives toward coordinated, enterprise-level information ecosystems.

4.5 Comparison with Literature

This section critically compares the empirical findings on the strategic integration of Health Information Systems (HIS) at Parirenyatwa Hospital with contemporary literature. Rather than merely demonstrating alignment, the analysis interrogates areas of convergence, divergence, and theoretical extension, situating the study within broader debates on digital transformation, socio-technical systems, and health information governance.

4.5.1 Interoperability: Confirming Global Patterns but Revealing Structural Constraints

The study found that interoperability challenges persist due to fragmented legacy systems, limited standardisation, and uneven departmental integration. This strongly aligns with global evidence identifying interoperability as a foundational barrier to digital health optimisation (World Health Organization, 2021; recent interoperability reviews in *BMC Medical Informatics and Decision Making*).

However, while much of the literature frames interoperability as a primarily technical standards issue, the findings at Parirenyatwa suggest a deeper structural constraint: interoperability breakdown frequently occurs at governance and workflow coordination levels rather than at the technical interface alone.

This extends socio-technical systems theory by demonstrating that:

- Technical connectivity does not guarantee functional integration.
- Organisational silos can neutralise technical interoperability gains.
- Informal communication practices may override system-based workflows.

Thus, unlike technology-centric interpretations in some high-income contexts, this study demonstrates that institutional fragmentation is a stronger predictor of integration weakness than technical standards gaps alone.

4.5.2 Governance as a Strategic Determinant: Extending the Resource-Constraint Narrative

Much literature on digital health in Sub-Saharan Africa emphasises infrastructure deficits (bandwidth, hardware, electricity instability) as primary constraints. While infrastructure limitations were indeed observed at Parirenyatwa Hospital, the findings indicate that governance ambiguity, overlapping ICT mandates, and inconsistent strategic coordination exerted equally significant influence on integration outcomes.

Recent governance studies in health informatics argue that IT governance maturity strongly predicts digital success (e.g., systematic reviews in 2022–2024 health IT governance literature). However, this study advances that argument by showing that in public tertiary hospitals: Governance coherence may be a more transformative lever than additional hardware investment.

This challenges the dominant “resource deficit” framing and repositions strategic leadership alignment as a central variable in HIS integration success.

4.5.3 Organisational Readiness and Power Dynamics: Extending Technology Acceptance Models

Consistent with Technology Acceptance Model (TAM) literature, findings confirm that perceived usefulness, training adequacy, and system usability influence adoption. However, the empirical data reveal an under-theorised dimension: professional autonomy and accountability sensitivity.

Some clinicians and administrative staff demonstrated resistance not due to usability barriers, but due to:

- Increased audit visibility.
- Performance traceability.
- Reduced discretionary control over documentation processes.

Most TAM-based studies emphasise cognitive acceptance factors (ease of use, usefulness), but rarely incorporate power relations within institutional hierarchies.

This study therefore extends TAM by suggesting that in public hospital environments: Perceived shifts in authority and surveillance are critical determinants of HIS adoption behaviour.

This adds a governance-political dimension to existing adoption theory.

4.5.4 Non-Linear Digital Maturity: Challenging Deterministic Progression Models

Digital maturity frameworks (e.g., staged progression models used in global digital health assessments) often assume linear advancement from digitisation to optimisation.

However, findings at Parirenyatwa reveal a cyclical and adaptive integration trajectory characterised by:

- Temporary regression due to budget constraints.
- Hybrid paper-digital coexistence.
- Infrastructure-related interruptions.
- Incremental, department-specific progress.

This suggests that digital maturity in resource-constrained public hospitals is:

- Iterative rather than sequential.
- Politically and economically contingent.
- Vulnerable to systemic shocks.

Therefore, the study refines digital maturity theory by proposing that: Integration maturity in developing-country public institutions is context-sensitive and non-deterministic, requiring adaptive rather than prescriptive modelling.

4.5.5 Hybrid Systems as Strategic Resilience

Literature frequently frames continued paper usage as evidence of incomplete digital transformation. However, findings from Parirenyatwa indicate that hybrid workflows sometimes function as resilience mechanisms against infrastructural instability.

Rather than representing failure, hybridisation may:

- Mitigate data loss risk.
- Compensate for downtime.
- Preserve clinical continuity during system outages.

This reframes partial digitisation as adaptive pragmatism rather than implementation weakness, particularly in volatile infrastructure environments.

4.5.6 Strategic Integration as Institutional Reform

Perhaps most significantly, the findings demonstrate that HIS integration at Parirenyatwa is not merely operational but institutional in nature. Integration reshaped:

- Reporting hierarchies.
- Financial billing transparency.
- Performance monitoring mechanisms.
- Interdepartmental accountability structures.

While global digital health literature increasingly recognises digital transformation as organisational change, this study empirically demonstrates that in a public tertiary hospital context: HIS integration functions as a governance reform instrument.

This elevates integration from an ICT initiative to a strategic institutional transformation process.

4.6. Summary

Empirical findings relating to the integration of Health Information Systems at Parirenyatwa Hospital are presented and analysed in this chapter. Data collected from interviews, surveys, and institutional documentation reveal that although several digital systems are operational, integration between them remains limited. Participants identified key challenges including fragmented system architecture, inadequate interoperability, infrastructure limitations, and

governance constraints. Differences in perspectives between management and frontline users also emerged regarding the effectiveness and usability of the systems. The findings highlight the complex interaction between technological infrastructure and organisational processes in shaping system performance. Overall, the results demonstrate the need for stronger coordination, improved governance structures, and strategic alignment of HIS initiatives.

CHAPTER 5 - DISCUSSION

5.1 Interpretation of Findings

The findings demonstrate that HIS integration at Parirenyatwa is progressing but remains at a transitional maturity stage characterised by partial digitalisation, limited interoperability, and uneven institutional readiness. While departments have adopted digital tools for billing, patient registration, and clinical documentation, system fragmentation and inconsistent data standards constrain full integration. These findings align with global evidence suggesting that HIS integration is rarely constrained by software availability alone, but rather by weak interoperability architecture, governance fragmentation, and human capacity gaps (WHO, 2021; AbouZahr et al., 2021). The results confirm that integration is fundamentally socio-technical, requiring alignment between infrastructure, workflows, leadership, and organisational culture.

Secondly, the study reveals that governance and institutional leadership play a decisive role in determining integration depth. Although Parirenyatwa operates within Zimbabwe's broader digital health policy framework, operational coordination between ICT units, hospital management, and clinical departments remains suboptimal. This mirrors findings in low- and middle-income countries where HIS sustainability depends heavily on clear accountability structures, financing models, and policy coherence (WHO, 2020; Fraser et al., 2022). The Zimbabwe National Health Strategy (2021–2025) emphasises digital transformation as a strategic pillar; however, the hospital-level translation of this policy requires stronger implementation mechanisms, structured training programs, and dedicated interoperability standards to bridge the strategy–practice gap.

Finally, the findings indicate that infrastructure reliability (power supply, network stability, hardware adequacy) and workforce digital competence significantly affect system utilisation. Staff adaptation challenges and workflow disruptions initially reduced efficiency gains, though gradual improvement was observed as users became more familiar with the system. Contemporary research confirms that digital health transformation requires continuous capacity building and change management rather than one-off training interventions (Braa & Sahay, 2022; WHO, 2021). The Parirenyatwa case therefore supports a phased Integration Maturity Model approach, beginning with infrastructure stabilisation and progressing toward advanced interoperability, analytics-driven decision-making, and integrated governance.

Strategically sequenced investment and institutional alignment are thus essential for converting HIS deployment into measurable improvements in service delivery, efficiency, and patient outcomes.

5.2 Implications for Business Management and IT

The findings of this study have significant implications for business management within healthcare institutions, particularly regarding strategic leadership, organisational alignment, and value-driven digital transformation. The integration of Health Information Systems (HIS) at Parirenyatwa demonstrates that digital transformation must be embedded within institutional strategy rather than treated as a purely technical initiative. Business managers must adopt a governance-oriented approach that integrates clinical, administrative, and ICT objectives to ensure that technology investments translate into operational efficiency, improved patient outcomes, and financial sustainability. Recent digital health literature highlights that leadership commitment, cross-functional coordination, and clear accountability structures are critical success factors for digital health initiatives, especially in resource-constrained environments (WHO, 2020; Fraser et al., 2022). For hospital management, this implies developing strategic roadmaps that align HIS integration with organisational performance indicators such as service delivery quality, revenue cycle management, and data-driven decision-making.

From an organisational management perspective, the study underscores the need for structured change management and workforce development as core business functions rather than supplementary activities. The introduction of integrated HIS alters workflows, reporting structures, and staff roles, requiring deliberate capacity-building strategies and continuous professional development programs. Evidence from recent studies suggests that digital transformation success depends heavily on organisational culture, user engagement, and adaptive leadership capable of managing resistance to change and facilitating digital literacy among healthcare workers (Braa & Sahay, 2022; AbouZahr et al., 2021). At Parirenyatwa, strengthening institutional readiness through training, stakeholder participation, and performance monitoring mechanisms would support sustainable adoption and reduce productivity disruptions during system transitions.

The implications for Information Technology management emphasise the need for interoperability architecture, infrastructure resilience, and long-term systems governance. HIS integration requires standardised data frameworks, scalable infrastructure, cybersecurity

safeguards, and continuous system evaluation to ensure interoperability across clinical and administrative platforms. The findings reinforce global recommendations that healthcare organisations should transition from fragmented ICT deployments toward enterprise architecture models supported by open standards and data governance frameworks (WHO, 2021). For Parirenyatwa, this means prioritising investments in reliable connectivity, integrated data platforms, and analytics capabilities that enable real-time decision support. Ultimately, successful strategic integration requires convergence between business management priorities and IT strategy, ensuring that technological innovation directly supports organisational goals, healthcare quality improvement, and sustainable digital health ecosystems.

5.3 Contributions to Existing Knowledge

This study contributes to existing knowledge by providing contextualised empirical insights into the strategic integration of Health Information Systems (HIS) within a tertiary healthcare institution in a low-resource setting. While global literature has extensively explored digital health transformation, there remains a shortage of detailed case-based analyses from Sub-Saharan Africa that examine how organisational realities shape integration outcomes. By examining Parirenyatwa Group of Hospitals, this research extends current scholarship by demonstrating that HIS integration is not solely dependent on technological infrastructure but is strongly influenced by institutional governance, workflow alignment, and socio-technical readiness. These findings reinforce recent digital health research emphasising that sustainable integration requires coordinated development of organisational capacity alongside technological innovation (WHO, 2020; Braa & Sahay, 2022).

Secondly, the study advances theoretical understanding by applying a strategic management lens to HIS implementation, bridging the gap between health informatics and business management disciplines. Existing literature often focuses on clinical or technical outcomes; however, this research highlights how leadership structures, strategic planning processes, and organisational change management practices influence integration maturity. The findings contribute to emerging frameworks that conceptualise HIS as enterprise-wide transformation tools rather than isolated clinical technologies, supporting arguments that digital health success depends on governance models, interoperability standards, and continuous performance evaluation mechanisms (Fraser et al., 2022; WHO, 2021). The proposed integration maturity perspective therefore enriches theoretical discourse by illustrating how staged digital transformation models can be operationalised in complex public hospital environments.

Finally, the study adds practical knowledge by generating context-specific lessons for healthcare institutions operating under resource constraints, particularly in Zimbabwe and comparable low- and middle-income countries. It highlights the critical role of incremental implementation strategies, adaptive leadership, and workforce capacity building in achieving long-term digital transformation goals. By linking empirical findings with contemporary digital health strategies, the research contributes to policy discussions on strengthening national health information ecosystems and supports the growing body of evidence advocating for integrated governance, interoperability frameworks, and data-driven decision-making cultures (AbouZahr et al., 2021; WHO, 2020). Overall, this study expands current knowledge by providing an applied model for understanding how strategic alignment between management practices and IT infrastructure can facilitate sustainable HIS integration within public healthcare systems.

5.4 Limitations of the Study

This study is subject to the following limitations that should be considered when interpreting the findings:

1. The research was conducted within a single tertiary institution, Parirenyatwa Group of Hospitals, which may limit the generalisability of the findings to other healthcare settings in Zimbabwe or across Sub-Saharan Africa. While case study designs are appropriate for generating in-depth contextual insights, they may not capture variations in governance structures, funding mechanisms, and digital maturity levels present in other hospitals. Recent digital health literature acknowledges that implementation outcomes are highly context-dependent, particularly in low- and middle-income countries where institutional capacity and infrastructure vary significantly (Braa & Sahay, 2022; WHO, 2020). Consequently, caution should be exercised in extrapolating the conclusions beyond similar tertiary-level public hospitals.
2. The study relied predominantly on qualitative data derived from interviews, document analysis, and participant perspectives. Although this approach enabled rich, interpretive insights into organisational dynamics and strategic alignment, it may be subject to response bias, recall bias, and social desirability bias. Participants may have overemphasised system successes or underreported operational challenges due to institutional loyalty or perceived professional risk. Furthermore, the absence of extensive quantitative performance metrics; such as system uptime statistics, cost-

efficiency indicators, or patient outcome measures; limits the ability to empirically validate the impact of HIS integration. Contemporary research highlights the importance of combining qualitative insights with measurable digital health indicators to strengthen evidence reliability and policy relevance (Fraser et al., 2022; WHO, 2021).

3. The rapidly evolving nature of digital health technologies presents a temporal limitation. HIS platforms, interoperability standards, cybersecurity frameworks, and national digital health policies are continuously evolving between 2020 and 2025, meaning that findings reflect a specific institutional moment rather than a static condition. Technological upgrades, policy reforms, or funding changes occurring after data collection may alter the hospital's integration maturity trajectory. Scholars have noted that digital transformation research must be interpreted within dynamic innovation cycles where technological, organisational, and regulatory variables shift over time (AbouZahr et al., 2021; Braa & Sahay, 2022). Therefore, longitudinal studies and periodic evaluation are recommended to track sustained integration outcomes and evolving governance mechanisms

5.5. Summary

Interpretation of the study findings is undertaken by linking the empirical results with the theoretical frameworks and literature reviewed earlier. The discussion explores how technological readiness, organisational capacity, and environmental influences shape the integration of Health Information Systems within public healthcare institutions. Insights from the Technology–Organisation–Environment framework and Institutional Theory help explain how institutional pressures, leadership structures, and infrastructure constraints influence digital transformation outcomes. The chapter emphasises that effective HIS integration requires more than technological investment; it also demands strong governance mechanisms, organisational change management, and stakeholder engagement. Implications for healthcare management, policy development, and digital health implementation in Zimbabwe are also examined.

CHAPTER 6 - CONCLUSION AND RECOMMENDATIONS

6.1 Summary of Key Findings

The study on the Strategic Integration of Health Information Systems (HIS) at Parirenyatwa Group of Hospitals produced the following key findings:

- i. **HIS integration is at a transitional maturity stage** – The hospital has implemented multiple digital systems; however, full enterprise-wide interoperability has not yet been achieved.
- ii. **Fragmented systems limit seamless data exchange** – Clinical, administrative, laboratory, pharmacy, and billing modules operate with partial integration, constraining real-time information flow.
- iii. **Infrastructure constraints affect system reliability** – Intermittent power supply, network instability, and hardware shortages reduce system uptime and efficiency.
- iv. **Governance structures require strengthening** – While strategic direction exists, clear accountability mechanisms for HIS oversight, interoperability enforcement, and performance monitoring remain underdeveloped.
- v. **Leadership commitment influences integration progress** – Executive support significantly shapes resource allocation, staff motivation, and cross-departmental coordination.
- vi. **Workforce digital competency varies across departments** – Differences in ICT literacy levels impact user adoption, workflow efficiency, and data accuracy.
- vii. **Change management processes are insufficiently formalised** – Limited structured training and transition planning initially caused workflow disruptions during system implementation.
- viii. **Data quality and standardisation challenges persist** – Inconsistent data entry practices and lack of harmonised standards hinder analytics and evidence-based decision-making.
- ix. **Strategic alignment between business management and IT is improving but incomplete** – HIS objectives are increasingly linked to operational efficiency and revenue management, though integration into performance management systems remains limited.

- x. **A phased Integration Maturity Model is necessary** – Sustainable transformation requires sequential strengthening of infrastructure, governance, interoperability architecture, and institutional capacity rather than isolated technological upgrades.

6.2 Conclusions

The study concludes that the strategic integration of Health Information Systems (HIS) at Parirenyatwa Group of Hospitals represents an ongoing institutional transformation rather than a completed technological initiative. While significant progress has been made in introducing digital platforms across clinical and administrative functions, integration remains at a transitional stage characterised by partial interoperability, evolving governance structures, and varying levels of workforce readiness. The findings demonstrate that HIS integration extends beyond technological deployment and requires coordinated alignment between organisational strategy, institutional leadership, infrastructure investment, and human capacity development to achieve sustainable outcomes.

The study further establishes that organisational and managerial factors play a central role in determining the success of HIS integration. Leadership commitment, effective governance frameworks, structured change management, and continuous staff training emerged as critical determinants influencing system adoption and utilisation. The research highlights that digital transformation in healthcare is inherently socio-technical, involving changes to workflows, professional roles, and decision-making processes. Without deliberate efforts to strengthen collaboration between clinical departments, management structures, and IT functions, digital systems risk operating in silos, thereby limiting their potential to improve efficiency, service delivery, and data-driven decision-making.

Finally, the study concludes that a phased, maturity-based approach offers the most viable pathway for achieving full HIS integration at Parirenyatwa. Strategic priorities should focus on strengthening infrastructure resilience, establishing interoperability standards, improving data governance mechanisms, and embedding digital technologies within organisational performance management frameworks. By aligning business management objectives with information technology strategy, the hospital can transition from fragmented digital adoption toward an integrated ecosystem that supports evidence-based healthcare delivery. These conclusions contribute to broader discussions on digital health transformation in resource-

constrained settings and provide practical guidance for tertiary hospitals seeking to achieve sustainable HIS integration.

6.3 Recommendations for Practitioners

Based on the findings of the study on the Strategic Integration of Health Information Systems (HIS) at Parirenyatwa Group of Hospitals, the following strategic recommendations are proposed to strengthen sustainable integration, enhance organisational performance, and align business management with information technology transformation:

- i. **Develop a Comprehensive HIS Integration Strategy**
The hospital should formalise a long-term HIS strategic roadmap aligned with institutional objectives and Zimbabwe's National Health Strategy. This roadmap should define integration priorities, implementation timelines, governance structures, and performance indicators.
- ii. **Strengthen Governance and Accountability Structures**
Establish a multidisciplinary HIS governance committee comprising clinical leadership, ICT specialists, administrative managers, and policy representatives to oversee integration decisions, enforce standards, and monitor implementation outcomes.
- iii. **Adopt Interoperability Standards and Enterprise Architecture**
Implement standardised data frameworks and interoperability protocols to ensure seamless communication between clinical, laboratory, pharmacy, billing, and administrative systems. Enterprise architecture planning should guide future system acquisitions.
- iv. **Invest in Infrastructure Resilience**
Prioritise stable power backup solutions, reliable network connectivity, and adequate hardware resources to minimise downtime and ensure continuous system availability.
- v. **Implement Structured Change Management Programs**
Develop formal change management frameworks that include stakeholder engagement, communication strategies, and phased transition plans to reduce resistance and workflow disruption during system upgrades.
- vi. **Enhance Workforce Digital Competency**
Introduce continuous training programs tailored to different user groups (clinical staff,

administrative staff, and managers) to improve digital literacy, system adoption, and data quality.

- vii. **Strengthen Data Governance and Quality Assurance Mechanisms**
Establish standard operating procedures for data entry, validation, and reporting to ensure consistency, accuracy, and reliability of information used for decision-making.
- viii. **Integrate HIS with Performance Management Systems**
Align HIS outputs with key organisational performance indicators such as patient throughput, revenue cycle efficiency, service quality metrics, and clinical outcomes to enhance strategic decision-making.
- ix. **Promote Data-Driven Decision-Making Culture**
Encourage routine use of dashboards, analytics tools, and real-time reporting to support evidence-based management at departmental and executive levels.
- x. **Ensure Sustainable Financing Models**
Develop funding strategies that combine government support, donor partnerships, and internal resource allocation to sustain HIS maintenance, upgrades, and innovation initiatives.
- xi. **Strengthen Cybersecurity and Data Protection Measures**
Implement robust cybersecurity policies, regular system audits, and staff awareness programs to safeguard patient data and ensure compliance with emerging digital health standards.
- xii. **Adopt a Phased HIS Integration Maturity Model**
Progressively implement integration stages starting with infrastructure stabilisation and governance strengthening, followed by interoperability expansion and advanced analytics capabilities.

6.4 Suggestions for Future Research

Based on the findings of this study on the **Strategic Integration of Health Information Systems (HIS) at Parirenyatwa Group of Hospitals**, several areas for future research emerge that can deepen understanding and support evidence-based digital health transformation.

- i. **Longitudinal Evaluation of HIS Integration Outcomes**
Future studies should adopt longitudinal research designs to assess how HIS integration evolves over time and how improvements in interoperability, governance, and infrastructure influence clinical outcomes, operational efficiency, and patient

satisfaction. Digital health literature highlights the importance of continuous evaluation to understand sustainability and long-term organisational impact (WHO, 2021; Braa & Sahay, 2022).

- ii. **Quantitative Assessment of Performance and Financial Impact**
Further research should incorporate quantitative metrics such as system utilisation rates, cost-benefit analysis, revenue cycle improvements, data accuracy indicators, and clinical performance outcomes. Mixed-method studies combining qualitative insights with measurable indicators would provide stronger empirical evidence regarding the value of HIS investments in resource-constrained environments (Fraser et al., 2022).
- iii. **Comparative Studies Across Zimbabwean Hospitals**
Comparative multi-site research involving provincial, district, and private hospitals would help determine whether the challenges and success factors identified at Parirenyatwa are institution-specific or reflective of broader national trends. Such studies could inform national digital health policy and standardisation efforts.
- iv. **User Experience and Change Management Research**
Future research should explore behavioural and organisational aspects of HIS adoption, including staff attitudes, digital literacy progression, workflow adaptation, and leadership influence on change management processes. Understanding human factors remains critical for successful digital transformation (AbouZahr et al., 2021).
- v. **Interoperability Frameworks and Enterprise Architecture Models**
Research focusing on the design and evaluation of interoperability frameworks tailored to low-resource healthcare systems would provide practical guidance for scaling integrated HIS environments. Studies could examine open standards, data governance models, and enterprise architecture approaches suitable for Zimbabwe's healthcare ecosystem.
- vi. **Impact of Data Analytics and Artificial Intelligence in HIS**
As digital maturity increases, future research should investigate how advanced analytics, predictive modelling, and artificial intelligence tools can enhance clinical decision support, resource allocation, and population health management within integrated HIS environments.
- vii. **Policy and Governance Implementation Studies**
Additional research should evaluate how national digital health strategies translate into institutional practice, identifying gaps between policy formulation and operational implementation within public hospitals.

6.5. Summary

The final chapter consolidates the key findings of the study and presents conclusions regarding the integration of Health Information Systems at Parirenyatwa Hospital. The findings indicate that although multiple digital systems are currently implemented across different hospital departments, limited interoperability and gaps in organisational readiness reduce their overall effectiveness in supporting coordinated healthcare delivery. Strengthening Health Information Systems integration within public hospitals requires improvements in ICT infrastructure, stronger digital governance frameworks, and better coordination between technological initiatives and institutional operational processes. The chapter proposes practical recommendations including the adoption of interoperable system architectures, development of staff capacity in digital health management, and alignment with national eHealth strategies. Directions for future research are also proposed, particularly comparative studies across hospitals and long-term evaluation of digital health integration initiatives.

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APPENDICES



The Catholic University in Zimbabwe

INTERVIEW PROTOCOL

Study Title

The Strategic Integration of Health Information Systems (HIS) at Parirenyatwa Hospital

Researcher

Paul Mapanzure: PG204736H

Master of Business Management and Information Technology (MBMIT)

Catholic University of Zimbabwe

Study Site

Parirenyatwa Group of Hospitals

1. Introduction to the Study

Good day. My name is Paul Mapanzure, and I am conducting research as a partial fulfilment of my MBMIT dissertation. The purpose of this study is to examine the strategic integration of Health Information Systems (HIS) at Parirenyatwa Hospital and to assess how integration strengthens public health management, service delivery, and institutional performance.

You have been selected to participate because of your role and involvement in the governance, implementation, or operational use of Health Information Systems within the hospital or related institutions.

The interview will take approximately 45–60 minutes.

2. Informed Consent Script

Your participation in this study is entirely voluntary. Before we proceed, I would like to inform you of the following:

- Your participation is voluntary, and you may withdraw at any time without penalty.
- You may decline to answer any question you are uncomfortable with.
- The information you provide will be treated with strict confidentiality.
- Your identity will not be disclosed in the final dissertation report.
- Data collected will be used strictly for academic purposes.
- With your permission, this interview may be audio-recorded for accuracy.
- All data will be securely stored and destroyed after the completion of the research.

Do you have any questions before we proceed?

Do you consent to participate in this study?

Do you consent to the interview being recorded?

(Record response: Yes / No)

Gender: (Male/Female)

Age Range: for example (20-29)

Signature (if written consent required): _____

Date: _____

3. Structured Interview Questions

SECTION A: Participant Profile

1. What is your current position and department within the hospital?

2. How long have you been involved in Health Information Systems?

3. What is your role in decision-making, implementation, or use of HIS?

SECTION B: Current HIS Deployment and Integration

4. What Health Information Systems are currently deployed in your department?

5. How would you describe the level of integration among these systems?

6. To what extent are the systems interoperable?

SECTION C: Strategic Alignment and Governance

7. Is there a documented HIS integration strategy guiding implementation?

8. How is HIS integration aligned with the hospital's broader strategic objectives?

9. What governance structures oversee HIS integration?

10. How does executive leadership influence integration initiatives?

11. How does collaboration with the Ministry of Health and Child Care (MoHCC) shape HIS integration?

SECTION D: Technological Factors (Technology Dimension – TOE Framework)

12. How adequate is the ICT infrastructure supporting integration?

13. Are interoperability standards or frameworks applied?

14. Are there any technological barriers that limit full integration?

SECTION E: Organisational Factors (Organisation Dimension – TOE Framework)

15. Does the hospital have sufficient skilled personnel to manage integrated HIS?

16. How would you describe staff readiness and attitudes toward integration?

17. What training mechanisms exist for system users?

18. How are change management processes handled?

19. Are financial or resource constraints affecting integration?

SECTION F: Environmental / Institutional Factors (Environment Dimension – TOE Framework)

- 20. How do national health policies influence HIS integration?
- 21. Are there regulatory requirements affecting data sharing and interoperability?
- 22. How do external stakeholders (e.g., MoHCC, donors, partners) influence integration?
- 23. Are there institutional pressures influencing system adoption?

SECTION G: Impact on Public Health Management

- 24. How has HIS integration or lack of it affected decision-making processes?
- 25. Has integration or lack of it improved reporting to national health authorities?
- 26. What impact has integration or lack of it had on patient care quality?
- 27. Has it enhanced disease surveillance and outbreak response?

SECTION H: Strategic Gaps and Recommendations

- 28. What major gaps remain in HIS integration?
- 29. What risks threaten sustainability?

30. What strategies would strengthen HIS integration?

31. What role should government play in enhancing integration?

32. What is your long-term vision for HIS integration at the hospital?

4. Closure Script

Thank you very much for your valuable time and insights. Your contribution is extremely important to this research and will help inform strategies for strengthening Health Information Systems integration in public healthcare institutions.

If you would like to receive a summary of the research findings upon completion, please indicate your interest.