



**HUMAN RESOURCE INFORMATION SYSTEM ADOPTION FOR
ORGANISATIONAL EFFECTIVENESS IN SELECTED GHANAIAN TECHNICAL
UNIVERSITIES**

by

ESTHER GYAMFI

**Submitted in fulfilment of the requirements of the degree of
DOCTOR OF PHILOSOPHY**

IN MANAGEMENT SCIENCES:

HUMAN RESOURCES MANAGEMENT

in the

Department of Human Resources Management

Faculty of Management Sciences

at the

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Date: 9 April 2026

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JANUARY 2025

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ABSTRACT

Human Resource Information Systems (HRIS) have become indispensable tools in enhancing organisational effectiveness through streamlined HR practices and data-driven decision-making. However, studies on HRIS within the Ghanaian University context have not received the necessary attention. This study explored the extent of HRIS adoption and its impact on organisational effectiveness within four selected technical universities in Ghana. Adopting a convergent parallel mixed-methods design underpinned by a pragmatic research paradigm, the study collected data from 306 senior members through quantitative methods and conducted qualitative interviews with three (3) participants. Purposive sampling for qualitative data and cluster and simple random sampling for quantitative data was employed. Thematic and statistical analyses were used to explore current HR processes, HRIS adoption, influencing factors and impacts on organisational effectiveness.

Findings reveal that while HR practices across the universities displayed strengths, there were notable gaps requiring improvement. HRIS adoption, although integral to daily administrative functions, showed variability in its effectiveness across recruitment, compensation management and broader HRM integration. Infrastructure deficiencies, such as unreliable internet and inadequate ICT resources, emerged as significant barriers to HRIS adoption, while factors like perceived complexity and data security concerns were not significant hindrances. The study also highlights the potential of HRIS to enhance operational efficiency and organisational learning and growth, although uncertainties remain regarding its financial impact on HR costs.

A conceptual framework was developed based on the Balanced Scorecard perspectives to holistically evaluate HRIS' impact on organisational effectiveness. This framework underscores the importance of strategic alignment between technology and institutional goals, offering practical insights for improved HRIS adoption and utilisation. By integrating qualitative and quantitative findings, this

research provides a comprehensive understanding of HRIS adoption in Ghanaian technical universities, paving the way for informed policy and practice interventions.

DECLARATION

I hereby declare that this thesis is my own work and is submitted in fulfilment of the requirements of the Doctor of Philosophy in the Department of Human Resources Management, Faculty of Management Sciences at the Durban University of Technology. I also declare that this thesis has not been submitted before to any other institution(s).

Signature:

Date: 27th January, 2025

DEDICATION

This thesis is dedicated to:

My parents - Mrs. Lydia Gyamfi and the late Elder Samuel Kingsley Gyamfi -
who invested in my education. My
husband: Prof. Ramos Asafo-Adjei,
and my children: Juliesta Efia Aso, Nana Amoako, Adwoa Kwartemaa and Nana
Baffour Awuah

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ACRONYMS

HRM	-	Human Resource Development
HRIS	-	Human Resource Information Systems
HR	-	Human Resource
TU	-	Technical University
IREC	-	Institutional Research and Ethical Committee
ERP	-	Enterprise Resource Planning
IT	-	Information Technology
E-HRM	-	Electronic Human Resource
MIS	-	Management Information System
LMS	-	Learning Management Systems
ICT	-	Information, Communication and Technology
TOE	-	Technological, Organisational and Environment Framework
SME	-	Small and Medium Enterprise
OE	-	Organisational Effectiveness
BSC	-	Balanced Scorecard
ROI	-	Return on Investment
TAM	-	Technology Acceptance Model
SPSS	-	Statistical Package for Social Sciences
KMO	-	Kaiser-Meyer-Olkin
SD	-	Standard Deviation
IOES	-	Impact on Organisational effectiveness
HPP	-	HRM practices and processes
FIA	-	Factors that influence the adoption and use of HRIS
AHS	-	Level of adoption and use of HRIS in Human Resource functions
GTEC	-	Ghana Tertiary Education Commission

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CHAPTER ONE

BACKGROUND AND OVERVIEW OF THE STUDY

1.1 INTRODUCTION

In this dynamic and ever-changing global business landscape, the adoption of technology-driven solutions has become a critical factor for organisational effectiveness. One such technological advancement is the Human Resource Information System (HRIS), which combines multiple Human Resource Management (HRM) functions, including recruitment, payroll, performance management and the management of employee data into a centralised system. Globally, HRIS has transformed the way organisations manage their human capital, leading to improved efficiency, better decision-making, and enhanced strategic planning (Sadiq, Khan, Ikhlaq and Mujtaba, 2022: 80).

The adoption of HRIS is not limited to the developed world. Developing regions, including Africa, are also recognising the potential of HRIS to drive organisational success. In Africa, the rapid digitalisation of business processes, coupled with the continent's growing economy, has spurred interest in HRIS as a tool for enhancing HR functions. Organisations across various sectors in Africa are increasingly adopting HRIS to streamline their HR operations, improve employee management, and support overall organisational goals (Abbas, Shah and Othman, 2021: 48). However, the extent of HRIS implementation and its effects on organisational effectiveness can vary significantly across different African countries due to diverse levels of technological infrastructure and economic development.

In Ghana, the integration of technology into existing processes has gained momentum, particularly within the higher education sector, where institutions are seeking to improve administrative efficiency and boost their human resource management capabilities. Universities, particularly, are under increasing pressure to adopt modern HR practices that can support their academic and administrative goals due to the large number of employees they must manage. Despite this growing

interest, the adoption of HRIS in Ghanaian technical universities presents unique challenges and opportunities which are influenced by several factors.

This study seeks to examine the adoption of HRIS in selected Ghanaian technical universities and its impact on organisational effectiveness. Specifically, this study aims to analyse the current state of HRM implementation and the level of HRIS adoption in selected Ghanaian technical universities. By identifying the challenges encountered and assessing the perceived benefits, the study seeks to provide valuable insights that can guide future HRIS adoption strategies and contribute to enhancing organisational effectiveness in the Ghanaian higher education sector.

1.2 BACKGROUND TO THE STUDY

The strategies, processes and practices used by organisations are constantly changing due to the impact of competitive global pressures and the advent of technological innovations. Moreover, the Covid-19 pandemic has necessitated the use of technology and online services in organisations, including educational institutions (Alqahtani and Rajkhan, 2020; Almaiah, Al-Khasawneh and Altunibat, 2020).

Scholars such as Das and Saha (2018), Quaosar and Rahman (2021) and Abbas, Ekowati, Suhariadi, Anwar and Fenitra (2023: 3553) have extensively studied and enhanced the effectiveness of management processes, particularly in terms of technological awareness, which is crucial for optimising managerial performance. Various departments and units within organisations now prefer the use of information systems in their practices and processes to achieve the maximum effectiveness they desire, and the Human Resource (HR) departments of organisations are no exception (Noutsu, Kamdjoug and Wamba, 2017: 2). This heightened technological awareness has ushered in a transformative phase in human resource management marked by the integration of information technology to meet the escalating demands by HRM managers. Das and Saha (2018: 10) indicate that HRIS plays an essential role in recruitment and selection, training and payroll administration in private

universities. Typical tertiary institutions employ thousands of staff members, encompassing academic and non-academic personnel, on both a full-time and part-time basis.

The task of managing the records of these staff members often presents numerous challenges. However, HRIS has emerged as a pivotal tool that promises to revolutionise traditional HR practices, offering streamlined processes, data-driven decision-making, and enhanced organisational effectiveness. HRIS is an integrated system used to gather, store and analyse information regarding an organisations' human resources (Bhaskar and Mohanasundaram, 2019: 325). It involves all aspects of managing employee demographic information, job information, compensation management, work scheduling, electronic signatures, attendance and leave tracking.

HRIS, when implemented effectively, can catalyse transformative change within universities, unlocking a myriad benefits. These include enhanced data accuracy and accessibility, streamlined HR processes from recruitment to retirement, real-time analytics for informed decision-making, personalised employee experiences, improved communication and collaboration, compliance adherence, and strategic workforce planning (Ilamosi and Oluyinka, 2020: 247). Furthermore, HRIS empowers HR professionals to transition from transactional roles to being strategic partners, leveraging data-driven insights to drive organisational agility and resilience. HRIS adoption stands as a cornerstone for enhancing organisational effectiveness in universities, empowering institutions to navigate complexity, drive innovation, and cultivate a thriving academic community. By embracing HRIS as a strategic enabler, universities can strategically prepare themselves to achieve long-term success in a rapidly changing educational landscape. Successful HRIS adoption in universities requires a holistic approach that encompasses strategic planning, stakeholder engagement, robust change management practices, and continuous evaluation and refinement. Institutions must undertake thorough needs assessments to identify existing pain points and align HRIS functionalities with specific organisational

objectives, be it enhancing recruitment processes; improving employee engagement; optimising training and development initiatives; or ensuring regulatory compliance.

However, the journey towards HRIS adoption in universities is not devoid of challenges. Academic institutions often encounter hurdles such as budget constraints, resistance to change, data security concerns, and the need for comprehensive training and support. Moreover, the diverse stakeholders within universities, including faculty, staff, administrators, and students, necessitate a nuanced approach towards HRIS implementation that aligns with universities' overarching mission and values. Despite the existence of strong evidence that HRIS plays important roles in managing human resources effectively, the adoption of these technological innovations in organisations in Sub-Saharan African countries have not been without hitches (Iwu, 2016:5). Like many other organisations in Sub-Saharan African, Ghanaian Technical Universities are no exception to the challenges of using technological innovations. As a result, the focus of this study is to establish the extent to which technical universities in Ghana have adopted and are using HRIS for organisational effectiveness.

1.3 TERMINOLOGY

The key terms of this study are explained below in order to offer a comprehensive understanding of the research. Further explanations and clarifications can be found in the literature review.

1.3.1 Human Resource Management (HRM)

Human Resource Management (HRM) is the organisational function focused on managing various aspects of employee relations, including compensation, recruitment, performance evaluation, organisational growth, safety, employee benefits, motivation, communication, training, and overall administration, all centred around supporting the workforce within the organisation (Lina, 2019:61). It involves

the process of recruiting, training, assessing and rewarding employees, while also managing labor relations, promoting health and safety, and ensuring fair treatment. (Dattaraju, 2020:30). In this study, HRM is defined to include all the HR activities carried out by HR departments/units.

1.3.2 Human Resource Information System (HRIS)

A Human Resource Information System (HRIS) is designed to capture, store and distribute data about an organisation's workforce. It aids in enhancing communication, facilitating interactions, and supporting the goals related to HR processes and services (Johnson, Lukaszewski and Stone, and 2016:236). It is a software application that integrates an organisation's human resources with information technology, enabling HR activities and processes to be conducted electronically on a computer-based platform. (Pieris and Preena (2020: 87). For this study, HRIS is defined as the integration of information systems and technologies into the HRM processes to achieve effectiveness and efficiency.

1.3.3 Organisational effectiveness (OE)

Organisational effectiveness represents the effectiveness of an organisation in achieving the outcomes as listed in its mission statement (Tiwari, 2019: 142). For the purpose of this study, organisational effectiveness is defined as a broader concept that encompasses more than just organisational performance.

1.3.4 Ghanaian Technical Universities

Technical Universities in Ghana form part of the higher educational institutions in the country with a mandate to provide industry-relevant courses across diverse disciplines and offer degrees at all levels. Thus, in the public settings of Ghana,

various categories of universities are identified, among them is the public technical universities category (Ghana Tertiary Education Commission).

1.4 PROBLEM STATEMENT

Organisations have extensively embraced and implemented technological advancements to enhance their core business operations. Nevertheless, Human Resources (HR) processes have lagged in adopting these technological strides, and HR departments frequently discover themselves reliant on antiquated manual procedures and practices. Gwambe (2020:2). Technical Universities, like other universities, record high volumes of employees in the form of teaching and non-teaching staff. Specifically, Technical Universities in Ghana are mandated to ensure that all their aims, goals and missions are effectively met. This means that these universities must attract and preserve skilled and knowledgeable human resources to fulfil this need. Managing these extensive volumes of employee information is a substantial and laborious undertaking that can result in numerous errors. Therefore, the utilisation of HRIS can help prevent these mistakes. HRIS could enhance HR processes for attracting and retaining the right human resources to do the job. However, how HRIS is aiding HR processes in Ghanaian Technical universities to achieve organisational effectiveness is still not well known. This study is consequently purposed on examining HRIS adoption in Ghanaian Technical Universities and its impact on organisational effectiveness.

Even though HRIS is now being embraced by many organisations, evidence suggests that studies on HRIS within the Ghanaian University context have not received the needed attention. Moreover, detailed documented studies on HRIS within the Ghanaian Technical University space are virtually non-existent. Extant literature within the Ghanaian domain have usually concentrated on banks and other manufacturing and mining companies (Akpalo, 2010; Ankrah and Sokro, 2012; Nyame and Boateng, 2015; Karikari, Boateng and Ocansey, 2015; Ankrah and Sokro, 2016; Arpoh-Baah, Odoom, Boakye, Okyere and Boateng, 2020, Hagan,

2021). However, the benefits, best applications and the weaknesses of existing HRIS in these universities can only be known and addressed through a study such as this.

Since much attention has not been given to HRIS adoption in Ghanaian Universities, this research intends to fill the existing gap within the Ghanaian context. Such insights into HRIS adoption will be vital for policymakers in Ghana's educational sector (including university managers and governments).

1.5 AIM AND OBJECTIVES OF THE STUDY

This study aims to explore the extent of HRIS adoption for organisational effectiveness in Ghanaian Technical Universities. The specific objectives are to:

- i. Analyse the current HR processes and practices in the selected Ghanaian Technical Universities;
- ii. Explore the level of adoption and use of HRIS in Human Resource functions in the selected Ghanaian Technical Universities;
- iii. Explore the factors that influence the adoption of HRIS in the selected Ghanaian Technical Universities;
- iv. Investigate the extent to which HRIS adoption impacts on organisational effectiveness;
- v. Provide a conceptual framework for effective HRIS adoption in the selected Ghanaian Technical Universities; and
- vi. Make recommendations for HRIS improvement in the selected Ghanaian Technical Universities.

1.6 RESEARCH QUESTIONS

- i. What are the current HR processes and practices in the selected Ghanaian Technical Universities?
- ii. To what extent is HRIS being adopted in the Human Resource functions of the selected Ghanaian Technical Universities?
- iii. What factors influence the adoption of HRIS in the selected Ghanaian Technical Universities?
- iv. How do HRIS adoption impact organisational effectiveness in the selected Ghanaian Technical Universities?
- v. How can HRIS adoption be effective in the selected Ghanaian Technical Universities?
- vi. How can HRIS be improved in the selected Ghanaian Technical Universities?

1.7 SIGNIFICANCE OF THE STUDY

This study holds significance for both current and future reform efforts within universities, particularly concerning HRIS implementation and management practices. It serves as a valuable source of consistent and high-quality information that can support informed decision-making by university management. Additionally, it establishes a reference point for similar studies within the higher education sector. Academics and students specialising in HR management will benefit from the study's contribution to the existing knowledge base regarding the factors influencing HRIS implementation in higher education institutions.

Furthermore, the study's findings will be beneficial for future researchers, addressing gaps in the current literature and contributing to scholarly work within both private and public universities. For HR professionals and organisations, understanding the challenges associated with HRIS implementation is crucial for effective technology integration and administration within the organisation. This study provides comprehensive insights into these challenges, thereby aiding management in implementing HRIS more effectively to enhance organisational efficiency.

1.8 SCOPE OF THE STUDY

According to the Ghana Tertiary Education Commission (GTEC), there are a total of ten (10) Public Technical Universities in Ghana that offer programmes leading to the award of various degrees (www.gtec.edu.gh). In this study, however, four TUs are used. Additionally, only the senior members (Teaching and Non-Teaching) of the four selected TUs participated. These staff were selected because they were able to provide usable responses to answer the research questions.

1.9 LIMITATIONS

Despite this study's valuable contributions to theory and management practice, it has several limitations. Firstly, the research is confined to the Ghanaian context, which may limit its applicability to other developed settings. This means that the unique aspects of the Ghanaian context may restrict the generalisability of the findings of the study. Secondly, the use of a questionnaire as a data collection tool means that participants did not have the opportunity to indicate other contextual factors and personal views with respect to HRIS adoption and usage in their various universities. Thirdly, the researcher encountered challenges in accessing key participants. For instance, the HR head of one of the universities refused to grant the researcher the opportunity for an interview. Despite these limitations, the study provides a clear and reliable account of participants' experiences and perspectives on HRIS adoption and usage at the selected universities.

1.10 LITERATURE REVIEW: A VIGNETTE

Extensive studies have been done to analyse HRIS in terms of its definitions, applications, roles, benefits, impacts and challenges in many organisations, and much effort has also been devoted to analysing the adoption, acceptance and use of HRIS. For this study, the review will cover the definitions, applications, the benefits and importance of HRIS. Other areas to be reviewed include: the factors influencing HRIS adoption and use, the challenges associated with HRIS and HRIS theories and models.

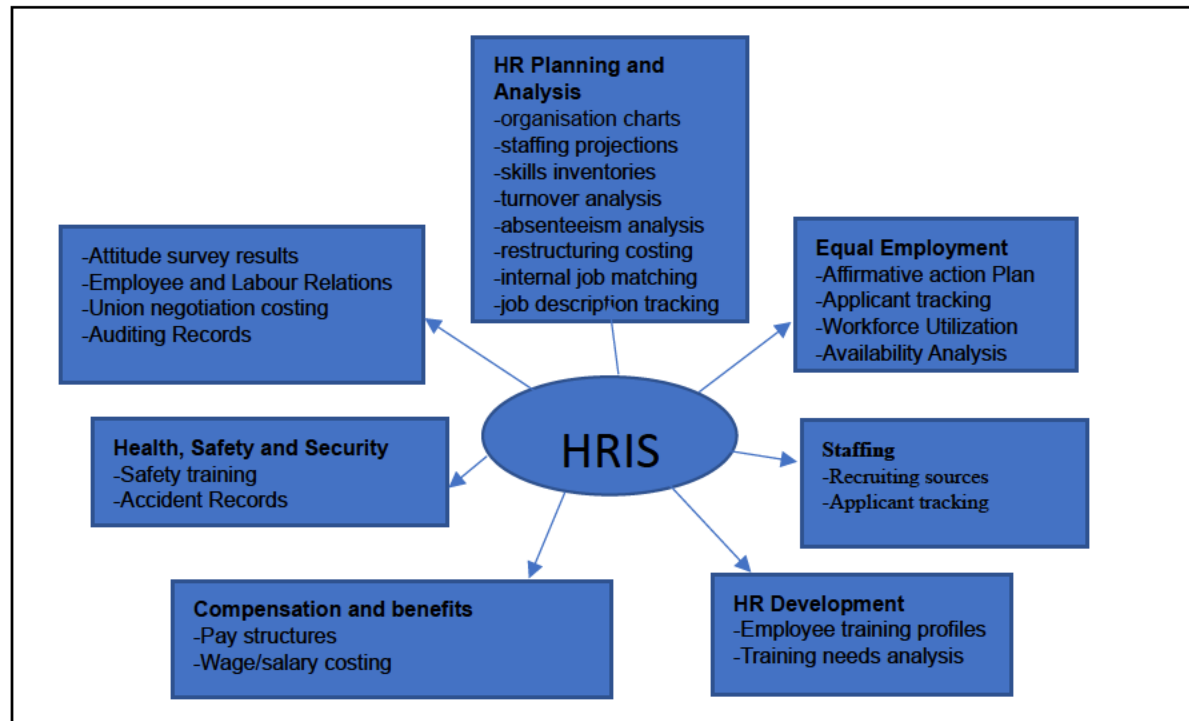
1.10.1 HRIS definitions, applications and uses

Several studies (Randle, Coleman and Kekwaletswe, 2017: 1103; Pieris and Preena (2020: 87) have defined HRIS. Randle, Coleman and Kekwaletswe (2017: 1103), for instance, define HRIS as a management system designed to help organisations oversee employees, their details, and activities, with the goal of delivering benefits to organisations' strategic planning. According to Al Mamun and Islam (2016: 29), an HRIS is an information system designed to gather, store, process, and retrieve HR data, thus enabling organisations to effectively pursue their strategic goals. The definitions of HRIS from the various studies have a common theme that explains HRIS to be the integration of information systems into the HRM processes to achieve effectiveness.

According to Debnath and Bhattacharjee (2019), the applications of HRIS vary with end-users, type of organisations and the status of the economic condition of a particular country. Several studies (Khan, Hussainy, Khan and Khan, 2017; Das and Saha, 2018; Sugata Debnath and Bhattacharjee, 2019; Bali, 2019) have focused on different applications of HRIS in the HR functions. Das and Saha (2018: 1), for instance, purport that the application of HRIS occurs in three stages. The first stage focuses on automating routine information processing, managing everyday paperwork at the operational level. In the second stage, the system offers flexibility for detailed inquiries and report generation. The third stage involves a Decision Support System that aids decision-making at higher organisational levels. Ilamosi

and Oluyinka (2020: 254) affirm this by indicating that HRIS aids in planning, administration, decision-making and control, enabling applications like employee selection and placement, payroll and pension management, training forecasts, and performance assessment. A summary of HIRS applications and usage as proposed by Das and Saha (2018:5) is given in Figure 1.1 below.

FIGURE 1.1: APPLICATIONS OF HRIS



Source: Das and Saha (2018: 5)

1.10.2 Importance and benefits of HRIS

Organisations adopt new technologies and systems when they are convinced of the benefits they would derive from them. Anupa (2021: 23) notes that the benefits of HRIS vary amongst organisations, with some using it to reduce costs while others employ it to enhance communication efficiency. Several scholars have extensively examined the importance and advantages of HRIS for organisations (Khan *et al.*, 2017: 139; Kamal, 2018: 22; Lina, 2019: 64). Existing literature highlights a range of benefits associated with Human Resource Information Systems (HRIS), including

improved efficiency in HR operations; the ability to generate diverse HR reports, a transition towards strategic Human Resource Management (HRM); and a comprehensive restructuring of the organisational HR function. It is clear that organisations need to invest in HRIS to fully harness and capitalise on these advantages.

1.10.3 Factors influencing the acceptance and use of HRIS

Organisations, striving to become more competitive, more efficient and more profitable, invest hugely in new technologies. However, the acceptance and use of new technologies in the workplace is hindered by many factors. This makes the investment in these new technologies a great loss to many organisations (Skoumpopoulou, Wong, Ng and Lo, 2018: 219). Several studies (Aksoy and Sallam, 2018; Dissanayake and Nandasena, 2019; Rath and Das, 2020; Menant, Gilibert and Sauvezon, 2021) have therefore concentrated on examining the factors that influence the acceptance and use of HRIS in organisations. Moreover, Dissanayake and Nandasena (2019: 72) considered these factors in terms of internal and external environmental elements. Dissanayake and Nandasena (2019:72) describe internal environmental factors as including employee willingness and commitment, organisational demographics, management support and commitment, corporate culture as well as the perceived benefits of the system. The external environmental elements were captured as competitive pressure, support of software experts and branding Government policies and network externalities.

1.10.4 Challenges of HRIS

Organisations face numerous obstacles when adopting and implementing new technologies. Various researchers (Alhalalmeh, 2018; Girisha and Nagendrababu, 2020) have identified key challenges to the successful use of HRIS as a lack of top leadership commitment; lack of infrastructure and incompatibility of software; lack of sufficient financial support and management; and lack of sufficient capital and skills. Additional challenges involve the costs of installing and maintaining an HRIS; limited cooperation and integration with other departments; resistance to cultural change within the organisation; and the complexity of HRIS, which can affect its acceptance

by employees and key managers. Ferdous, Chowdhury and Bhuiyan (2015: 36), for instance, aver that top management's reluctance, privacy issues for employees, organisational internal resistance to implementing HRIS and the conversion costs are the main challenges facing some companies in Bangladesh.

1.10.5 Organisational Effectiveness

Organisational effectiveness measures the successful functioning of organisations in reaching their goals, and HRM has consistently been crucial in enhancing organisational effectiveness. (Oswal and Narayanappa, 2015). Several scholars have confirmed the relationship between HRM practices and organisational effectiveness (Teimouri, Chegini, Jenab, Khoury and LaFevor, 2016; Mazibuko and Govender, 2017; Teimouri, Hosseini, Imani and Bagheri, 2018; Kansal and Singhal, 2018; Johnson, Nguyen, Groth and White, 2018). Teimouri *et al.* (2018), for example, analysed the effects of HRM practices on organisational effectiveness and found that there is a positive and significant relationship between effective HRM functions such as training, selection and recruitment, compensation and performance evaluation and organisational effectiveness.

1.10.6 HRIS theoretical framework

Countless models and theories have been propounded to support the adoption of HRIS. Researchers have used models such as the Technology Acceptable Model, Technology; Organisation and Environment (TOE) framework; The Institutional Theory; Unified Theory of Acceptance and Use of Technology (UTAUT); Diffusion of Innovation (DOI); Work Adjustment Theory; Actor Network Theory (ANT); and Resource-Based View (RBV) to underpin their studies. Particularly, Rahman, Qi and Jinnah (2016) used the UTAUT model to determine employees' attitudes toward HRIS adoption in the Bangladesh banking and financial sector. Rahman *et al.* (2016: 8) found that social influence has both direct and indirect effects on the adoption of HRIS. Scupola and Pollich (2019: 1) also applied the Technology, Organisational and Environmental Framework to examine the determinants of HRIS adoption in the Danish Small and Medium Enterprises. Scupola and Pollich (2019: 1) purport that

perceived benefits, organisational knowledge and expertise and top management support are proven significant in driving HRIS SMEs' adoption decisions. This study adopts the updated DeLeon and McLean (2003) Information System Success Model to evaluate the success of the HRIS at Ghanaian universities and employs the Technology, Organisational and Environmental (TOE) framework to examine the factors that influence the adoption of HRIS at the universities because of their proven effectiveness in HRIS studies.

1.11 RESEARCH METHOD AND DESIGN

Research methods refer to the systematic strategies, techniques, and procedures used to collect and analyse data to gain insights or draw conclusions about a particular subject (Satpathy, Barman, Saha and Roy, 2023: 9). In any research, the choice of method depends on the research question, objectives, and the nature of the data being collected (Khan, Raman, Sambamoorthy and Prashanth, 2023: 1). This section presents the research method and design employed in the study, detailing the philosophy that guided the study, the data collection and analysis methods and the interpretation processes. By articulating the research method and design, this section aims to provide clarity on how the study was structured to yield valid and reliable results.

1.11.1 Research paradigm

This study adopts a pragmatic research paradigm within a mixed method approach, guided by the belief that researchers can employ the methodological approach best suited to the research problem at hand. Pragmatism allows for flexibility in choosing combinations of qualitative and quantitative methods to meet the study's objectives effectively. Scholars like Dyer (2020: 3) and Moosmayer, Waddock, Wang, Hühn, Dierksmeier and Gohl (2019: 921) attest to the success of pragmatism in answering research questions. This approach transcends the traditional divide between qualitative and quantitative methods, prioritising whether the research helps uncover what the researcher seeks to know. The study's sampling, data collection and analysis techniques incorporate both quantitative and qualitative processes, aligning

closely with pragmatism. In conclusion, the pragmatic approach, particularly within mixed methods, is deemed appropriate and effective for social science research, as evidenced by the study's methodology and outcomes.

1.11.2 Research approach

The study chose a deductive research method due to its suitability for incorporating measurable data to derive conclusions and make inferences about the research question or problem. This approach, as outlined by Kapoor, Mahamuni, Bhowmick and Qureshi (2022:20), involves testing existing theories, formulating explicit research questions, using quantitative techniques, optimising time and leveraging established knowledge within the HRM domain. In summary, the deductive research method was selected to facilitate rigorous testing and analysis, building upon existing theoretical frameworks and contributing to the body of knowledge in Human Resource Management.

1.11.3 Research design

The study adopted a convergent parallel mixed methods approach as the most appropriate research design, integrating elements of both qualitative and quantitative research methodologies. This method is described by Creswell (2018) as involving the gathering and analysis of quantitative and qualitative data independently, comparing or synthesising outcomes, and forming an overarching interpretation. Given the complexity of the research objectives, which require understanding HRIS adoption and its impact on organisational effectiveness from multiple perspectives, a mixed methods design was essential. This approach allows for a more comprehensive and rigorous analysis, leveraging the strengths of qualitative and quantitative methods while compensating for their respective weaknesses. By combining these methods, the researcher was able to arrive at more precise conclusions and gain a deeper understanding of the research topic.

1.11.4 Population

According to the Ghana Tertiary Education Commission (GTEC), there are a total of ten (10) Technical Universities in Ghana (www.gtec.edu.gh). The study's population comprises the teaching and non-teaching senior members from four out of ten Ghanaian Technical Universities as of 2023. The teaching staff includes Assistant Lecturers, Senior Lecturers, Associate Professors and Professors while the non-teaching staff comprises Junior Assistant Registrars, Assistant Registrars, Senior Assistant Registrars and Deputy Registrars. This targeted population was chosen due to their relevance in providing valuable data to address the research questions effectively. The total population for this study was 1413 staff members for the quantitative aspect and 4 principal officers for the qualitative aspect. As emphasised by O'Leary (2017: 204), having a clear and well-defined population in mind is crucial for sampling purposes.

1.11.5 Sampling Method

This study utilised a combination of probability and non-probability sampling methods. For probability sampling, the researchers employed a cluster sampling approach in three stages. Initially, Ghanaian technical universities were grouped into three belts. In the second stage, 50% of the universities from each belt were randomly selected to ensure a representative sample across the country. In the third stage, a sample frame was created based on the numbers of teaching and non-teaching staff in the selected universities. Subsequently, a proportional allocation of the sample was determined for both staff categories in the four chosen universities. Participants were then selected using the simple random sampling technique through a lottery method. On the other hand, for non-probability sampling, the Heads of the Human Resource Units from the selected universities were purposefully chosen to participate in the study. This intentional selection was based on the understanding that these individuals, in their roles, possess crucial insights and data relevant to specific aspects of the research questions. Consequently, 306 participants were selected for the quantitative data, while 4 participants were selected for the qualitative data.

1.11.6 Data Collection

It is evident in the extant literature that most research involves the collection of data. Usually, the task of data collection starts after the research problem is identified and the research design is finalised (Mazhar, Anjum, Anwar Al and Khan, 2021: 6). Taherdoost (2021: 10) describes data collection as the process of gathering, assessing and analysing accurate insights for research, using established and reliable methods. The data collection tools used for the study are a survey questionnaire and an interview guide.

1.11.6.1 Questionnaire

The study utilised a closed-ended questionnaire designed to gather data from senior members of the four selected Technical Universities. The questionnaire employed a 5-point Likert scale, ranging from strongly disagree to strongly agree. It comprised five sections covering demographics, human resource practices, level of HRIS adoption, factors influencing HRIS adoption, and the impact of HRIS on institutional effectiveness.

1.11.6.2 Interview Guide

An interview guide was employed to gather data from the Heads of the HR units in the selected universities. The interview guide focused on obtaining information regarding the current HR processes and practices, particularly emphasising the application of HRIS within the Technical Universities. It also delved into the factors influencing HRIS adoption and usage within these institutions. Additionally, the interview guide sought to gather insights into the impact of HRIS on organisational effectiveness.

1.12 DATA ANALYSIS

Data analysis involves organising and interpreting textual or visual information to uncover explicit and implicit insights, exploring participants' perspectives, methods, understanding, beliefs, emotions and experiences to assess how a phenomenon is

formed (Mezmir, 2020:15). This study used the convergent mixed-method approach that makes it possible for the quantitative and qualitative data to be analysed independently and then integrated (Creswell, 2018: 343). The researcher therefore used a side-by-side comparison approach to combine quantitative and qualitative data. This comparison approach requires that the researcher reports the quantitative results first, followed by the qualitative results, which either confirms or disconfirms the quantitative results. According to Wilson (2017), mixed methods help to analyse data in the same research so that the strengths of each help offset the limitations of the other.

1.13 PILOT TEST

A pilot study was conducted using a sample of twenty (20) senior members randomly selected from a different university to assess the reliability and understandability of the items. The purpose of this pilot study was to ensure that the questions were clear, comprehensible, and appropriately framed for the study's objectives. Feedback from the pilot study indicated that while the questions were generally understood, some were deemed too lengthy and technically worded, prompting revisions for clarity and brevity. Additionally, the allocated time for completing the questionnaire was found to be sufficient. Overall, the pilot study aimed to enhance the reliability and validity of the research instrument, ensuring that data collection proceeded smoothly and effectively.

1.14 VALIDITY

Validity refers to the extent to which a test achieves its intended goal (Bahariniya, Ezatiasar and Madadzadeh, 2021: 10). In other words, validity indicates how accurately a scale measures what it is intended to measure. High validity in research signifies that the results produced are consistent with reality (Bahariniya, Ezatiasar and Madadzadeh, 2021: 10). In this study, validity was established through the pilot test study conducted, as well as from the literature. To ensure validity, the study posed questions that not only aligned with the research objectives but also corresponded with findings from the literature. This

was done by including questions on generally agreed factors that measure HR practices, level of HRIS adoption, determinants of HRIS adoption and usage in literature. Moreover, the statistical test of Factor Analysis was run to ensure the validity of the instrument. Additionally, interviews were conducted to improve the quality of the research.

1.15 RELIABILITY

To ensure the reliability of the findings, a thorough review of existing literature was conducted to define the problem, aims, and objectives of the study. This review provided the researcher with insights into the methodological and theoretical gaps in previous research on the subject, guiding the design of the study's methodology. Additionally, similar questions were included in both the questionnaire and interviews across the different universities involved, ensuring consistency and accuracy in the findings. For the university selection process, the researcher specifically chose four technical universities in Ghana to enhance the accuracy and consistency of the results. Additionally, all participants underwent the same selection process to ensure the accuracy of the data collected. Statistically, Taber (2018) and Kennedy (2022: 20) emphasised that Cronbach's Alpha reliability test is a method to check instrument reliability. The reliability of the study was therefore assessed using Cronbach's alpha test. The instrument achieved a Cronbach's Alpha score above 0.60, confirming its reliability (Taber, 2018).

1.16 TRUSTWORTHINESS AND CREDIBILITY

To ensure the trustworthiness of qualitative inquiries, Guba (1981) outlined four essential parameters for conducting such studies: credibility (corresponding to internal validity), transferability (linked to external validity or generalisability), dependability (focusing on reliability) and confirmability (emphasising objectivity). These criteria were utilised in the qualitative aspect of this study.

1.17 ANONYMITY AND CONFIDENTIALITY

This study strictly adhered to the principles of anonymity and confidentiality. To achieve this, questionnaires and interview questions did not include personal details such as participants' names. Moreover, pseudonyms were used to replace the actual names of the selected technical universities. The researcher distributed the questionnaires electronically via WhatsApp to the selected participants. Additionally, to ensure confidentiality during the qualitative data collection, the researcher personally conducted the interviews.

1.18 ETHICAL CONSIDERATIONS

Prior to the commencement of the study with selected universities, Gatekeeper's permission to conduct research was obtained from these participating institutions' relevant offices. This followed the issuing of the ethical clearance by the institutional research ethics committee within which the study is registered (IREC). Participants were provided with a letter containing information regarding the nature of the study, the research purpose, the use of research findings and the extent of participant involvement, including confidentiality.

1.19 CHAPTER SUMMARY

This chapter provided a foundational overview of the research study, beginning with the background, which sets the context and significance of the study. It highlighted the key issues and the inspirations that drove the research, offering a comprehensive understanding of the topic's relevance. The problem statement was clearly articulated, outlining the specific challenges or gaps in knowledge that the study aims to address. This section established the focus of the research and underscores the importance of finding solutions or generating new insights. The aim of the study is presented, detailing the specific objectives the research intends to achieve. These objectives guide the study's direction and inform the subsequent methodology. The chapter also included a brief literature review, summarising the existing research and theoretical frameworks relevant to the study. This review helps identify what is already known and where the current study fits within the broader academic

discourse. Finally, the methodology section was introduced, providing a preliminary outline of the research methods and design that will be used to collect and analyse data. This section ensured that the study is methodologically sound and capable of addressing the research problem effectively. Overall, this chapter lays the groundwork for the research, ensuring that the study's purpose, significance, and approaches are understood. The next chapter examines the evolution of human resource information system, its adoption and applications.

CHAPTER TWO

EVOLUTION OF HUMAN RESOURCE INFORMATION SYSTEMS, ITS ADOPTION AND APPLICATIONS

2.1 INTRODUCTION

In the rapidly advancing landscape of new technologies, Human Resource Information Systems have emerged as pivotal tools that transform how organisations handle their human resources. Based on the objectives of the study, this chapter is focused on themes such as the dynamic evolution of HRIS, and its transformative journey from rudimentary manual HRM processes to sophisticated digital platforms that drive efficiency, strategic decision-making and competitive advantage. The historical development of HRIS is traced in this chapter, highlighting key milestones and technological innovations that have shaped its trajectory. The factors that have driven the adoption of HRIS, including the increasing demand for data-driven decision-making and the need for streamlined HR processes, are also examined. Additionally, the diverse applications of HRIS in contemporary organisations, illustrating how these systems support not only operational efficiency, but also strategic human resource management are addressed. Moreover, factors that influence the adoption and use of HRIS in organisations are discussed in relation to existing theories. By exploring the evolution, the adoption and the applications of HRIS, this chapter is aimed at providing a comprehensive understanding of how these systems have become integral to modern organisational success and how these systems continue to adapt to the constantly evolving business environment.

The chapter ends with a review of some theoretical models underpinning HRIS adoption.

2.2 A HOLISTIC VIEW OF HUMAN RESOURCE MANAGEMENT (HRM)

Much has been written in the literature regarding the emergence and development of Human Resource Management. Some scholars believe that HRM emerged from the human relations movement, which began in the early twentieth century due to the work of scholars such as Taylor, Mayo and Fayol (Obedgiu, 2017: 986). The Industrial Revolution began when humans shifted to using steam power and machinery to replace manual labour. In response to this change, experts began exploring ways to enhance worker productivity (Kadam, 2022: 213).

In the late 1800s and early 1900s, a scholar named Frederick Taylor, after observing workers at a steel company, found that many workers put in less than their maximum effort, a gesture he tagged soldiering (Adediran, 2021: 3). Taylor, therefore, suggested a piece-rate payment system based on individual worker productivity, replacing traditional fixed-rate pay with scientific work standards (Corbacioglu, 2017: 79). Taylor introduced a new ideology focused on optimising human effort, aiming for maximum output with minimal effort. The approach emphasised specialisation, the division of labour and the concept of line management. Taylor's efforts began the managerial function of control and marked the beginning of scientific management (Adediran, 2021: 3). The concept of scientific management aims to establish objective methods for assessing employee productivity, moving away from a reliance on managers' subjective evaluations (Kadam, 2022: 213).

In the early 1900s, Henri Fayol was the first to present a comprehensive theory on general management, outlining fourteen principles and five key elements of management (Edwards, 2018: 45). According to Ramakrishna (2019: 169), these principles enabled a better understanding of the relationship between human and other resources in accomplishing organisational purposes. The works of Fayol supported and complemented Taylor's scientific management. The main difference

between their works was that Taylor's orientation was towards the management of work while Fayol's was towards the management of organisations. Their works came to be known as the 'classical management approach'. They both established the fact that the management of personnel and material resources are central to organisational success (Adediran, 2021: 4).

However, the classical management approach attracted various reactions, commendations and criticisms. Some scholars raised criticisms that the classical management approach has led to a decline in working conditions, social patterns and the division of labour (Kadam, 2022: 213). For instance, Mayo (1949) conducted a series of experiments on employees at the Hawthorne Works of the Western Electric Company in the USA. Mayo's (1949) experiments did not accept Taylorism but rather proved that work satisfaction and performance rely more on working conditions, attitudes, communications, positive management response and encouragement (Warner and Busse, 2017: 3). The results emphasised that the group dynamics and social structure within an organisation play a critical role in influencing productivity, either positively or negatively. This led to a push for increased worker participation, enhanced trust and transparency in the workplace as well as a stronger focus on teams and group interactions. In conclusion, while Taylor's Scientific Management principles significantly influenced the development of industrial engineering, quality control, and personnel departments, the Human Relations movement scholars emphasised the role of the organisation's leadership and personnel department. HRM concepts such as group dynamics, teamwork, motivation and organisational social systems all spawned from Mayo's work in the mid-1920s (Önday, 2016: 102). The human relations aspect of Mayo's research established a foundation for what is now known as Human Resource Management in the field of management (Adediran, 2021: 1).

2.2.1 HRM evolution across the world

The evolution of HRM has been thoroughly examined on a country-by-country basis to provide a comprehensive understanding of how different national contexts

influence HRM practices. This section highlights the diverse technological, cultural and regulatory factors that have shaped the implementation of HRM functions in various countries. By examining these variations, the study offers valuable insights into the unique challenges and opportunities faced by organisations in different regions, emphasising the importance of tailoring HRM strategies to fit the specific needs and circumstances of each country. Thus, several scholars have attempted to give extensive historical accounts of HRM development in their respective countries (Ayentimi, Burgess and Brown, 2018: 126; Zhu and Warner, 2019: 87; Darwish, Wood, Singh and Singh, 2020: 375). For instance, Abdul-Kahar and Sulaiman (2017: 8-9) explored the history and policy practice of HRM in Ghana and concluded that government interferences, political polarisation and the divide and rule tactics have negatively impacted the progress and development of HRM in Ghana and that much needs to be done in order for the nation to benefit from the full complement of HRM practices. In a related study, Ayentimi, Burgess and Brown (2018: 126) explored the evolution of Human Resource Management (HRM) in post-colonial Ghana and identified factors that have hindered its progress. These factors include cultural beliefs and assumptions, reverence for social status, power and authority; the involvement of religious institutions in business; and the absence of professionalisation and regulatory bodies in HRM, all of which have impeded the development of HRM practices in Ghana over the years.

Zhu and Warner (2019: 87) examined the development of HRM in China to highlight the dynamic interplay of convergence, divergence and contextualisation within the broader field of HRM. Zhu and Warner (2019) argued that the methods used to manage people in China have either aligned with or differed from Western and foreign-developed theories and practices, depending on the institutional context and the specific period. On their part, Darwish, Wood, Singh and Singh (2020: 375) proffer that the development of the Indian HR paradigm occurred in distinct phases. During the colonial era, various laws were enacted to offer some protection to employees and their unions. These regulations played a key role in shaping the evolution of the personnel function, emphasising proper procedures and

bureaucratic consistency within larger organisations in India. This eventually led to the progression from the personnel function to the emergence of HRM.

Based on the discussion thus far, it is obvious that HRM development is a continuous process shaped by ongoing research, which seeks to position it advantageously for the benefit of organisations globally. The growth and evolution of HRM are influenced by social, economic, political and industrial factors, which are specific to each country (Brewster and Haak-Saheem, 2020: 8). As a result, the rate at which HRM develops and progresses varies from one country to another.

2.2.2 HRM conceptualisation

Universally, Human Resource Management has been perceived to be a multidisciplinary function that has endured tremendous changes in its functionalities. As a result, the role of an HRM manager has evolved from merely addressing personnel matters to developing and executing complex strategies for organisations (Nasir, 2017: 217). This multidisciplinary nature of HRM has led to the many different definitions of HRM being propounded by scholars (Lina, 2019; Dattaraju, 2020; Safi and Shobaki, 2021; Rakesh, Muhammed, Manoj and Abhilash, 2022).

Human Resource Management is the organisational function responsible for managing various aspects related to employees within organisations. This includes tasks such as recruitment, compensation, performance evaluation, organisational development, safety, employee benefits, motivation, communication, training and administrative duties (Lina, 2019: 61). Otoo (2019: 950) defines HRM as a function within organisations that aims to optimise the use of employees to achieve both organisational and individual objectives. It involves creating management systems that ensure that human talent is utilised efficiently and effectively to meet organisational goals. According to Dattaraju (2020: 30), it involves the process of hiring, training, assessing and compensating employees, as well as managing labor relations and ensuring their health and safety and concerns related to fairness.

Opatha (2021: 31) argues that the definition of HRM should cover the strategic perspective, partnership perspective and sustainable perspective to managing employees.

Additionally, Safi and Shobaki (2021: 151) perceive HRM as the key function that manages the human element within organisations, acting as the central link between departments while overseeing employee performance, workflow and administrative matters to ensure optimal service to both management and employees. Similarly, Rakesh *et al.* (2022: 1) define HRM as the process of aligning and managing an organisation's workforce to achieve mutual goals through the effective recruitment, development and retention of talent. Accordingly, Opatha (2021:31) offers this holistic definition of HRM as:

The adoption of certain functions and activities for utilising employees efficiently and effectively in an organisation to achieve its goals, which include satisfying the key stakeholders to a possible extent and contributing positively to the natural environment. It involves the formulation, implementation and on-going maintenance of strategies, policies, procedures, rules, practices and systems of managing employees strategically, anticipatorily and sustainably.

Central to these HRM definitions and characteristics is the synergistic interplay of the aspects and practices of HRM. To fully understand HRM in terms of content, implementation, outcomes and limitations, it is important to look at the HRM practices divergently and convergently to comprehend the interplay of the independent aspects of HRM and how they meld into a systemic whole to engender the proper functioning of organisations the world over. In this study, HRM is defined to include all the HR activities carried out by HR departments/units.

2.2.3 Core practices of HRM

HRM involves many functions in corporate organisations. HRM functions refer to specific practices, formalised policies and philosophies that are drawn to motivate

and to retain employees to ensure the effective functioning, growth and survival of organisations (Christopher, 2019: 25). According to Kapur (2020: 3), these practices are designed based on the individual, organisational culture, ideologies and values.

There is a wide range of HRM practices that organisations implement, as practices listed in the extant literature (Miah and Hafid, 2019: 77; Mira, Choong and Thim, 2019; Jashari and Kutllovci, 2020; Easa and Orra, 2021; Anwar and Abdullah, 2021: 35). The practices found in the literature include training and development, employee recruitment and selection job analysis and compensation management. Other practices are employee performance management, managerial relations, employee engagement and communication, health and safety, succession planning and career planning, policy formulation, performance management and administrative responsibilities. Lenart-Gansiniec, Sypniewska and Chen (2023: 24) opine that HRM practices improve the efficiency and results achieved by employees. Similarly, Ibrahim and Paul (2020: 133) indicate that HRM practices such as recruitment and selection, training and development, performance management and compensation management help improve organisational performance and effectiveness. It is evident that HRM practices are multifaceted, paving the way for the next section, which explores some of the core functions of HRM in greater detail.

2.2.3.1 Recruitment, selection and placement

The success of organisations has been linked to the types of individuals they employ (Mahapatro, 2021: 5). Therefore, there is a need for organisations, including educational institutions, to have well-defined and detailed HRM policies and practices that stipulate how employees can be recruited, selected and placed. Geetha and Bhanu (2018: 63) argue that in an era of heightened global competition and a fast-evolving business environment, corporate success increasingly relies on attracting and retaining top-quality individuals whose contributions can significantly benefit the organisation. Therefore, recruitment should focus not only on drawing applicants but on finding qualified candidates to fill open positions (Madanat and Khasawneh, 2018: 3). Stephen, Cinjel, Apikins and Samuel (2019: 188) emphasise

that recruitment, selection and placement are crucial HR functions that ensure that organisations have a suitable supply of human resources across all stages and positions, at the appropriate time and in the right place.

Odor, Martins-Emesom and Bakwuye (2019: 27) assert that an effective recruitment process should adhere to best-practices and follow equal opportunity principles. Applicants should not be given preferential treatment based on factors such as race, gender, marital status, disability, sexual orientation, family responsibilities, ethnic background, trade union affiliation or political and religious beliefs. Muduli and Trivedi (2020: 1617) proffer that the recruitment process starts by informing potential candidates about job openings using various recruitment strategies. These strategies serve as communication tools for recruiters to share relevant and accurate job information with prospective candidates, which encourages them to apply for the position within the organisation. An effective recruitment process should inspire and motivate a wide range of qualified applicants to apply for an available position within the organisation (Odor *et al.*, 2019: 22).

Hamza *et al.* (2021:1) define recruitment as the process of identifying, selecting and hiring the most qualified candidate, whether from within or outside the organisation, for a job opening. Similarly, Abbas, Shah and Othman (2021: 47) argue that recruitment is the initial step in selecting the right person for the right job, and the growth of an organisation depends thereupon. This process involves planning, targeting, identifying, shortlisting and selecting the best talent for a specific role.

The choice of a particular method of recruitment depends on the source of recruitment the organisation intends to utilise (Muduli and Trivedi, 2020: 1615). Research has shown that there are two main sources of recruitment available to an organisation, and these are the internal and external sources (Stephen, Cinjel, Apikins and Samuel, 2019:189; Karim, Bhuiyan, Nath and Latif, 2021: 20; Ujebe, Echezona and Ogbonnia, 2023: 93; Mumba and Qutieshat, 2023: 19). Karim *et al.* (2021) identify two main methods of recruitment, namely, external recruitment and

internal recruitment. Internal source recruitment involves organisations hiring people from within to fill a position(s). This can be done through job posting, promotions transfers and rehiring of former employees. External source recruitment involves attracting applicants from outside a particular organisation to fill vacant positions (Stephen, Cinjel, Apikins and Samuel, 2019: 189). Wolniak (2018: 477) notes that filling a specific position within an organisation can be achieved through internal recruitment, where candidates are sourced from within the company or through external recruitment, where individuals are hired from outside the organisation.

Wolniak (2018: 477) explains that internal recruitment involves encouraging current employees to apply for open positions within the organisation. In this way, the recruiter can precisely select the desired employees in terms of their incompetencies, abilities and skills. On the other hand, external recruitment can be done through advertisements in both print and electronic media, as well as on the internet. External recruitment makes it possible for organisations to attract new employees who have new potential and who are not compromised by systems (Wolniak, 2018: 477). However, Muduli and Trivedi (2020: 1617) argue that an organisation's decision to adopt various recruitment methods depends on their effectiveness, including factors such as easy accessibility, reliability of resources; efficient processing; ability to generate favorable responses; meeting deadlines and cost-effectiveness.

Deciding to allow an individual to join the organisation is the critical next stage to recruitment (Hunter *et al.*, 2017: 248). Selection is the process of assessing and interviewing candidates for a particular role to ensure the most suitable person is chosen. It includes multiple stages, such as receiving applications, screening, conducting interviews, administering tests, performing medical checks, verifying references, and finally, making the hiring decision. (Hamza *et al.*, 2021: 2). According to Puchert, van Niekerk and Viljoen (2022: 4), interviews are the preferred selection method, as they provide recruiters with specific information regarding the applicant's

personality, attitudes and transferable skills, which are deemed necessary to make an appropriate selection decision.

Fitri, Handaru and Yohana (2021: 96) describe employee placement as the process of assigning responsibilities to workers based on their abilities and expertise. Once an employment offer is made, the next step is to assign the newly hired employees to their respective areas of specialisation. Shin and Hur (2024: 7416) further explain that a poor employee placement system leads to incompetent, dissatisfied and disengaged employees, resulting in low performance. Blicblau *et al.* (2016) aver that proper employee placement positively impacts employee performance. Similarly, Siahaan *et al.* (2016) indicate that employee placement is positively correlated with employee performance in the banking sector. The placement of employees is therefore a process of utilising competencies such as the knowledge, skills and expertise possessed by employees to place them in areas of work that are considered appropriate; it also involves distributing employees based on the potential possessed by candidates to succeed in their jobs. Many organisations initially hire new staff on temporary or probationary contracts, typically lasting one year. At the end of this period, the appointment may be made permanent if the new employee's performance meets the required standards. (Rosna *et al.*, 2023: 1377).

Recruitment and selection in the Ghanaian context have not been without hitches. For instance, Otoo, Assuming and Agyei (2018: 211) conducted a study to assess the recruitment and selection practices of public sector higher education institutions. The study revealed that public sector higher education institutions make use of recommendation as the predominant mode of selection which leads to issues of favouritism, partiality or bias in recruitment. Furthermore, there were delays in feedback after interviews. The study concluded that the recruitment practices in public sector higher education institutions in Ghana are ineffective.

The importance of recruitment and selection in Human Resource Management (HRM) cannot be overstated. It is essential for every organisation to conduct the

recruitment process in a manner that best aligns with its specific recruitment objectives. Additionally, these processes must be executed professionally to ensure the acquisition of highly competent candidates. This will in turn lead to enhanced performance and productivity for the organisation.

2.2.3.2 Training and development

Training and development involve ongoing efforts by organisations to enhance employee capabilities by providing them with the necessary knowledge and skills. Rodriguez and Walters (2017: 208) and Madanat and Khasawneh (2018: 3) observe that in today's dynamic work environment, employees must be skilled in performing a variety of tasks efficiently and effectively. A well-structured training and development programme provides employees with ongoing knowledge and experience, enabling them to work productively. Laing (2021: 439) notes that the formal education system does not adequately equip individuals with job-specific skills for positions within an organisation. Therefore, employees need extensive training to acquire the expertise required to contribute meaningfully to the organisation's growth. Employee training and development help both organisations and individuals achieve the skills and competencies needed to perform specific roles.

Sendawula *et al.* (2018: 3) categorised training and development under two main categories, namely on-the-job training and off-the-job training. Employees of an organisation can receive on-the-job training through internal programmes while performing their duties. Common on-the-job training and development methods include apprenticeships, induction programs, and job rotation. For off-the-job training, employees receive training outside the organisation. Methods used for this type of training may include simulations, role-playing, case studies, and classroom lectures (Vasanthi and Basariyab, 2019: 671-672).

Shafini *et al.* (2016) as referenced in Mahadevan and Yap (2019: 8), contend that employees are more likely to focus during training when it takes place outside of their

usual work environment as the chances of being distracted by work-related activities are significantly lower than if the training were held within the workplace. Similarly, Mtulo (2014), as cited in Afeke (2020: 16), concurs that off-the-job training enables employees to engage in training programmes without interruptions. Mtulo (2014) adds that off-the-job training is more organised, with a clear agenda that maximises the learning period and offers a structured learning experience. In their study, Ab Rashid, Hamzah and Ramli (2020: 54) examined the connection between on-the-job training and off-the-job training towards employee performance. The findings indicate that employee performance is notably influenced by both on-the-job training and off-the-job training. Ab Rashid, Hamzah and Ramli (2020) additionally found that off-the-job training has a stronger impact on employee performance. This suggests that greater emphasis should be placed on the content of off-the-job training to enhance employee performance. However, Mvuyisi and Mbukanma (2023: 91) argue that employees can settle into their jobs and be provided with the necessary job-related skills through on-the-job training which leads to organisational success and increased performance, as they learn and perform the tasks at the same time.

From the foregoing discourse, it is safe to claim that although both on-the-job and off-the-job staff training offer some significant advantages, the latter proves more viable because of its clearly set out purposefulness which is deemed to encourage participants to fully commit with the intention of improving upon individual and organisational performance.

Pertaining to the purpose of training and development, Mazhisham, Khalid, Nazli, Manap and Hussain (2018: 21) aver that the purpose of training is to ensure the effectiveness of the programme by properly managing and aligning the right types of training with the needs of employees, employers and the organisation. A training and development programme involves several stages or steps that ensure the achievement of its objectives. These steps involve identifying training needs, designing the training program, delivering the training, and monitoring and evaluating its effectiveness (Mamun, 2021: 276).

As Pathy (2019: 19) espouses, a training needs assessment identifies the gaps between employees' current skills and the skills required to perform their jobs effectively, both now and in the future. It helps determine if training is the appropriate solution to a workplace issue; identifies the necessary training; and evaluates the type and scope of the training programme. After analysing the results of the training needs assessment, the objectives of the training programme are established (Pathy, 2019: 19). In the second stage, instructional design and training programme content, including exercises and activities, are developed. The type of training method, which may be either on-the-job training or off-the-job training is considered. According to Ramli *et al.* (2018: 716), the implementation stage, which is the third stage, denotes the realisation of the actual training programme where the time, the venue and the resources of the training are planned well and agreed upon. The fourth stage is an evaluation and follow-up step, in which the organisation assesses the programme's success or failure, and determines whether the training programme achieved the set objectives, after which recommendations for improvement are made (Ramli *et al.*, 2018: 716)

From the literature, these crucial steps are central to any successful training and development programme implementation within organisations as they set clear guidelines that guarantee professionalism and engender the smooth implementation of training and development programmes – a necessary happening to guarantee expected employee performance.

2.2.3.3 Performance management

Rameshbabu (2017: 1) defines performance management as a structured process aimed at enhancing organisational performance by developing the capabilities of individuals and teams. DeNisi and Murphy (2017: 421) describe it as encompassing a range of activities, policies, procedures, and interventions intended to support employees in improving their performance. Similarly, Aguinis (2019: 2) indicates that performance management is a continuous process of identifying, measuring and

developing the performance of individuals and teams, and aligning performance with the strategic goals of the organisation.

Rameshbabu (2017: 47) proposes that performance management involves aligning individual goals with organisational objectives and ensuring that individuals adhere to the core values of the organisation. On their part, Schleicher *et al.* (2018: 2210) and Levy *et al.* (2017: 56) argue that performance appraisal is a subset or smaller piece of performance management. Although Kuubetersuur (2020: 39) contends that performance management and performance appraisal are used interchangeably, Schleicher, Baumann, Sullivan, Levy, Hargrove and Barros-Rivera (2018: 2210) explains that, whereas performance appraisal is generally a sanctioned event which occurs once or twice a year, performance management is an extensive range of continuous activities focused on overseeing employee performance. According to DeNisi and Murphy (2017: 421), the performance management process involves performance appraisals, feedback, goal setting, training and reward systems. It focuses on enhancing individual performance in alignment with strategic objectives, ultimately striving to improve overall organisational performance.

Performance management is the backbone of organisational success, serving as a structured approach to aligning individual contributions with broader business objectives. It is not merely a system of evaluating employee output, but a comprehensive framework that fosters continuous improvement, employee engagement and strategic alignment. At its core, performance management ensures that employees clearly understand their roles, expectations and how their work contributes to organisational goals. This alignment drives motivation and productivity while promoting accountability. Despite its potential, performance management is often criticised for being overly bureaucratic or subjective. Poorly designed systems can demotivate employees and lead to bias or favoritism. The challenge lies in creating a fair, flexible and inclusive system that adapts to the diverse needs of an organisation's workforce.

2.2.3.4 Compensation Management

Ezeh (2014), as cited in Keynan (2018: 3), describes compensation management as a function of HRM that focuses on planning, organising and controlling the direct and indirect payments to employees in return for the effort they put into the organisation. Similarly, Madanat and Khasawneh (2018: 3) perceive compensation as a Human Resource tool used to attract the best people and enhance employee performance and behaviours.

Several studies have been conducted to examine the impact of compensation management practices on employee performance and organisational effectiveness (Omuya, 2018; Arif, Syaifani, Siswadi and Jufrizen, 2019: 273; Zafar, Sarwar, Zafar and Sheeraz, 2021; Pertiwi and Supartha, 2021). According to Reddy (2020: 17), the effect of compensation and benefits on employee performance and organisational effectiveness is primarily influenced by the current compensation and performance management programmes available at the organisation. Accordingly, Fulmer, Gerhart and Kim (2023: 688) postulate that scholars are now focusing on how pay systems influence performance, turnover and other outcomes, recognising that these effects can vary based on individual characteristics, demographics and relative standing within a workgroup. A study by Omuya (2018: 733) reveals that employee performance can be influenced by total adherence to compensation and reward.

A study by Arif *et al.* (2019: 273) revealed that compensation has a positive and considerable effect on employee performance in the Department of Highways and the Development Construction Unit of Roads and Bridges in North Sumatra Province. This suggests that the more favorable the compensation provided to employees, the better their performance., the better employees perform. In addition, Pertiwi and Supartha (2021: 339) found that compensation has a positive and significant effect on job satisfaction, organisational commitment and employee retention.

Despite the findings of these studies showing the positive impact of compensation on employee performance, Ayandele and Etim (2020: 96) advise Human Resource managers and employers to understand what truly motivates their employees and be cautious when applying incentives, in that employees are motivated differently by different compensation incentives. In this direction, Lestari, Haryono and Kurnia (2020: 2) explain that compensation can be direct and indirect. According to Manurung (2017: 85), direct compensation can be salaries or wages, whereas indirect compensation can be paying for employees' vacation, insurance cover, pension plans and national social security benefits. Brasilio and Tridayanti (2020: 200) analysed the effect of direct and indirect compensation on employee performance in Surabaya Container Terminal. The results suggest that both direct and indirect compensation have positive and significant effects on employee performance. Brasilio and Tridayanti (2020: 200) posit that, in order to enhance employee performance, organisations can sustain and enhance indirect compensation services, as they have a significant impact on performance. This includes improving employee welfare and addressing current employee needs. In return for the services employees provide, organisations can offer indirect compensation.

It is evident from the literature that although various HRM practices have been advanced, the implementation and success of these practices are determined by the individual organisation carrying out the practice. That is, context is crucial. The choice of a particular practice is dependent on the overall goal of the organisation. It is therefore necessary for organisations to formulate their own human resource policies and practices to enhance the achievement of their set goals.

2.2.4 Execution of HRM functions and practices

Some scholars have argued that it is not enough to have these functions or policies in place, but that the implementation of HRM functions is as important for HRM effectiveness as the formulation and design of these functions and policies (Kellner *et al.*, 2016; Van Waeyenberg and Decramer, 2018). Woodrow and Guest (2014), as

cited in Brandl, Keegan and Kozica (2022: 249), similarly emphasise that the poor execution of high quality HRM practices can lead to ineffective HRM. Although most organisations eventually adopt similar HRM policies and practices, they often achieve different outcomes. This suggests that the variation lies not just in the practices themselves, but in how they are implemented (Makhecha *et al.*, 2018: 21; Trullén, Bos-Nehles and Valverde, 2020: 150).

The primary focus of HRM enquiries has traditionally been on HR department personnel, as the key executors of HRM functions (Gordana and Ilic, 2020: 11). However, contemporary studies are increasingly emphasising the pivotal roles played by both general employees and top management in this regard. While each group may have distinct responsibilities, collectively, the staff in the HR department, general employees and top management collaboratively bear the responsibility for implementing HRM practices and tasks (Bos-Nehles and Meijerink, 2018: 3069; Boada-Cuerva *et al.*, 2019: 64). To manage these tasks, there is need to cooperate and interact with each other on a general platform. The use of technology in HRM has been widely accepted as a medium through which they can all interact and share information for the implementation of HRM practices. One such technology is Human Resource Information Systems (Mathew, Rwela and Mkwizu, 2023: 67). This leads to the next section where the use of technology in HRM is discussed thoroughly.

2.3 THE GROWTH OF HUMAN RESOURCE INFORMATION SYSTEMS (HRIS)

Technology has transformed how organisations operate and manage their employees (Parker, Van den Broeck, and Holman, 2017: 3). Prior to the 1990s, the advantages and significance of technology for the HRM field were not fully understood, largely due to the limited theories and research conducted in this area. (Kambur and Yildirim, 2023: 434). However, in the last twenty years, the great impact of technology on HRM practices has led to the development of HRIS. Shahreki *et al.* (2020: 9) suggest that because of new procedures and regulations introduced by governments, large companies required systems to manage payroll, employee compensation, and personnel records. This led to organisations implementing

technology for maintaining payroll procedures. Many researchers have emphasised that the emergence and use of technology in HRM practices have been analysed and adopted in phases based on the era and the type of technology available at that time, namely main-frame computing, Client Server and PC-based Applications, ERP and Web-based Systems and Cloud-based Applications (Kim, Wang and Boon, 2020; Shahreki *et al.*, 2020).

Kim, Wang and Boon (2020: 230-233) reviewed sixty years of research on the connection between technology and human resource management and report on three periods of technology development in HRM. During the first period leading up to 1976, mainframe computers started to gain public attention, and human resources managers began to recognise the importance of utilising computing technologies in employee management. The second period (1977–1996) was marked by the emergence of personal computers. As computers became more affordable, advanced Management Information Systems were developed, significantly shaping the evolution of HRIS. The third period, spanning from 1997 to 2019, witnessed a significant surge in large-scale investments in internet services, driving rapid growth in the technology sector. HR professionals faced the increasing adoption of virtual work arrangements, while many HR functions, such as recruitment and training, began integrating internet technologies. Kim, Wang, and Boon (2020) further argue that these technological advancements across the three periods brought notable transformations to the workplace and created valuable opportunities for scholars to explore the connection between HRM and technology.

Shahreki *et al.* (2020: 9-12) also reviewed both the professional and academic development of HRIS to critically evaluate its growth through four key periods of technology and report that during the constant growth in organisational size and geographic settings, there was need to develop more effective means of documenting and storing large amounts of employee data, hence main-frame computers were developed. The review of literature on HRIS mainframe systems showed that most studies were expert-driven, focusing on the implementation,

development, and application of these systems. Large organisations began utilising HRIS to automate essential HR functions, such as payroll, and to manage recordkeeping efficiently.

Shahreki *et al.* (2020: 9-12) add that the establishment of personal computers and Client Server in the mid-1980s and 1990s resulted in reduced costs for companies compared to mainframe computing and enabled managers and employees to access data directly from their personal computers. Client-server systems supported HRM by providing HR experts and managers with appropriate information to enhance HR development and assist in the decision-making process and reduced administrative problems. The Enterprise Resource Planning (ERP) and Web-based Systems period saw the adoption of web-based systems and ERP in HR practices emerged, facilitating processes such as recruitment, selection, performance management, training, and compensation. Additionally, the shift to cloud-based software has significantly transformed HRIS delivery and functionality.

As highlighted in the four phases of IT adoption, the HRM field has experienced significant transformations in recent years, incorporating various information technologies to achieve its objectives. Table 2.1 provides an overview of the history and key evolutionary milestones in the HRM and HRIS fields.

TABLE 2.1: EVOLUTION AND CHANGES OF HRIS

Time frame	Changes in HR Technology
Prior to 1940	Manual record keeping and payroll
1940s – 1950s	Development of original payroll systems
	Introduction of electronic data processing systems on computers for employee assistance and payroll
	Establishment of ADP

1960s – 1970s	Implementation of personal information systems
	Emergence of Management Information systems
	SAP establishment and R/2 released, precursor of integrated ERP
1980s – 1990s	Development of central server, client server, LANs, computing
	Accessibility of HR information to personal workstations
1990s – 2010	Development of metrics to facilitate reporting systems
	Development of ERP systems for HR
	Implementation of self-service systems (ESS, MSS)
	Emergence of single HR function systems
2010 to present	Establishment of cloud-based software for HR practices
	Use of social media for recruitment, selection and employee relations

Source: Shahreki *et al.* (2020: 12)

2.3.1 Difference between MIS, E-HRM and HRIS

Various terminologies have been propounded to connote the use of technology in the management of organisations. Terminologies such as Electronic Human Resource Management (e-HRM), Management Information Systems (MIS) and Human Resource Information Systems (HRIS) have been coined based on the era and the type of technology available at that time to indicate the use of technology in HRM (Ali, 2019: 84; Ambulkar, 2023: 477; Milon, Alam and Pias, 2022: 404; Mulliri, Hoxha and Baraku, 2022: 308).

Ali (2019: 84) defines the term MIS as an integrated system that provides information to support the operations, the management and the decision-making function in organisations. According to Mulliri, Hoxha and Baraku (2022: 308), the main objective of MIS is to collect and organise all data coming from various areas of an organisation, to support and facilitate the decision-making process and to improve quality to increase the business productivity and profitability. Ambulkar (2023: 477) also suggests that MIS comprises people, machines, procedures, databases and

data models which work together to collect data from both internal and external sources of an organisation for managerial decisions.

Milon, Alam, and Pias (2022: 404) describe e-HRM as a broad concept encompassing all potential integrations, mechanisms, and interactions between HRM and information technology, aimed at creating value for both employees and management within organisations. Similarly, Abuhantash (2023: 647) defines eHRM as a subset of HRM that leverages information technology to enhance the employee experience and organisational outcomes by optimising HR processes, improving communication, and enabling data-driven decision-making. According to De Alwis, Andrić, and Šostar (2022: 4), the key advantage of implementing e-HRM lies in its ability to relieve HR practitioners of intermediary tasks, allowing them to focus on strategic planning as they shift from administrative roles to becoming strategic planners. Shobaki et al. (2017: 10) further explain e-HRM as the integration of human resource management and information technology using webbased applications in HR processes.

Quaosar and Rahman (2021: 472) define HRIS as an information technology system designed to collect, store, maintain, analyse, and retrieve essential employee-related data within an organisation. Similarly, Gilibert and Sauvezon (2021: 2) describe HRIS as a system composed of processes, procedures, people, and functions aimed at acquiring, preserving, retrieving, analysing, managing, and distributing information related to an organisation's human resources. Priota (2020: 7) highlights the role of hardware and software applications in facilitating HRM practices, policies, and strategies. Barišić, Poór, and Bach (2019: 586) emphasise that the greatest impact on organisational effectiveness comes from the extent of HRIS usage, which is determined by the range of functionalities available within the HRIS software systems.

The definitions of these terms highlight the integration of technology and information systems in HRM, leading some researchers to argue that the distinction between eHRM and HRIS is subtle (Samy, Aziz, Tarek, and Ismail, 2023: 5). For instance,

Girisha and Nagendrababu (2019: 100) assert that the term "e-HRM" is often used interchangeably with HRIS and that e-HRM operates with the support of HRIS. Similarly, De Alwis, Andrić, and Šostar (2022: 5) clarify that HRIS refers to systems used specifically within HR departments to optimise HR processes, while e-HRM involves systems designed to benefit non-HR personnel, such as employees and managers. Shahreki et al. (2020: 9) conclude that e-HRM represents the use of HR functionalities supported by HRIS to facilitate connections among applicants, employees, managers, and their decision-making processes.

The literature expresses the concept of technology possibilities in HR functions with different terminologies like e-HR, e-HRM, HR intranet, Web-based HR, computerbased HRM systems (CHRIS), HR portals and HRIS (Muqaddim and Hosain, 2021: 81; Samy, Aziz, Tarek and Ismail, 2023: 5). Hence, MIS, e-HRM and HRIS refer to the use of technology and information systems in the activities of organisations. MIS can be described as a canopy term that incorporates the various management systems that organisations use (Milon, Alam and Pias, 2022: 404). E-HRM and HRIS, on the other hand, are subsets of the MIS that are designed and implemented to capture, to store, and to disseminate data regarding organisations' human resources (Galanaki, Lazazzara and Parry, 2019: 264). In summary, Muqaddim and Hosain (2021: 2) and Omran and Anan (2019: 904) posit that whatever definition is chosen by researchers, e-HRM had been interchangeably associated with HRIS, virtual HRM and web and internet-based HRM. Researchers need to consider HRIS as part of e-HRM to the extent that it includes internet-based information technology, and that HRIS has been already accepted as the key tool in e-HRM. In the same vein and for the purpose of this study, HRIS will stand for all terms coined for the use of technology and information systems in the functions of HRM.

2.3.2 Conceptualisation of HRIS

HRIS has been defined variously, and all of these definitions have emphasised the use of information systems and technology in human resource functions and

processes to achieve efficient and effective results (Maduagwu and Ugwu, 2018: 44; Pieris and Preena, 2020: 87; Johnson and Carlson, 2021: 6; Gilibert and Sauvezon, 2021: 2). Maduagwu and Ugwu (2018: 44) for instance describe HRIS as software equipped with a database that enables the input, storage, and manipulation of employee data within an organisation. These systems offer management access to comprehensive employee information, reports, and analyses. Furthermore, HRIS also manages company-related documents, including employee handbooks, emergency evacuation procedures, and safety guidelines.

Pieris and Preena (2020: 87) state that HRIS as a software application that links an organisation's human resources with information technology, enabling HR activities and processes to be conducted electronically on a computer-based platform. Similarly, Gilibert and Sauvezon (2021: 2) describe Human Resource Information Systems (HRIS) as complex systems that integrate various processes, procedures, human roles and functions to manage and disseminate information related to an organisation's human resources. On their part, Johnson and Carlson (2021: 6) define HRIS as a system designed to collect, store, process, analyse, retrieve and distribute information related to an organisation's human resources, supporting HRM and managerial decision-making.

The definitions by Karpagambigai and Poornimarani (2020: 183) and Priota (2020: 7) emphasised the importance of incorporating hardware and software technologies to support HRM practices, policies and strategies. According to Menant *et al.* (2021), HRIS applications span across multiple HR functions, including recruitment, induction, payroll, incentives, appraisals, training, talent management and succession planning. Furthermore, HRIS is recognised as a sophisticated computerised system that aids in managing workforce information, both for administrative and strategic decision-making. Barišić, Poór and Bach (2019: 594) suggest that the impact of HRIS on organisational performance is largely determined by the extent to which its various functionalities are utilised. According to Safaâ and Mohamed (2020: 399), an effective HRIS is characterised by improved management

of repetitive tasks, centralised data, enhanced tracking of employee information, quicker data responsiveness, and efficient sharing of HR files among various stakeholders within the company.

Based on the literature reviewed thus far, it is apparent that the definitions of HRIS have a recurring theme of IT integration in HRM functions. It is against this backdrop that the present study defines HRIS as the integration of information systems and technologies into the HRM processes to achieve effectiveness and efficiency.

2.4 HRIS APPLICATIONS

According to Sugata and Bhattacharjee (2019: 519), the applications of HRIS vary with end-users, type of organisation and the status of the economic condition of a particular organisation. Priota (2020: 8) identifies HRIS applications to include payroll systems, benefits administration, training and recruitment systems, time management systems and performance management systems. The different applications of HRIS, including systems for recruitment and selection, performance management, records management, payroll, compensation and benefits management, and training and development are reviewed in this section. Additionally, the review covered applications such as time and labour management systems, self-service/employee interfaces and communication portals.

2.4.1 Recruitment and selection systems

Recruitment and selection are vital functions of any Human Resource Department. HRIS helps in organising recruitment activities like resumé management, interview panel making and selection criteria (Das and Saha 2018: 9). Pombo (2019: 12) posits that job portals allow the matching process to be more efficient in terms of both speed and quality, and that not only do they help workers to find jobs which are suited to their skills, but job portals also help employers identify employees who are suitable for organisations. In the literature, some recruiting systems that have been identified are e- recruitment, video recruitment, electronic application system, applicant

tracking system, digital recruiting and job portals Other recruiting systems identified are career web sites, job search agent, self-assessment tools, streaming videos, candidate relationship management system and social media (Sołek-Borowska and Wilczewska, 2018: 31; Black and van Esch, 2020: 218).

2.4.2 Performance management systems

A web-based appraisal system leverages both the intranet and internet to efficiently assess employees' skills, knowledge, and performance (Mohammed, 2023:6). Performance management systems or portals are designed to enhance employee performance and productivity by providing accurate performance data, enabling evaluations, monitoring progress, and delivering feedback. These portals offer detailed performance reports, allowing the performance of all employees to be reviewed comprehensively. (Bali, 2019: 222). One such system identified in the literature is the Computerized Performance Monitoring (CPM). According to Bhaskar and Mohanasundaram (2019: 326), CPM helps Human Resource managers to assess the work done by each employee and the flow of information about employees. Alrawashdeh, Zaki, Yusof and Mat (2022: 152) indicate that another performance management system is the E-performance appraisal. The E-performance appraisal system is a software programme designed to facilitate online performance evaluations. A key advantage of this performance management system is that it provides greater control over employee behaviour, ensuring alignment with the organisation's goals. This software enables managers to measure employee performance effectively and generate periodic reports for employees.

2.4.3 Records management portals

This system serves as a portal for managing employee files, storing information such as demographics, education, and work experience. These files are easily searchable, retrievable, and updatable. By maintaining employee records in electronic formats with systematic naming and enhanced security, the portal eliminates the risk of file loss or misplacement (Bali, 2019: 222). This is corroborated by Mukred, Yusof and Alotaibi (2019: 97343) who aver that electronic records

management ensures greater efficiency and effectiveness in government operations, promotes transparency and accountability in decision-making, and improves the delivery of efficient and cost-effective public services to citizens. Accordingly, Newa, and Mwantimwa (2019: 119) observed that effective e-records management enhances data quality across public institutions while minimising human errors, increasing security, facilitating data access and reducing duplication.

2.4.4 Payroll, Compensation and benefit management systems

Information on organisations' payroll, compensation and benefit plans and policies are found in this system or portal. Policies regarding the type of incremental allowance given when an employee is promoted; information about pay grades and ranges for each role; positions eligible for bonuses and the structure of these bonuses could also be included (Bhaskar and Mohanasundaram, 2019: 326). Quaosar and Rahman (2021: 474) explain that compensation and benefit portals allow payroll staff to simply input employees' working hours or production data, after which the system automatically processes the required actions to calculate the financial information for the HR department.

Silva and Lima (2018: 122) report that these portals provide information on salary processing, salary comparison, retirement planning, pensions, benefit administration and cost-benefit analysis. According to Kianto *et al.* (2017: 13), data processed through metrics and integrated into advanced compensation models can assist managers in making decisions regarding the performance of all employees.

2.4.5 Training and development portals

This system offers organisations a platform to manage and monitor employee training and development activities. With its help, the HR department can maintain the records of employees, including their knowledge, weaknesses and other criteria, enabling the organisation to schedule relevant training sessions (Das and Saha, 2018: 9). Dhande and Mane (2017: 34) further explain that systems like Learning

Management Systems (LMS) enable the HR department to track employees' education, qualifications and skills. The LMS also identifies the training courses, books and learning materials needed to enhance these skills. Specific training sessions can then be organised, with resources mapped and managed within the same system. Additionally, the LMS allows the HR department to approve training, manage budgets and schedules, and link these activities with performance management and appraisal metrics.

2.4.6 Time and labour management systems

According to Batubara, Ananta and Indra (2024: 2), a key method for assessing employee performance is through attendance monitoring. However, manual attendance systems where employees manually record their presence, are often deemed less effective due to their susceptibility to manipulation, which can compromise the authenticity of the data. Maintaining accurate and comprehensive attendance records is essential for ensuring successful operations and evaluating employee performance effectively. Time and Labour Management systems enable employees to document their working times and absence times, while allowing managers to track the working and absence times of their employees. According to Lina (2019: 64), these systems help HR departments to track the attendance and punctuality of employees and provide information necessary to calculate vacation time, leaves of absences and termination dates (Gupta, Kundu and Das, 2019: 117120; Singh *et al.*, 2020: 517). Singh *et al.* (2020: 517) report that an automated attendance system helps correct the time consuming and expensive errors of using manual systems. These errors include accidentally switching the details of employees leading to false entry of information, which can create problems in other HR functions.

2.4.7 Self-service/Employee interface

The Employee Self Service portal is a system that allows the employees of an organisation to be self-sufficient when dealing with human resource management matters. It reduces reliance on the HR Manager or Head in making decisions and

obtaining feedback (Nguti and Mose, 2021: 5). There are two applications involved in the self-service interface, namely self-service for employees and Management self-service for the HR department. The self-service portal for employees allows employees to update and manage their personal information directly and perform some HR transactions without having to go through the HR department. The management self-service portal, on the other hand, allows the HR departments to keep track of employee performance and training histories and access a wide range of information about all employees in organisations (Bhaskar and Mohanasundaram, 2019: 326).

Skoumpopoulou and Jörden (2019: 7) and Nguti and Mose (2021: 10-11) have examined the role and importance of self-service portals to organisations. Nguti and Mose (2021) examined the role of e-self-service function in organisation outcomes in Kenya and concluded that Self Service portals have a significant effect on organisational outcomes. Nguti and Mose (2021) recommended that recruitment and selection, training and development, compensation and benefits should be made available on self-service portals so that employees and managers can access the information they need whenever and wherever they want. The study by Skoumpopoulou and Jörden (2019: 7) however concluded that these self-service systems are more intricate than initially assumed and often give rise to various challenges, contradicting the common perception among stakeholders that they are purely a solution for enhancing efficiency and effectiveness.

2.4.8 Communication portals

Communication portals enable employees, supervisors and HR departments to collaborate and communicate amongst themselves wherever and whenever the need may be. Employees can voice and register their concerns through these portals, thereby building more collaborative teams through the elimination of communication barriers (Bali, 2019: 223). Cakula and Pratt (2021: 21) suggest that in the HR domain, these tools allow for a detailed evaluation of an employee's record, leading to analytic-driven recommendations based on their performance.

Accordingly, Sachdeva and Wadera (2023: 4694) explain that communication portals open new avenues for collaboration between managers and employees and have the potential to shape interactions and connections both inside and outside organisations

It can be concluded that different HRIS applications are actively in use, and there is a significant rise in the use of HRIS for HRM functions. Organisations are now actively using a variety of systems which not only serve to facilitate HR practices effectively but also keep operating expenses to a minimum. It is also observed that HRIS applications are not just about the use of technology but also about the systems being able to perform the job efficiently and effectively. It is about the systems being able to integrate with other existing systems to execute jobs. Therefore, it is important to ensure continuous improvement in the use of HRIS systems and portals. Thite *et al.* (2012: 12) present the information systems providing support for HRM practices at different organisational levels, summarised in Table 2.2:

TABLE 2.2: INFORMATION SYSTEMS SUPPORTING HRM

Organisational Level	Type of System	Goals and Focus	HRM Examples
Operational	Transactional Processing System	-Improved transaction speed and accuracy - Improved efficiency in the processing of daily business transactions -Reduced transaction costs	-Payroll processing -Time and attendance entry -Online creation and dissemination of application forms
Managerial	Management Information Systems	-Provide key data to managers -Support regular and ongoing decisions -Provide defined and ad-hoc reporting	-Producing reporting -Calculating yield ratios for recruiting -Calculating per-capita merit increases
Executive	Executive Information Systems	-Provide aggregate high-level data -Help managers with long-range planning -Support strategic direction and decisions	-Succession planning -Aggregate data on balanced scorecard
Boundary spanning	Decision Support System	-Interactive and iterative managerial decision making -Support forecasting -Support business simulations	-Staffing needs assessment -Labour market analysis -Employee skills assessment
	Expert System	-Embed human knowledge into information systems -Automate decisions with technology	Resume keyword searches
	Office Automation System	-Designing documents -Scheduling shared resources -Communication	-Email training-room communication
	Collaboration Technologies	-Supports electronic communication and collaboration between employees	-Communication support for e-learning

	Enterprise Resources Planning Systems	-Support virtual teams -Integration and centralisation of corporate data -Share data across functional boundaries - Single data source and common technology architecture	-Online meeting and shared documents -HR departmental skills

Source: Thite *et al.* (2012: 12)

2.5 IMPORTANCE AND BENEFITS OF HRIS

Organisations adopt new technologies and systems once they are convinced of the benefits they would accrue from these new technologies and systems. Anupa (2021: 23) reports that the benefits of HRIS fluctuate amongst organisations, and that while some utilise it to lessen costs, others use it to quicken better correspondence. Researchers have focused on examining the importance and benefits of HRIS to organisations (Khan *et al.*, 2017: 139; Kamal, 2018: 22; Lina, 2019: 64; Ngwenya, Aigbavboa and Thwala, 2019).

Lina (2019: 64) explains that HRIS helps reduce the use of paper and related materials; simplifies storage; facilitates the distribution of up-to-date organisational policies and procedures; enhances participation across the organisation; and minimises errors in payroll and employee data. Lina (20219) further contends that HRIS applications improve the accuracy of time and attendance tracking, speed up information processing and strengthen employee communication. Yakusak (2015: 32) states that HRIS effectively tracks the overall performance development strategies, disciplinary actions, personal staff data, staff succession plans and management of potential staff and applicants.

Ngwenya, Aigbavboa and Thwala (2019: 4) investigated the influence of Human Resource Information Systems (HRIS) within a sizable construction organisation in South Africa. Employing a quantitative research approach, the data collected was analysed using descriptive statistics. The findings indicate that HRIS serves as a management system aligning with the labour relations legislation in the country, providing a clear business vision and saving time. Additionally, HRIS effectively reduces the errors attributable to human factors. Respondent data underscored that the enhanced management system aligns with legislation, standardises business processes and serves as an extensive database for a variety of employee information. HRIS also compiles employee profiles in adherence to the Employment Equity Act, contributing to increased overall decision-making efficiency. Maxwell and Yadav

(2019:182) add that Human Resource Information Systems (HRIS) play an essential role in improving overall organisational performance and efficiency. HRIS simplifies the HR management process, making it faster, more cost-effective and productive, and ultimately driving the organisation toward greater success. However, the benefits of HRIS can only be fully realised when the system is properly implemented within the organisation.

Alkashami (2023: 382) similarly avers that a strong HRIS enables the HR department to streamline hiring, onboarding, employee management, and retention within a single, unified platform. It promotes seamless collaboration and alignment across processes within the organisation. Modern HRIS solutions are adaptive, incorporating updates based on feedback or evolving business rules to address the changing needs of HR teams, employees, and employers. This adaptability enhances employee satisfaction by offering benefits like self-service functionality, which boosts efficiency. Additionally, an HRIS equipped with a proprietary talent management system empowers businesses to effectively manage their workforce. Similarly, Sharmila and Babu (2024:1243) contends that HRIS facilitates long-term planning by supplying data for workforce planning, including supply and demand forecasts, staffing needs, equal employment information, separations, and applicant qualifications. It also supports development by providing insights into training program costs and trainee performance. Additionally, HRIS contributes to compensation programs by offering salary forecasts, pay budgets, and supports labour and employee relations through information on contract negotiations and employee assistance requirements. Sharmila and Babu (2024:1244) further argues that the primary focus of HRIS includes managing employee information; reporting and analysing employee data; handling organisational-related documents such as staff handbooks; safety guidelines; and administering benefits such as enrollment, status changes and personal information updates. Ideally, HRIS reduces the need for staff to perform administrative tasks, allowing HR managers more time to focus on strategic roles.

The future of HRIS looks promising as it opens new opportunities for human resources and the organisations that effectively implement it.

It is safe to claim, based on extant literature, that HRIS boosts the efficiency of HR functions, strengthens the HR department's contribution to the organisation and improves structures such as payroll, time and attendance tracking, performance appraisal, recruitment, learning management and training systems. HRIS also supports employee self-service, scheduling, absence management and performance diaries. Additionally, HRIS helps reduce HR costs; increases HR personnel motivation; and facilitates smooth problem-solving, effective performance appraisal systems, systematic job analysis and the adoption of new mindsets.

2.6 HRIS ADOPTION

Organisations are making efforts to adopt HRIS due to the numerous benefits associated with it (Nguti and Mose, 2021: 558). The existing literature portrays HRIS as a better way to ensure effectiveness and efficiency in the implementation of HRM functions. That is, scholars agree on the importance of adopting HRIS, emphasising that it is superior to manual systems in minimising costs and maximising effectiveness. Accordingly, Maduagwu and Ugwu (2018: 44) believe that the need to cut HRM costs in line with economic realities, promote self-service and ensure an optimum return from human resources, all in pursuit of the organisational effectiveness, has led to the adoption of HRIS by many organisations.

Quaosar et al. (2018:13) explored the necessity of adopting HRIS and concluded that integrating technology into traditional HR practices can lead to a significant and effective transformation of an organisation. Similarly, Safaâ and Mohamed (2020:399) highlight the critical role of Human Resource Information Systems (HRIS) in offering decision-making tools vital for achieving strategic positioning in the digital transformation era. HRIS enhances information flow, reliability, planning, scheduling, and employee communication, ultimately enabling more efficient information sharing and better access to valuable insights.

In contrast, other studies (Mabaso, 2020: 24; Maduagwu and Ugwu, 2018: 43) have attempted to demonstrate that HRIS adoption and use do not necessarily result in effectiveness and efficiency, as claimed in the literature. Instead, it is challenged that HRIS often leads to increased costs and expensive investments that do not align with its purported benefits. Therefore, organisations ought to conduct a needs analysis and cost-benefit analysis before deciding whether to adopt HRIS. The needs analysis is aimed at helping organisations determine the type of technology and the level of HR operations that require new technology. The cost-benefit analysis is aimed at informing the organisation whether it is prudent to adopt the new technology. As indicated by Zafar, Randolph and Martin (2017:60) and Mabaso (2020: 24), there are various costs, risks and security concerns associated with HRIS software that organisations should carefully evaluate before deciding on adoption. For smaller organisations, there may be insufficient justification for purchasing HRIS if they can effectively operate without such a system. Maduagwu and Ugwu (2018: 43) also suggest that organisations should manage the cost of maintaining HRIS structures to ensure that HRIS and its associated cost do not undermine the organisation's competitiveness.

2.6.1 Empirical studies on HRIS adoption

In specific geographical areas, several studies have been undertaken in different countries across Europe, America and Asia to examine the use of technology in HRM activities (Sołek-Borowska and Wilczewska, 2018: 31-32; Tessema *et al.*, 2020: 128; Das and Saha, 2018: 2). Sołek-Borowska and Wilczewska (2018) analysed how new technology has influenced the recruitment process in organisations in Western Europe and Poland, and their findings indicate that the traditional paper-based recruitment process has evolved and is no longer used in its original form. Recruitment methods and associated technologies are now utilised for tasks such as attracting applicants, processing applications and communicating with candidates. Sołek-Borowska and Wilczewska (2018) additionally found that video recruitment is

widely used in Western Europe, increasingly dynamic in the United States and, while still emerging in the Polish market, it shows significant potential to become a major factor in recruitment and selection processes. Sołek-Borowska and Wilczewska (2018) concluded that integrating modern technologies into recruitment and selection not only ensures the successful completion of recruitment projects but also leads to substantial improvements, reducing both costs and time.

Furthermore, a study by Khan *et al.* (2017: 143) shows that HRIS is commonly used in Pakistani organisations to access employee information, monitor absences and conduct performance appraisals, thus allowing for faster information retrieval and reducing errors and paperwork. Khan *et al.* (2017) suggest that the most important applications of HRIS are employee information management and absence monitoring, while compensation management and training and development are considered the least useful applications of HRIS. In a related enquiry, Tessema *et al.* (2020: 128) identified and examined six technologies that influence recruitment and selection methods in an American multinational company, namely corporate job boards, commercial job boards, social media, recruiting software, interactive technologies and HR analytics. Tessema *et al.* (2020) found that these recruitment technologies significantly impact the overall recruitment and selection processes and propose that using technology for recruitment and selection is not optional but essential for the success of any organisation.

Priya and Preetha (2022: 402) report that major volumes of studies on HRIS have been focusing on developed countries, such as the USA, Canada and Western Europe, while studies in developing countries are scarce. According to Nguti and Mose (2021: 557), the use of technology in HRM is fairly new in Africa, and because of this, its introduction and adoption in organisations are fraught with challenges. That is, most studies on HRIS are focused on South Africa, with minimal literature available on other regions (Nguti and Mose, 2021). Priya and Preetha (2022: 402) and Schislyaeva and Plis (2021) as cited in Abbas, Shah and Othman (2021: 48) confirm

that the trend is changing gradually, and organisations in Africa are now adopting information systems (IS) for their HR processes.

In Cameroon, Noutsa *et al.* (2017: 15) conducted a study to identify key factors that promote the acceptance and use of HRIS in Cameroonian organisations and their impact on performance. The study revealed that HRIS implementation is still far from perfect, although its adoption is likely to enhance employee management. Noutsa *et al.* (2017) concluded that a significant lack of awareness about the HRIS concept contributed to administrative delays, incomplete questionnaire returns and challenges such as financial and logistical constraints. Udekwe and Andre (2017: 6) investigated the factors influencing the implementation, maintenance and use of HRIS in two retail organisations in the Western Cape of South Africa. Their research revealed that the HRIS was underutilised in both companies due to issues like poor data quality, insufficient training and the high costs of implementing and maintaining the system. These challenges led to low satisfaction levels amongst employees and management, which hindered the organisations from fully benefiting from the system. However, Udekwe and Andre (2016) also found that factors such as management support, effective teamwork and system security played a role in the successful implementation of HRIS.

In Kenya, Magutu and Marika (2018: 44) examined the impact of HRIS on HRM practices within state corporations and found that HRIS adoption is relatively high in these organisations, largely due to the availability of the necessary infrastructure such as computers, internet access and technical expertise. Magutu and Marika (2018) also revealed that state corporations select HRIS software based on their specific needs, with commonly used systems including SAP, Microsoft Access, Oracle, PeopleSoft, Microsoft Dynamics NAV, Inspire HRM, IPPD and PayPoint. Magutu and Marika (2018) concluded that HRIS usage in Kenyan state corporations offers several benefits, including faster report generation, enhanced data security, ease of record updates, easier data access and improved accuracy.

Algeria, Chabani (2020: 242) explored the managerial objectives, benefits and challenges of implementing HRIS in public organisations. The findings from the case study revealed that public organisations face significant obstacles in adopting HRIS. The primary challenge identified was the lack of communication between various levels of management, a problem also prevalent in private organisations. Other challenges found included technical issues that delayed projects and employee resistance to the new system, which also mirrored challenges in private organisations.

In Tanzania, Matimbwa, Shillingi, and Masue (2021:25) examined how user, technological, and organizational characteristics affect the effectiveness of HRIS across six regions in mainland Tanzania. Their study revealed that key user characteristics, including IT skills and employee commitment, play a significant role in enhancing HRIS effectiveness, particularly regarding timeliness, completeness, and accuracy. Additionally, technological factors such as usefulness, compatibility, complexity, and reliability were identified as critical determinants of HRIS performance. Organisational characteristics, including IT infrastructure and employer support for employees, were crucial in determining HRIS effectiveness.

Obiri-Yeboah, Odei-Lartey and Simmons (2015:10) argue that not all organisations especially Ghanaian public institutions are able to derive significant value from technology adoption. The Government of Ghana acknowledges in its policy document that the mere deployment of IT within public sector organisations and institutions does not necessarily translates into improvements in productivity, efficiency and service delivery (The Ghana ICT for Accelerated Development 2003: 41). Thus, several studies have been carried out to assess HRIS usage in the Ghanaian context.

Botchwey, Opoku and Acquah (2021: 256) explored the reasons behind the introduction of the Electronic Health Records (EHR) system at Pentecost Hospital and its impact on the facility's performance. Their study found that factors such as frequent

data loss; lack of expertise in managing the system; the desire to enhance work efficiency; the need for easier access to patient health records; and occasional time waste for clients were key motivators for adopting the EHR system. Additionally, Botchwey *et al.* highlighted several positive outcomes following its implementation, including streamlined hospital operations, increased client satisfaction, reduced waiting times, faster healthcare delivery, improved data storage, enhanced revenue generation and an overall better quality of healthcare services.

In addition, Attatsitsey and Osei-Bonsu (2021: 15) conducted a study to assess the impact of modern information technology on the effectiveness and efficiency of HRM practices in Ghanaian organisations. The results revealed that organisations utilise various information systems, including Management Information Systems (MIS), as well as application software such as database management systems, spreadsheets and data mining/warehousing tools. Additionally, IT tools like the internet/intranet and web portals are employed to facilitate communication and collaboration. Attatsitsey and Osei-Bonsu (2021) indicated that information technology positively impacts HR practices in these organisations and that organisations have recognised the benefits of using IT for HR tasks, leading them to invest more in IT and enhance the expertise of their workforce to better utilise the software. However, Attatsitsey and Osei-Bonsu (2021) noted that the underutilisation of HR software was due to employees' lack of competence in using the systems. Hagan, Lotsu, Hodow and Abaka-Yawson (2022: 349) also conducted a study to identify the challenges related to the adoption of HRIS and found that the primary challenge to HRIS adoption was the lack of management support. Hagan *et al.* (2022) concluded that the absence of management backing significantly delays the successful implementation of HRIS.

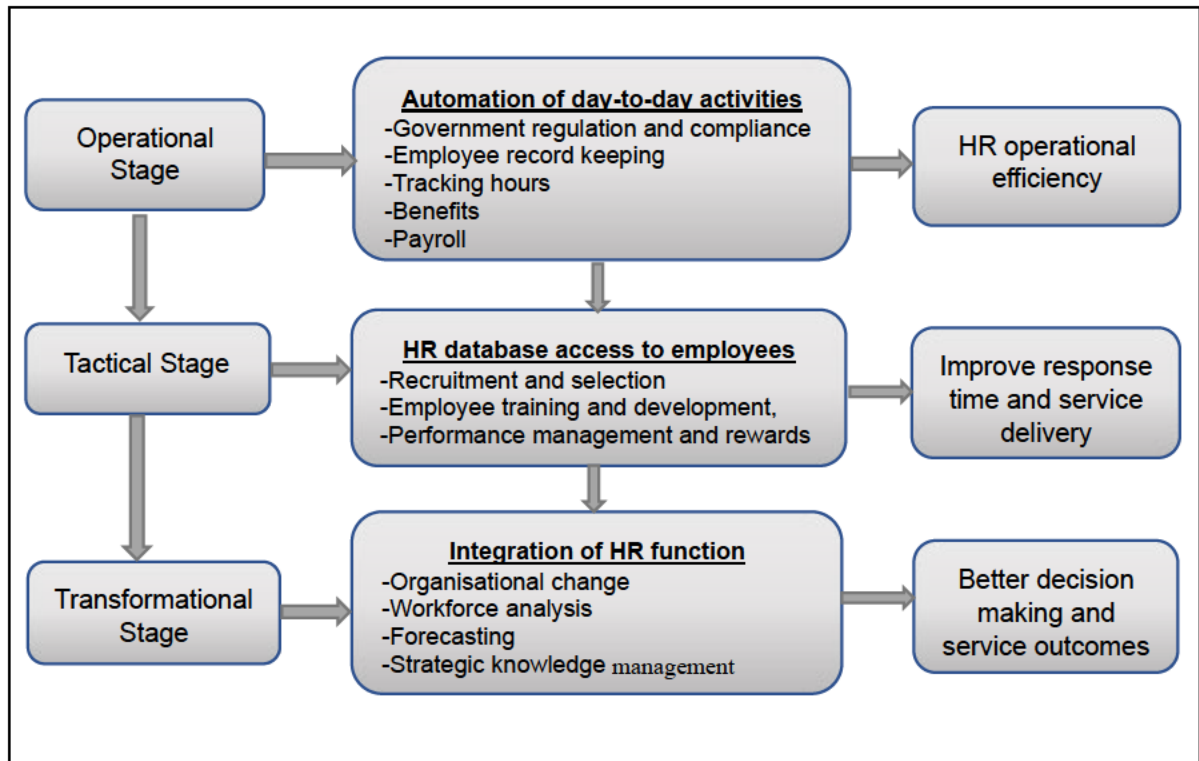
From the reviewed studies, it is noticeable that the higher educational sector, which is one of the biggest service sectors in the country, has virtually no studies conducted in this area in terms of HRIS applications. It is against this backdrop that the current study aims at assessing how HRIS has been adopted in these universities and how

they impact effectiveness in the institutions. Notwithstanding, majority of studies across Europe, Africa and in the Ghanaian contexts have shown that HRIS works better, depending on how fully and efficiently it has been adopted and used. This brings to the fore the fact that there is no one way for HRIS adoption. Different levels and stages of HRIS exist depending on the organisation's choice. It is therefore expedient to examine the levels of HRIS adoption and what they really entail.

2.7 STAGES/LEVELS OF HRIS ADOPTION AND USE

The level of adoption and use of HRIS fluctuates amongst organisations. While some utilise it for administrative purposes, others use it for better decision-making processes and strategic purposes. The stages of HRIS depict the extent to which HRIS is being used in the functions of HRM. In the literature, three stages of HRIS adoption have been identified, namely operational, tactical and strategic (Karikari, Boateng and Ocansey, 201; 425; Priota, 2020). Other studies refer to these stages as transactional, traditional and transformational (Pieris and Preena, 2020: 87). It must be noted that although the terms are different, they all connote the same stage characteristics respectively and empirical studies on what is involved in each of the stages abound in the literature. The three stages in HRIS adoption are summarised in Figure 2.1 below.

FIGURE 2.1: THE THREE STAGES OF HRIS ADOPTION



Source: Naveed, Suhail and Rana (2021: 6)

2.7.1 Operational/Transactional HRIS

Olughor (2016: 503) describes transactional HRIS as systems that focus on routine HR tasks such as employee record-keeping, payroll data entry, tracking employee status changes and managing employee rewards. Similarly, Valcik, Sabharwal and Benavides (2021: 34) and Pieris and Preena (2020: 87) define operational HRIS as systems that handle everyday tasks requiring extensive record-keeping, updating payroll information, managing employee status change and administering benefits. These systems are designed to provide frequently used data for HR departments. Examples of operational HRIS include position control systems, employee information systems (EIS), performance management systems, government reporting systems and training systems (Vanishree and Raghavendra, 2017: 130). Additionally, Maduagwu and Ugwu (2018: 47) refer to transactional HRIS as systems that supply managers with data to support routine HR decisions, citing examples like employee

information systems; position control systems; applicant selection and placement information systems; and performance appraisal systems.

Empirical evidence suggests that most organisations, especially in developing countries, are operating in this stage of HRIS usage. Muhammad, Shah and Azhar (2021: 24) conducted a study in the Pakistani banking sector to explore whether banks have started to use HRIS beyond the routine transactional aspects. Muhammad, Shah and Azhar (2021) found that the banks have failed to exploit HRIS to its full potential but are rather still using HRIS at the routine transactional level.

2.7.2 Tactical/traditional HRIS

Tactical HRIS refers to the technology and HR personnel responsible for executing specific tasks that align with Human Resource Management functions to support the achievement of organisational objectives (Votto *et al.*, 2021: 2). It is primarily applied to traditional HR activities such as recruitment and selection, training, compensation and performance management (Pieris and Preena, 2020: 87). Hansen (2022) explains that tactical HRIS involves decision-making in areas such as hiring, job analysis and design, training and development, and employee compensation plans. Similarly, Priota (2020: 8) asserts that tactical HRIS provides essential data to support decisions related to resource allocation for recruitment, job analysis, training and compensation. Maduagwu and Ugwu (2018: 48) also emphasise that tactical HRIS aids managers in making decisions regarding resource allocation for these HR activities. However, Johnson and Carlson (2021: 6) argue that these traditional HR functions can acquire strategic value if their outcomes align with the organisation's broader goals. A tactical HRIS typically generates data that assists in decisions about resource distribution for hiring, job design, workplace analytics, training, development and employee recognition (Arun, 2021; Martins, 2020).

2.7.3 Strategic/transformational HRIS

HRIS is argued to have reached its full potential at this stage when the system provides data or information to facilitate strategic decisions in human resources plan to give it a competitive advantage (Moussa and El Arbi, 2020: 19). Maduagwu and Ugwu (2018:44) highlight a shift in the perception of Human Resource departments, moving from a purely transactional and administrative function to a strategic internal business partner that facilitates the implementation of strategic HRM. Similarly, Pieris and Preena (2020:87) emphasise that strategic HRIS encompasses activities that add value to the organisation, including organisational development and change, structural realignment, cultural transformation, strategic redirection, and innovation, all aligned with the organisation's vision and mission. Transformational HRIS further supports strategic HR functions by enabling organisational change, workforce analysis, forecasting, strategic knowledge management, and workforce development, ensuring the integration of organisational goals and strategies with information systems (Valcik, Sabharwal and Benavides, 2021: 35).

Irum and Yadav (2019: 5) suggest that strategic HRIS plays a crucial role in shaping corporate strategy by providing top management with valuable information that aids in decision-making and policy development. As a decision support system, HRIS helps managers in the planning and management of Human Resource functions.

Similarly, Ilamosi and Oluyinka (2020: 254) affirm that HRIS supports various organisational processes, including planning, administration, decision-making and control. This functionality enables applications such as employee selection, placement, payroll and pension management, training projections and performance evaluations.

Despite several studies confirming the three stages of HRIS adoption, Amara, Bibimoune and Kara (2022: 259) identify a fourth stage known as comprehensive HRIS which is a combination of all the stages including operational, tactical and strategic matters. Hence, Amara, Bibimoune and Kara (2022) posit that there are four

main stages of Human Resources Information Systems: Operational HRIS, Tactical HRIS, Strategic HRIS and Comprehensive HRIS.

It has been observed in the literature that the outcomes stemming from the adoption of HRIS differ amongst organisations, primarily due to variations in the stages of HRIS implementation they undergo. While some organisations are actively intensifying their use of HRIS and reaping its complete benefits, others have encountered challenges in realising both short-term and long-term advantages (Sulaeman and Nurcholidah, 2023: 145). It is evident that most organisations aspire to attain the full advantages offered by HRIS, yet the success of any system is contingent upon specific factors. Therefore, it is crucial to pinpoint the potential factors that influence the adoption of HRIS in organisational settings. The following section explores the various factors that influence the adoption and utilisation of HRIS.

2.8 FACTORS INFLUENCING HRIS ADOPTION

Various studies have explored the factors influencing the adoption of HRIS in organisations. These studies have already confirmed that several factors do influence HRIS adoption at different levels and settings and the effect on HRIS can be either positive or negative (Noutsu, Wamba, and Kamdjoug, 2019; Ololade, Paul, Morenike and Esitse, 2023: 4; Quaosar, Rahman and Rahman, 2024). These factors as listed in the extant literature include employees' acceptance of technology, size of organisation, management commitment and support and user satisfaction. Other studies have included government policies, competitive pressure and the IT expertise of staff (Noutsu, Kamdjoug and Wamba, 2017; Aksoy and Sallam, 2018; Dissanayake and Nandasena, 2019).

Other studies have analysed factors that influence HRIS adoption in terms of whether they are organisational, environmental or technological factors. Dissanayake and Nandasena (2019: 72) evaluated these factors in terms of internal and external

environmental elements and explained the internal environmental factors to be the willingness and commitment of employees; organisational demographic characteristics; management commitment and support; corporate culture and the perceived benefits of the system. The external environmental elements were captured as competitive pressure, support of software experts and branding, Government policies and network externalities.

Quaosar (2017: 89) explored the connection between innovation, organisational characteristics, environmental factors and the adoption of HRIS and found that factors such as relative advantage, compatibility, complexity, top management support, organisational size and HRIS expertise are positively associated with HRIS adoption, with organisational size having a significant impact on the extent of adoption. Similarly, Robinson and Shiny (2024: 4756) investigated the various factors that influence the decision-making process regarding HRIS adoption. They identified key determinants including organisational readiness, technological infrastructure, perceived benefits, and external factors.

Major works on factors influencing technology adoption and usage have examined these factors through the three main dimensions of the Technology-OrganisationEnvironment (TOE) framework, namely, technological, organisational, and environmental factors. Liu and Cao (2022:12) and Kwabena et al. (2021:331-332) utilised the TOE framework to identify key determinants of technology adoption and usage. Their findings reveal that technological factors, such as compatibility and relative advantage, organisational factors, including top management support and employee readiness, and environmental factors, such as social influences and competition, significantly impact technology adoption. This study will adopt these dimensions to explore the factors influencing HRIS adoption.

2.8.1 Organisational/Institutional factors

According to Naushad and Sulphey (2020: 985), organisational factors are the internal forces that are controllable by the organisation. These factors are inevitable forces that prompt organisations to adopt technology. Jayadeva, Shikhare and Verma (2022: 5801) propose that organisations can work with HRIS when they have a good internet and networking system, proper telecommunication systems, dedicated departments to look after the IT issues, Infrastructure capability and IT infrastructure to handle the safety and privacy of the organisation. Other factors identified in the literature are the size of the organisation, organisational readiness, structure and processes, management commitment and support, financial resources, the cultural background of employees and employees' acceptance of technology

(Badhurudheen, 2018: 22; Melo, Luft and Rocha, 2021: 129; Jayadeva, Shikhare and Verma, 2022). Melo, Luft and Rocha (2021: 129) for instance listed financial resources, company structure, innovation capacity, ability to know, operational capacity, strategic use of technology, trust; technological resources, support for innovation, quality of human capital, accumulated organisational knowledge, expertise and infrastructure, organisational readiness, top management support, organisational culture and management structure as some organisational factors that influence technology adoption.

Jayadeva *et al.* (2022: 5801) conducted a study to identify the factors that influence HRIS effectiveness. They surveyed 226 employees from HR departments across various organisations and found that IT infrastructure, management support, staff capabilities and market competition were key factors affecting the effective use of HRIS. Similarly, Badhurudheen (2018: 22) explored the impact of internal factors on HRIS adoption in manufacturing companies in the Western province. The study, using a structured questionnaire, discovered that internal environmental factors such as the CEO's technological skills, top management support, centralisation and employees' HRIS experience had a positive and significant impact on the level of HRIS adoption.

These organisational factors, identified in the existing literature, are further discussed in the following sections.

2.8.1.1 Organisational readiness

Organisational readiness refers to the level of preparedness an organisation achieves before adopting or initiating new technology or activity (Halpern, 2020:3). To overcome internal resistance to technology adoption, Yeow *et al.* (2018: 57) propose several strategies to enhance organisational effectiveness, including communicating a clear strategy, establishing a dedicated cross-departmental team to develop workforce skills and manage external resources, and creating a detailed blueprint that maps all information flows, processes, and tools within the organisation. Additionally, they emphasise defining measurable indicators to monitor progress and ensuring that the ICT department supports business and technology integration efforts to align technologies with organisational objectives. Similarly, Pell and Blondell (2018), as cited by Halpern (2020: 3), identify four essential requirements for driving technological adoption and change: a clear strategic direction supported by visible leadership, effective partnerships and collaboration to understand emerging technologies, identify use cases, and manage risks, robust internal capabilities in terms of technological skills and resources, and a forward-thinking mindset and culture that prioritises and implements effective IT solutions.

Other studies have looked at organisational readiness in terms of the level of financial and technological resources available to an organisation, which may include infrastructure, relevant systems and technical skills (Kabukye, de Keizer and Cornet, 2020: 2; Hussain and Papastathopoulos, 2022: 2). Although the exact definition of organisational readiness differs in the literature, all agreed that organisational readiness has a strong influence on the adoption of technologies and is used to determine whether the organisation has the necessary attributes to adopt HRIS (Jayadeva *et al.*, 2022: 5798; Robinson and Shiny, 2024: 4756).

2.8.1.2 Organisational Structure

Organisational structures reflect the background for key decisions, division of responsibilities and tasks, and various actions and processes of modern organisations that ensure the creation and maintenance of competitive advantage. Its indicators are formalisation, centralisation, specialisation, configuration and standardisation, professionalism, decentralisation, complexity and communication styles (Glod, 2019: 135). According to Gupta, Misra, Kock and Roubaud (2018: 86), organisational structure has been identified as a factor that can either support or hinder technology adoption. Moreover, IT adoption is more likely to succeed in organisations with less hierarchical and more decentralised structures. Nwachukwu and Chladkova (2019: 76) also assert that a flexible organisational structure and governance model are important to support the efficient use of human resources, financial resources and strategic analysis capability of an organisation. In a study by Hartwell (2018: 654) on innovation adoption within the UK's main contracting construction sector, it was found that organisational structure plays a significant role in this process. The study revealed that a consolidated organisational structure positively influences innovation adoption, whereas a fragmented structure has a less favorable impact.

2.8.1.3 Employees' acceptance of technology

The willingness of an organisation's employees to adopt and use new technologies significantly affects the decision to implement innovations (Agostini and Nosella, 2020: 630). A major challenge that organisations face when introducing new technologies is employee resistance to change. Scholars have linked this resistance to factors such as fear of job loss, lack of skills in new technologies, uncertainty about the future and adaptability, low tolerance for change, disruption of personal expectations, competing priorities, non-reinforcing reward systems, peer pressure, mistrust, organisational politics, poor timing, loss of control, and the breakdown of support systems (Basyal and Wan, 2017: 353). According to Ajibade (2018: 3), employees are more likely to adopt technology when they perceive it as useful and

easy to use. Therefore, the greater the recognition that a system will simplify their tasks, the more likely employees are to embrace and view the new technology as beneficial.

Empirically, it has been proven that technology acceptance by employees depends on various factors namely ease of use, system quality, system usefulness and user satisfactions, as some of the factors determining employees' acceptance of technology (Kamaludin and Kamaludin, 2017; Bayraktaroglu *et al.*, 2019; Kannipamula, 2020; Bayraktaroglu *et al.*, 2019).

2.8.1.4 Size of Organisation

The influence of an organisation's size on the adoption of Human Resource Information Systems (HRIS) is significant, with larger organisations generally being more likely to adopt such systems compared to smaller ones. This trend is primarily due to the greater availability of resources, greater personnel flexibility, and stronger management capabilities to invest in innovative efforts (Corsi, Prencipe and Capriotti, 2017: 2).

In contrast, smaller organisations often face challenges such as limited budgets, less sophisticated technological infrastructure, and fewer specialised personnel, making the adoption and effective use of HRIS more difficult. Research has shown that in smaller firms, the lack of resources and expertise can lead to delays in adopting HRIS, despite its potential benefits in improving efficiency and decision-making in HR management (Khaund and Nath, 2023: 71). However, studies highlight that the size of the organisation does not influence the adoption of technology. That is, the adoption of HRIS is independent from the size of the organisation. The study by Mahadik and Ayarekar (2020: 73) for instance concluded that HRIS adoption is independent of the size of the organisation and that there is no relationship between size of the organisation and usage of HRIS. This notwithstanding, recent studies have emphasised that understanding these dynamics is crucial for tailoring HRIS solutions

to meet the specific needs and capabilities of organisations of different sizes (Alkhwaldi *et al.*, 2023: 64).

2.8.1.5 Top management commitment and support

Al-Dmour (2014) cited in De Alwis, Andric and Sostar (2019: 251) views management commitment as the level of willingness within top management to support and adjust organisational culture and processes to facilitate the adoption of HRIS applications. Traditionally, the role of top management has involved supporting employees, helping resolve issues, encouraging collaboration and positive interactions across roles, fostering bottom-up innovation through incentives, and guiding unit managers to drive innovation by providing clear and steady direction. Recent studies, such as that of Hsu, Liu, Tsou and Chen (2019: 576) indicate that support from top management plays a crucial role in overcoming challenges and enhancing a company's technological capability to effectively adopt or implement new services or products.

Maduku *et al.* (2016: 719) identified a strong link between top management support and the intention to adopt mobile marketing in African SMEs. Udekwe *et al.* (2021: 269) also highlighted several critical factors affecting the adoption and use of HRIS in South Africa's health sector. These factors include insufficient management support and prioritisation for HRIS; a preference for manual processes over digital systems; inadequate infrastructure; a lack of integrated information systems; limited funding; and workplace security concerns. Sungwa (2021: 11) iterated that many organisations across Africa encounter significant challenges when attempting to replace traditional human resource management practices with technology systems, and amongst these obstacles are limited support from top management and financial or budgetary constraints. Therefore, Udekwe *et al.* (2021: 269) emphasised the importance of management in the health sector providing support to improve the effectiveness of HRIS. This can be achieved by addressing infrastructural issues related to the use of HRIS in the health sector.

2.8.2 Technological factors

Bryan and Zuva (2021: 140) explain that technological factors refer to the sophistication of IT usage and management within an organisation. They further note that organisations with well-established IT departments possessing the necessary knowledge and capabilities are more likely to adopt new technological systems. According to Nguyen, Le and Vu (2022: 5), these factors may include IT infrastructure, IT expertise of employees, internet quality, perceived complexity and perceived compatibility.

2.8.2.1 IT infrastructure and resources

According to Rahaman and Arif (2018: 24), IT infrastructure consists of a set of physical devices and software applications that are required to operate in the entire organisation. Muriithi, Horner and Pemberton (2016: 95) and Pan (2020: 3) posit that IT infrastructure plays a significant role in determining which technologies to use, and that increasing investment in technology infrastructure within an organisation is likely to enhance the equipment and policies related to technology within the organisation. Matimbwa and Masue (2019: 134) noted that despite the Tanzanian government's efforts to replace costly satellite bandwidth with Optic Fibre Cable for better communication, reliable internet remains a challenge for some MDAs. As a result, certain MDAs lack dependable official internet connections and rely on employees' personal modems to access and update HR information. According to Masum *et al.* (2020: 701), recent studies have indicated that IT infrastructure is the most common barrier to adopting IT-enabled applications in organisations of the developing countries.

2.8.2.2 IT expertise of employees

Having technology experts within the organisation would always help the organisation to adopt new technologies (Mitra, Kapoor and Gupta, 2022: 6). The perceived complexity of adopting new technology often leads to resistance, particularly when

employees lack the necessary knowledge and skills. The IT expertise of employees and HRIS users plays a major role in the decision to implement HRIS within an organisation. IT skills and familiarity with digital tools make HRIS adoption easier, as they increase users' willingness and ability to work with the system (Qaisar, Shahzad and Arif, 2018: 1). Consequently, IT skills are essential for companies aiming to develop effective IT applications. Numerous studies have identified these complementary factors as vital for successful IT implementation. In this context, IT skills are measured by the number of employees solely engaged in IT-related tasks. Firms with higher levels of IT skills, while controlling for other factors, are generally more advanced users (Ditsa and Haleem, 2024: 779). Gope, Elia and Passiante (2018: 11) recommend that organisations encourage employees by offering training and skills development programmes to help them quickly gain the knowledge and abilities needed for adopting new technologies.

2.8.2.3 Perceived compatibility

The decision to adopt technology is influenced by its compatibility with existing technology, culture, values and work practices. An innovation is perceived as compatible when it is seen to be consistent with other technology already in use in the organisation (Ahmad *et al.*, 2019: 5). According to Sugandini *et al.* (2018: 663), compatibility is based on existing values, past experiences and the needs of potential adopters. The more simplistic and less complex the technology is, the easier it is for organisations to adopt. Similarly, Kandil, Ragheb, Ragab and Farouk (2018: 119) describe 'compatibility' as the degree to which an innovation aligns with an organisation's existing values, past experiences and adoption requirements. Consequently, organisations that view HRIS as compatible with their business operations are more likely to maintain its use, which subsequently enhances their business performance. Moreover, a positive previous experience of adoption of an innovation will also influence the adoption of new technology, whereas negative previous experiences can negatively impact the adoption of another innovation (Mairura, Ngugi and Kanali, 2016: 504). Matimbwa, Masue and Shilingi (2020: 38)

employed the ordered logistic regression model to assess the influence of some technology features on the effectiveness of HRIS. The study concluded that most technological features such as compatibility increase the effectiveness of HRIS in terms of timeliness, completeness and accuracy. In this light, Sun, Cegielski, Jia and Hall (2018) emphasised compatibility as significant determinants of adoption behaviour.

2.8.3 Environmental factors

The environmental context refers to all factors outside an organisation that may facilitate or constrain the adoption of new information technology, consisting of its competitors, government agencies and the industry (Qalati, Li, Vela, Bux, Barbosa and Herzallah, 2020: 990; Beier and Früh, 2020). Badi *et al.* (2021: 6) note that the environmental dimension is the broader context in which a firm operates, encompassing its industry, competitors, access to external resources and interactions with government bodies. Similarly, Seshadrinathan and Chandra (2021) emphasise that the environment is influenced by factors like industry conditions, government regulations and competition. Elghdhan *et al.* (2021) highlight that the environmental context both limits and creates opportunities for technological advancements. Bryan and Zuva (2021) argue that organisations must align with their environment and respond to their demands as their strength is shaped by both internal and external factors, including the environment, organisational size and strategy. The variables selected for this construct include Government Policies, External Support and Competitive Pressure. Environmental factors present opportunities and constraints for technological innovation adoption. It is implied that in more turbulent and unstable environments, a more rapid adoption of technology would be carried out. The environmental dimension comprises competitive pressure, technology vendor support and government regulations and policies.

2.8.3.1 Government policies

The prime policy focus of the governments of many developing countries has been on innovation, technological development and upgrading in the digital field. The current debate on industrial and government policies is now less about market interventionism, but rather on technological innovation. According to Curtis (2016), governments in both developed and developing countries have realised the importance of technology and innovation to the development process and have accepted that the adoption of advanced technologies is key to stimulating productivity, competitiveness, employment and growth. Nikopoulou, Kourouthanassis, Chasapi, Pateli and Mylonas (2023: 6) assume that Government policies are important in the adoption and implementation of modern digital technologies. Government participation in the adoption of HRIS is important and, as such, its role must be emphasised. There is also a need for the government to be actively involved in resolving infrastructural and other issues on the use of HRIS in the health sector (Udekwe, Iwu, De la Harpe and Daramola, 2021: 91).

2.8.3.2 Competitive pressure

For organisations to be competitive, they are compelled to look for better ways of doing things. HRIS, known for its effectiveness and efficiency, has been adopted by organisations to help them overcome the competitive pressures. Competitive pressure is defined by the pressure that comes from the external environment that can compel organisations to adopt new technologies. Competitive pressures come from stakeholders such as potential customers, government agencies and competitors (Qalati *et al.*, 2020: 991). Dissanayake and Nandasena (2020: 71) note that previous research indicates that competition and pressure from rivals are key drivers for IT implementation. Hmoud (2021: 8) emphasises that competitive pressure is a major predictor of IT innovation adoption and significantly impacts decision-making in modern organisations. Similarly, Jayadeva, Shikhare and Verma (2022: 5796) argue that the primary goal of implementing HRIS is to gain a competitive advantage in the market, thereby keeping competitors at bay. Ali (2018), for instance,

examined the relationship between HRIS and gaining competitive advantage in a mobile service company in Egypt. The study results showed that there is a positive relationship between HRIS and competitive advantage in the mobile service company.

2.8.3.3 Vendors' support

According to Dissanayake and Nandasena (2019: 71), HRIS software services are often provided by third-party vendors, whose ongoing support is crucial for the development and maintenance of an effective system. The decision to adopt new technology greatly influences the level of vendor support and associated marketing efforts. HRIS vendors are held responsible for the success of innovation adoption (Jemine and Guillaume, 2021: 21). The study of Hagan, Lotsu, Hodowu and AbakaYawson (2022:348), for instance found that the lack of reliable vendors frustrates the adoption of HRIS.

Similarly, a study by Naveed *et al.* (2021: 18) revealed that the adoption of HRIS has remained costly for a public organisation in Pakistan because of costly vendors and the prolonged process of implementation of the system. Sharma (2022: 51), however, explains that due to the high cost of adopting legitimate HRIS solutions, some organisations opt for cheaper and unlicensed versions from untrustworthy vendors. This poses significant risks for organisations by exposing them to potential system crashes caused by viruses, leading to continuous repair fees from the unreliable vendor. Additionally, the unauthorised software may contain backdoor access, allowing the vendor to potentially exploit the organisation's sensitive information (Sharma (2022: 51).

Understanding the factors influencing technology adoption helps to predict and manage what to adopt, when to adopt and under what conditions to adopt. Armed with this information, an organisation can take good decisions on HRIS adoption. Notwithstanding, some organisations have been able to adopt HRIS and chalked

some successes in their HRM activities. This next section examines the success indicators of HRIS.

2.9 HRIS SUCCESS INDICATORS

According to Quaosar, Hoque and Bao (2018: 15), a successful HRIS ensures that organisations, through their human resource function, are employing the best individuals suitable for employment, enabling them with suitable training, maintaining and managing them with fair remuneration. Quaosar *et al.* (2018:15) further suggest that a well-functioning HRIS has many transformational effects enabling the total restructuring of an organisation. Several models and theories have been propounded to explain HRIS success indicators and various studies either confirm or refute these theories. Other studies have used these models to examine the success rate of HRIS in organisations (Puspitarini, Handayani, Pinem and Azzahro, 2018).

Savalam and Dadhabai (2018: 81) assessed the success of Integrated HRIS by examining User Satisfaction about the system. The study used system Quality, Information Quality of the system as well as System Use as the determinants for User Satisfaction. Based on the results, the study therefore concluded that Integrated HRIS is successful. In a related study, Bali (2019: 221) concluded that the success of HRIS is positively associated with User satisfaction which is further influenced by the quality of the HRIS system, information and ease of use. Noutsa *et al.* (2017) also found out that HRIS adoption can only be predicted by a quality system, and that organisations need to develop this system if they want to fulfil organisational objectives.

2.10 BARRIERS TO HRIS IMPLEMENTATION

Despite the numerous benefits HRIS can offer, extensive debate exists in relation to its application and profitability in practice. In an effort to become more competitive, more efficient and more profitable, organisations invest hugely in new technologies such as HRIS. However, the acceptance and use of these new technologies by employees and other end-users have been a major hindrance to the success of these

new technologies. This makes the investment in these new technologies a great loss to organisations (Skoumpopoulou, Wong, Ng and Lo, 2018: 219).

Organisations encounter many barriers while adopting and implementing new technologies. Various scholars have identified key challenges to the successful use of HRIS as a lack of top leadership commitment; lack of infrastructure and incompatibility of software; lack of sufficient financial support and management; and lack of sufficient capital and skills. Others include the cost of installation and maintenance of HRIS; lack of cooperation and integration with other departments; difficulty in changing the organisation's culture; and complexity of HRIS and its acceptance amongst the employees and key managers (Bogale, 2016; Rahman, Islam and Qi, 2017; Khan *et al.*, 2017; Alhalalmeh, 2018).

According to Irum and Yadav (2019: 5), the most common problems in HRIS implementation include privacy and ethical concerns, high costs, technical challenges, and employee resistance. The shift to information technology raises serious issues about employee privacy, as the ease of information sharing heightens the risk of exposing personal data. Information displayed on dashboards is particularly vulnerable to leaks, making it accessible to both internal and external parties. This can result in sensitive details entrusted to the organisation becoming publicly available, thereby causing a breach of privacy.

Another difficulty is the high cost involved in setting up the necessary technological infrastructure, training employees, and maintaining the system. Even after implementation, there is no guarantee that the software will meet organisational needs unless it is regularly updated. Technical threats such as bugs or viruses may also compromise the system, leading to potential failure (Irum and Yadav, 2019: 5).

Furthermore, management may face resistance from employees during the adoption and use of the new system. Such resistance often arises because new technologies

disrupt established workflows and organisational culture, while the additional time and effort required for training may discourage employee engagement (Irum and Yadav, 2019: 5).

Considering these challenges, one of the key tasks for management and the HR department is to demonstrate that HRIS is effective and contributes to improved organisational performance. When employees and end-users are convinced of its value, they are less likely to perceive it as a cost burden. This mindset can foster greater motivation and commitment among staff, ultimately enhancing productivity and performance (Irum and Yadav, 2019: 5).

Nachit and Okar (2020) highlight that HRIS can be challenging for users to access easily, underscoring the need for simplified functionalities and user training. Additionally, Simms (2020) identifies issues with HRIS in terms of accurately and promptly capturing documents, a limitation that leads to significant distrust amongst management and staff regarding the reliability of reports within the health sector. Furthermore, resistance from both management and employees in using HRIS contributes to a lack of trust in workforce reports, with skilled health workers often disengaged from HRIS as they focus mainly on receiving their salary and overlook the potential benefits that HRIS could offer (Islam, Raju and Azad, 2021).

2.11 Chapter Summary

The above chapter provided an outline of the various literature in the field of HRIS and described the basis for understanding the subject matter. Going by the findings of the literature review, the importance of technology usage in HR functions cannot be overemphasized, especially when an organisation wants to achieve its objectives effectively and efficiently. The literature has also revealed that adopting technology in HRM functions has its shortcomings. In a bid to become more competitive, more efficient and more profitable, organisations invest hugely in new technologies such as HRIS. However, resistance to change from employees and end users has hindered

the successful adoption and implementation of these new technologies. This makes the investment in these new technologies a great loss to organisations. The next chapter looks at the how HRIS can be optimized for organizational effectiveness.

CHAPTER THREE

OPTIMISING HUMAN RESOURCE INFORMATION SYSTEMS FOR ORGANISATIONAL EFFECTIVENESS

3.1 INTRODUCTION

The various dimensions of organisational effectiveness are reviewed in this chapter. Firstly, the meaning of the term 'organisational effectiveness' is interrogated, showing the divergences in the definitions of the term and the uncertainty about what it stands for. The chapter then looks at various dimensions of organisational effectiveness as captured in the extant literature. These are identified as follows: approaches to organisational effectiveness, indicators of organisational effectiveness, as well as any similarities/differences amongst these indicators. Thereafter, the indicators of organisational effectiveness adopted in this study are specified, and a blended approach is suggested as an effective option for this study. The chapter ends by exploring the link between HRIS adoption and organisational effectiveness, as specified by the study.

3.2 THE CONCEPT OF ORGANISATIONAL EFFECTIVENESS

Issues related to the effectiveness, efficiency, productivity, excellence, quality and performance of organisations have been a subject of interest for many scholars. (Pandya and Srivastava, 2017: 271; Holbeche, 2018; Nawaz and Laij, 2021: 61). The conceptualisation and measurement of effectiveness present significant challenges for organisations and there is no consensus amongst authors regarding the definition, approaches, criteria and determinants of the concept (Holbeche, 2018: 302).

Albassami *et al.*, 2019: 35; Kulshrestha and Tripathi, 2021: 348). Holbeche (2018: 30) therefore proposes that in defining organisational effectiveness and how to achieve it, organisations must consider the changing nature of the organisational environment, employment models and the employment relationship. Against this backdrop, several definitions of organisational effectiveness have cropped up over the years in literature.

All these definitions have concentrated on how well organisations are performing against their stated objectives and goals. The objectives may be defined in terms of achieving desired level of output, desired level of resource utilisation, desired efficiency of processes in converting inputs to outputs, or the desired level of stakeholder satisfaction (Sharma and Singh, 2019:116).

An organisation is considered successful or effective when it achieves organisational effectiveness. This means the organisation is effective if it accomplishes its intended outcomes and goals. (Pandya and Srivastava, 2017: 273). Similarly, Irissappane and Marie (2015: 79) consider organisational effectiveness as how successfully organisations achieve their missions. Organisational effectiveness entails making tasks simpler with less work and avoiding mistakes so that there will be no re-work.

In the educational sector, organisational effectiveness has been defined differently by many scholars. While Paharia and Singh (2018) refer to organisation effectiveness as the satisfaction of students which makes them work harder for effectiveness of the institution, Cameron (1978) as cited in Nawaz and Laij (2021:61) define organisational effectiveness in the educational context through factors such as student educational satisfaction, faculty and administrator job satisfaction, organisational health, and student academic growth. Similarly, Cameron (1978) identified measures of organisational effectiveness in the education sector, including professional development and faculty quality, student personal and career development, system openness and community engagement, as well as the ability to secure resources.

The concept of organisational effectiveness has on many occasions been used interchangeably with organisational performance. While some researchers believe that the two terms are the same, others are of the view that organisational performance cannot be used in place of organisational effectiveness. Singh, Darwish and Potocnik (2016: 214) suggest that while organisational performance pertains to financial metrics, product market success, and shareholder returns, organisational

effectiveness is a broader concept that encompasses financial performance but also includes additional indicators such as operational efficiency, customer satisfaction, corporate social responsibility, and other outcomes that extend beyond financial measures.

For the purpose of this study, organisational effectiveness is defined as a broader concept that encompasses more than just organisational performance. While organisational performance refers specifically to measurable outcomes such as profitability, productivity and efficiency, organisational effectiveness includes a wider range of factors. These factors cover the organisation's ability to achieve its strategic goals, adapt to changes in the environment, foster employee satisfaction and development, and maintain long-term sustainability. Therefore, organisational performance is considered a subset of organisational effectiveness.

3.3 APPROACHES TO ORGANISATIONAL EFFECTIVENESS

Kareem and Hussein (2019: 311) argue that a single approach cannot be used to measure organisational effectiveness, as it is a multi-approach concept. Campbell (1977), as cited in Gebretsadik (2020: 824), identified four main approaches used to measure organisational effectiveness, namely Goal Approach, the Systems Resource Approach, the Internal Process Approach and the Strategic Constituency Approach. Sharma and Singh (2019: 115-116) propose several perspectives on organisational effectiveness. The Goal Approach considers effectiveness as the degree to which an organisation meets its objectives or targets. The System Resource Model defines it by the organisation's ability to secure valuable and limited resources. The Internal Process Model assesses effectiveness in terms of the efficiency of internal processes and procedures. Lastly, the Strategic Constituency Approach evaluates effectiveness based on how well an organisation meets the needs of its primary stakeholders, including investors, customers, employees, the community, society and regulatory bodies. The following sections will analyse each of these four approaches in detail.

3.3.1 Goal Approach

The goal attainment approach is the earliest and the most extensively used approach in organisational effectiveness (D'souza and D'souza, 2017: 78; Eydi, 2015: 461). The Goal approach attempts at measuring organisational effectiveness in terms of goal achievement by an organisation. Examples of such goals include profit maximisation, high productivity, boosting employee morale, and providing efficiency (Chhanwal and Deshmukh, 2020). The goal approach focuses primarily on the outcomes of an organisation, assessing its ability to achieve one or multiple output objectives and its success in reaching its stated goals in alignment with desired performance levels (Grant, 2020:161).

Several studies have used the goal approach to examine the organisational effectiveness of entities (Teo and Low, 2016: 1; Olivier and Martins 2018: 5; Williams *et al.*, 2019: 361). Choon and Patrick (2016: 82), for example, conducted a study in a high-tech company in Singapore to determine whether goal setting affects employee effectiveness and ultimately improves organisational effectiveness. A conceptual model on goal setting and its relationship with employee effectiveness and organisation effectiveness was developed, and the findings indicated that goal setting has a positive relationship with both employee effectiveness and organisational effectiveness. Olivier and Martins (2018: 5) proposed a conceptual model which suggests that if an organisation has a balance between various internal structural features, it will facilitate the achievement of its goals as stipulated in its vision and mission and will ensure effective and efficient service delivery. Williams *et al.* (2019: 361) also used the goal approach as an organisational effectiveness approach to measure the performance of a family business in the south-eastern part of USA.

In-as-much as the goal approach has been recognised as the most extensively used approach, this does not mean it has no shortfalls. Several shortfalls have been levelled against the goal approach. Chhanwal and Deshmukh (2020: 98) for instance posits that the short-term goals of an organisation may differ from its long-term goals,

making it difficult to choose which one to use in the measurement. Similarly, Akhigbemidu, Amah and Okocha (2021: 159) mentioned that the most evident limitation of the goal approach is that organisations have multiple goals, which might be conflicting with each other and changes over time, especially with the short-term goals. The earliest is the goal attainment approach and is characterised by an identification of goals to measure performance.

3.3.2 Systems Resource Approach

According to D'souza and D'souza (2017: 78), the system resource approach views the organisation as an open system, whereby the organisation acquires inputs; engages in transformation processes through interrelated sub-systems; and generates outputs. The systems resource approach suggests that an organisation is successful when it is effective at exploiting its environment in order to acquire necessary resources (Bhuyan, 2018:160). This approach centers on an organisation's ability to grow and adjust to external environmental conditions, placing significant emphasis on expansion, preparedness, resource acquisition, external support and adaptability (Zlatković, 2018: 18). Irissappane and Marie (2015: 79) describe the System Resource approach as focusing on how an organisation interacts with both its internal and external environments, and how effectively it leverages and acquires limited resources from these surroundings.

Fynn, Jones, and Jones (2021: 1) employed a Systems Resource Approach to examine research activities and relationships within a local authority. Utilising a Participatory Action Research Approach, they applied qualitative methods to investigate these dynamics within Norfolk County Council. The study highlighted several examples of successful practices and models of research collaboration in various departments. Despite challenges such as resource constraints, capacity issues and barriers to knowledge exchange, key stakeholders demonstrated a willingness to take action that would help the authority become more research focused. The findings also pointed to opportunities for creating enhanced

collaborative partnership models and systems that could support sustainable research and knowledge exchange processes both within the institution and across organisations (Fynn, Jones, and Jones, 2021: 1).

3.3.3 Strategic Constituency Approach

According to Kareem and Hussein (2019: 113), the Strategic Constituency Approach focuses on the expectations of powerful stakeholders and their interests, which cross over the organisation. This approach to organisational effectiveness posits that an organisation is deemed effective when it meets the needs and expectations of its various stakeholders, or strategic constituencies (Kareem and Hussein, 2019: 311). This approach emphasises that different groups, such as customers, employees, investors and suppliers have distinct interests and criteria for evaluating the organisation's performance. The effectiveness of an organisation therefore hinges on its ability to satisfy these diverse constituencies at least minimally, ensuring their continued support and engagement (Hassan, 2021).

Moreover, the Strategic Constituency Approach is particularly relevant in contexts where outputs are not easily quantifiable, such as in non-profit organisations. Here, effectiveness may not be measured solely by financial metrics but rather by the extent to which the organisation fulfills its mission and serves its community (Al-Shaiba, AlGhamdi and Koc, 2019: 5). The Strategic Constituency Approach also highlights the competitive nature of stakeholder demands. Organisations often face pressure from multiple groups vying for limited resources, necessitating a strategic alignment of goals to ensure that all constituencies feel valued (Ikegwuru, 2022: 229). This competitive aspect can lead to conflicts, as the interests of one group may not align with those of another. For instance, in a corporate setting, shareholders may prioritise profit maximisation, while employees may advocate for better wages and working conditions. The organisation must navigate these competing interests to maintain its effectiveness and sustainability (Otoo, 2024: 109).

In summary, the Strategic Constituency Approach provides a comprehensive framework for assessing organisational effectiveness by focusing on stakeholder satisfaction. It emphasises the need for organisations to engage with and address the diverse interests of their constituencies, thereby fostering a more inclusive and responsive operational model.

3.3.4 The Internal Process Approach

The Internal Process Approach emphasises that an organisation is effective if it can offer a harmonious and efficient internal environment (Bhuyan 2018:160). The internal process approach to organisational effectiveness emphasises the importance of internal mechanisms and processes that contribute to the overall performance and success of an organisation. This model posits that organisational effectiveness is not solely determined by external factors such as market conditions or competition, but rather by how well an organisation manages its internal processes, structures and culture. One of the foundational aspects of the internal process approach is the recognition that effective leadership and a strong organisational culture are critical to fostering an environment conducive to achieving organisational goals (Jiang, Zhao, Xue, Wang and Yang, 2023: 514). This multi-faceted approach is echoed by Kulikowska-Pawlak (2018: 159) who suggest that understanding the dynamics of internal processes can lead to improved organisational effectiveness, particularly in the context of organisational politics and change. Furthermore, the Internal Process Approach is closely linked to employee engagement and job satisfaction, which are critical for fostering a productive work environment (Yadav, Pandita and Singh, 2022: 521).

The Internal Process Approach to organisational effectiveness underscores the importance of internal mechanisms, leadership, culture, and employee engagement in achieving organisational goals. By focusing on these internal factors, organisations can create a supportive environment that enhances overall performance and effectiveness

TABLE 3.1: COMPARING THE FOUR ORGANISATIONAL EFFECTIVENESS APPROACHES

Approach	Definition:	When useful:	Focus	Problem	Ways to solve the approach
	An organisation is effective to the extent that....	The approach is preferred when...			problems
Goal attainment	It accomplishes its stated goals.	Goals are clear, time bound and measurable.	Goal oriented	Difficult to state the goals	Making consensus of the state of the goals
Systems	It acquires needed resources.	A clear connection exists between inputs and outputs.	Means (Process) oriented	Some process variables are easy to measures but other are not	focusing on means rather than the ends

Strategic constituencies	All strategic constituencies are at least minimally satisfied.	Constituencies have a powerful influence on the organisation and the organisation must respond to demands.	The Interest of constituencies/Stake holders	The satisfied constituencies are different depending on their interest; separating the constituencies from larger environment is difficult to carry out.	Amalgamation and merger
Balanced scorecard	The identification and measurement of areas critical to the business	The organisation is complex and is operating in a demanding environment	Choosing the important thing as the goals	The important things for organisation and to develop measures for these	Depends on the attitudes of senior managers to involve the stakeholders and manager
					in the process of nominating the important goals.

Source: Wanusmawatie (2015: 40)

3.4 INDICATORS OF ORGANISATIONAL EFFECTIVENESS

Several indicators exist on organisational effectiveness, and most studies adopt their own specific measure on organisational effectiveness, different in content and coverage from others (Nwanzu and Anayo, 2018: 21). Several factors consistently impact the selection of indicators for an organisation's effectiveness. These include: a clear mission, supportive policies, suitable organisational design, favorable working

conditions, competitive pay and benefits, positive management practices, employee loyalty, operational efficiency, and a customer-focused approach. Additionally, factors such as a sense of accomplishment, recognition, opportunities for advancement, ability to shoulder responsibility and prospects for growth also play a significant role. (Madhukar and Shelankar, 2018: 213).

Some researchers have also argued that the Indicators of OE should be generated based on the approach used in the measurement. Accordingly, Nwanzu and Uhiara (2018: 24) propose that for the Goal approach, the indicators must be quantity and quality of output and efficiency. For System Resources Approach, the acquisition of factors of production, profitability, adaptability, and growth must be the indicators. The Internal processes approach should come up with employee morale, commitment, loyalty, trust, job satisfaction, cohesiveness, and free flow of information as its indicators. The last approach, the Strategic Constituency Approach focuses on meeting the needs and expectations of various stakeholders, including shareholders, employees, management, suppliers, customers, trade unions and regulatory government agencies, using these as key indicators of success (Nwanzu and Anayo, 2018: 24).

Bijina (2019: 193), however, proposed that OE should be measured in terms of an organisation's internal and external stakeholders. Bijina (2019: 193) defines the internal stakeholders as involving the whole staff in the organisation, and external stakeholders as the organisation's owners/ investors, customers, external partner organisations and members of the society. Zoogah, Peng and Woldu (2015: 11) developed a typology of Organisational Effectiveness indicators based on the internal and external contexts, as well as on the short-term and long-term dimensions. This is depicted in the figure below.

FIGURE 3.1: TYPOLOGY OF ORGANISATIONAL EFFECTIVENESS INDICATORS

Context	Period	
	Short term	Long term
Internal External	Profitability	Survival
	Sales	Viability
	Production	Learning
	Innovation	Growth and development
	Legitimacy	Advantages
	Customer satisfaction	Investor attraction
	Political rent	Industrial network
	Community improvement	Supplier welfare
	Employee well being	Societal transformation

Source: Zoogah, Peng and Woldu (2015: 11)

In the African context, Pandya and Srivastava (2017: 276) aver that developing countries are still striving to define and identify the indicators and dimensions of organisational effectiveness since their socio-economic and cultural conditions are entirely different from those of the developed countries. Similarly, Zoogah, Peng and Woldu (2015: 9) argue that the African context influences the effectiveness of African organisations in a way that is different from other western contexts. Hence, the indicators of organisational effectiveness in the African context are influenced by a blend of modern management practices and traditional values, emphasising adaptability, stakeholder engagement, and cultural alignment (Ngwangwama, 2018:4).

In recent times, there has been a growing demand for more integration of non-financial indicators and their implications for firm's performance (Terziev *et al.*, 2017; Bui *et al.*, 2020; Moses, Houqe and van Zijl, 2018: 10). Terziev *et al.* (2017: 1085), for

instance, have argued that some effectiveness measurements record false signals about performance and profitability, and they do not take into account the requirements of today's strategies, thereby forcing organisations to ignore less tangible non-financial criteria such as product quality, customer satisfaction, delivery times, flexibility, time to develop a new product and a higher level of workers' know-how. For this reason, many organisations try to improve effectiveness measures, systems and management styles that perfectly assess the organisation's effectiveness in all angles. These measurement systems must be flexible, include non-financial perspectives and must be changeable as needed.

Contemporary strategies have therefore been developed to address the limitations of traditional methods, with the Balanced Scorecard method standing out as a particularly significant modern approach (Iyibildiren and Karasioglu, 2018: 16). Considering that organisational effectiveness encompasses a broader spectrum beyond just financial metrics, including operational efficiency, customer satisfaction, corporate social responsibility and other non-financial outcomes (Singh, Darwish, and Potocnik, 2016: 214), it is advisable to gauge organisational effectiveness through the Balanced Scorecard. Thus, this study utilises the Balanced Scorecard as a metric for organisational effectiveness as it integrates various aspects beyond financial measures.

3.5 THE BALANCED SCORECARD (BSC)

Al-Saadoon (2017:28) defines the Balanced Scorecard (BSC) as a strategic management tool that helps organisations achieve their goals by translating their mission into a comprehensive set of financial and non-financial performance measures, aiding in performance evaluation. The BSC offers a more thorough and complex analysis of organisational effectiveness by creating a system of indicators that supports a holistic, integrated view. This enables organisations to focus their efforts, set priorities and communicate them to managers, employees, investors and customers (Quesado, Guzmán and Rodrigues, 2018: 188). The Balanced Scorecard

is a method for measuring performance that converts an organisation's vision and strategy into specific objectives (Tuan, 2019: 72). Bahiaa, Ahmed and Raheem (2020: 380) further explain that the balanced scorecard is an integrated management control system and a strategic approach that enhances organisational capabilities through the interaction of its dimensions, aiming to achieve strategic goals and improve competitive positioning. Oliveira, Oliveira, Fijałkowska and Silva (2021: 174-175) view the BSC as a tool that connects an organisation's vision, mission, strategies and operations, mapping goals, objectives and performance.

According to Fijałkowska and Oliveira (2018: 63), the BSC proposed by Kaplan and Norton (1992 and 1996) have four main conventional perspectives, namely: the financial perspective; customer perspective; learning and growth perspective; and the internal process perspective. These four perspectives have been used in various studies to measure the performance and effectiveness of organisations. Chopra and Gupta (2019: 88) explored the impact of knowledge management practices, such as a knowledge-sharing culture, knowledge-based human resource management (HRM), strategy and leadership, and information and communication technology (ICT) on organisational performance using the four perspectives of the balanced scorecard. Based on a sample of 277 employees from Indian firms, the study found that both a knowledge-sharing culture and knowledge-based HRM had a highly significant impact on all four balanced scorecard perspectives. Meanwhile, strategy and leadership had a positive and significant effect on the Learning and Growth and Internal Process perspectives, but did not significantly influence the Customer Satisfaction or Financial perspectives. Additionally, ICT practices were found to have no significant impact on any of the performance measures.

Similarly, Nafari and Rezaei (2022: 7) examined the connection between human resource strategies and organisational performance using the balanced scorecard. Conducted as a cross-sectional study amongst clinical and administrative staff in a public hospital in Isfahan province, Iran, the research found a strong positive

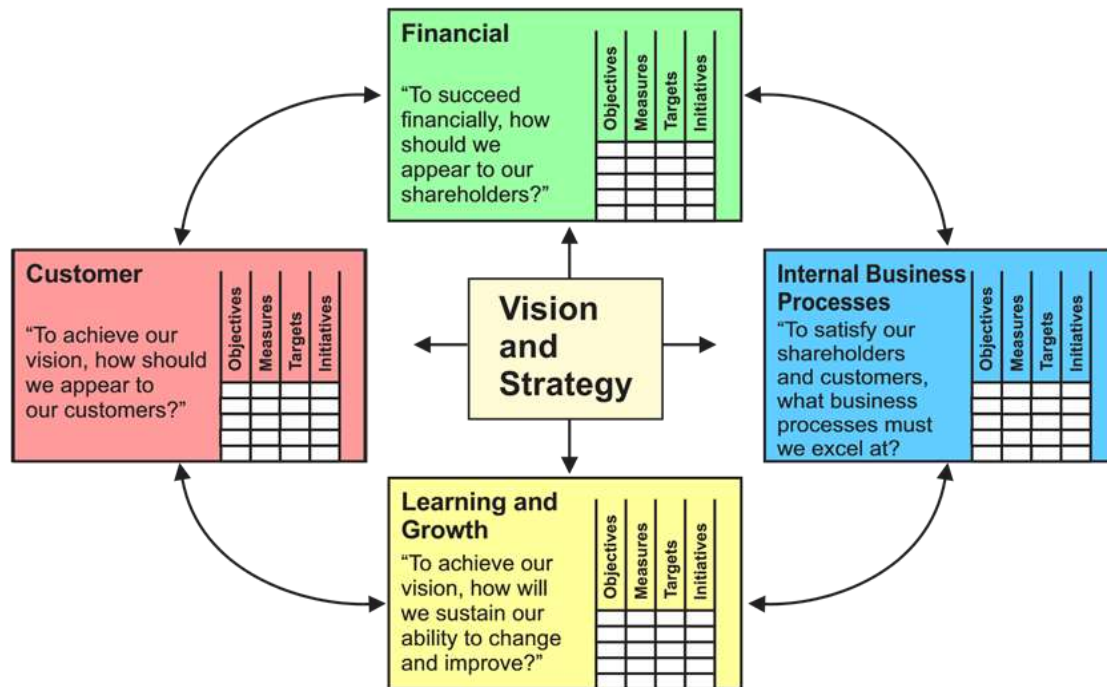
relationship between human resource strategies and organisational performance. The results indicated that the Learning and Growth perspective showed the highest correlation with human resource strategies, while the financial perspective had the lowest. Additionally, the study revealed that training and development, staff compensation and reward, and recruitment strategies had the most significant impact on organisational performance. The study concluded that human resource strategies influenced non-financial aspects of organisational performance more than financial ones, emphasising the need for the hospital to focus on strengthening HR strategies in non-financial areas. In summary, the balanced scorecard approach enhances organisational effectiveness by fostering collaboration across departments during strategy development and implementation (Oyewo, Moses and Erin, 2021: 11).

In designing a balanced scorecard, Kumari (2011: 74) identifies four steps that can be followed, namely:

- i. Define the key objectives for each perspective, ensuring they align with the organisation's overall vision and priorities.
- ii. Determine performance indicators for each objective to assess progress and guide the organisation toward achieving its goals for each perspective. These indicators will serve as benchmarks for measuring success.
- iii. Establish clear, measurable targets for each key area identified, providing a basis for performance evaluation and progress tracking.
- iv. Develop detailed strategies and action plans for each activity, outlining the steps the organisation will take to achieve the predetermined goals effectively.

Graphically, Narayanamma and Lalitha (2016: 61) provided the following figure to explain the balance scorecard depicting the four perspectives with their objectives, measures, targets and strategies, as outlined by Kumari (2011: 74).

FIGURE 3.2: THE BALANCED SCORECARD



Source: Narayanamma and Lalitha (2016: 61)

Although the BSC has been widely adapted to various types of organisations, implementation of balanced scorecard does not necessarily lead to organisational success (Dhamayantie, 2018: 222). According to Bartlett *et al.* (2014), understanding the strategy in place and the proposed connections between the BSC perspectives is essential for ensuring the successful implementation of the Balanced Scorecard. It is therefore important to critically examine the BSC's four perspectives by establishing what they actually measure and what their indicators are. The subsequent sessions explore these perspectives in detail.

3.5.1 Financial Perspective

The Financial Perspective of the balanced scorecard indicates whether the organisation is financially effective in accomplishing its aims. This perspective represents the organisation's long-term goals, identifies the way shareholders see the

organisation and is linked to the interests of the organisation's shareholders (Oliveira, Oliveira, Fijałkowska and Silva, 2021: 174-175). Al Mseden and Nassar (2015: 99) aver that the financial perspectives is concerned with the ability of organisations to provide financial profitability, financial stability and cost effectiveness. The most used indicators for this perspective are Growth in Sales, Gross Profit, Net Profit, Return on Sales, Cash Flow, Profit per Employee, Earnings per Share and Return on Equity or Earnings and Before Interest and Taxes (Berkova, Adamova and Nyvltova, 2017: 1842).

In terms of the limitation of the financial perspective, Riofrio, Granizo, Mayorga and Alarcón (2023: 3920) noted that performance indicators like return on capital employed (ROCE) or return on investment (ROI) in the financial perspective only measure past performance and do not account for future investments or growth risks. In other words, while the financial perspective is a significant aspect of measuring a business's performance, it does not necessarily reflect the company's ability to optimise its long-term strategy and vision.

For this study, HR related cost reduction and increased productivity are the indicators considered from the financial perspective. HR-related cost reduction and increased productivity are highly relevant measures for assessing the financial impact of HRIS due to their direct influence on an organisation's bottom line. These metrics provide a comprehensive view of how HRIS directly influences financial performance, offering clear, quantifiable benefits that align with the organisation's goals of improving efficiency and reducing costs (Begum *et al.*, 2020: 187; Hasyim, Hasyim, Muhammad and Bakri, 2023: 524).

3.5.2 Customer Perspective

This perspective aims to assess customer satisfaction by measuring factors such as the ability to meet delivery deadlines, the quality of the products (goods or services) offered, and customer satisfaction in relation to the agreed price (Oliveira, Pinho and Silva, 2018: 606). Likewise, Kornelius, Bernarto and Widjaja (2020: 757) confirmed

that this perspective evaluates delivery time, product/service quality and cost. Some examples of indicators that could be used from this perspective include service levels, customer satisfaction and complaint rates.

From the customer perspective, the following aspects are prioritised: delivering goods and services that meet customer needs and align with specifications, ensuring customer retention, maintaining high-quality service delivery, fostering effective communication, providing excellent customer care, reducing customer complaints, and enhancing the planning and execution of projects to better reach customers.

For the purpose of this study, the customer perspective will be limited to the internal customers of organisations. According to Khan, Lalitha and Omonaiye (2017: 182), customers can be divided into internal and external. External customers are individuals and organisations who invest in and perform transactions with an organisation, while internal customers are the staff working within the organisation providing the services as per the requirements of the external customers.

3.5.3 Learning and Growth Perspective

The learning and growth perspective focuses on the organisation's intangible assets that contribute to strategic success. It aims to identify the objectives and indicators that support the development of skills crucial for organisational growth (Oliveira, Pinho and Silva, 2018: 606). In line with this, Iyibildiren and Karasioglu (2018: 18) argue that an organisation's ability to meet expectations, such as growth and profitability for shareholders and delivering new, high-quality products for customers, depends on its capacity for learning and growth. This perspective highlights sustainable investment for the future and the professional development of employees. Key indicators in this perspective include employee participation in training programmes, employee satisfaction, the number of trained employees, and adherence to organisational regulations (Tuan, 2019: 74).

In the context of learning and growth, the researcher identifies several key characteristics: knowledge management, improving information sharing, and empowering staff to discuss work-related activities and challenges based on their geographical locations. Additionally, the researcher emphasises the systems designed to coach and assist employees in effectively addressing and resolving tasks, promoting learning and knowledge transfer, as well as encouraging group discussions and collaborative efforts.

3.5.4 Internal Process Perspective

The internal process perspective enables organisations to identify new methods and processes that must be effectively implemented to achieve objectives related to customers and finances (Iyibildiren and Karasioglu, 2018: 17). This perspective focuses on critical internal activities and processes that are vital for both customer satisfaction and reaching the organisation's financial goals, ultimately leading to shareholder satisfaction (Oliveira *et al.*, 2021: 175). Berkova, Adamova and Nyvltova (2017: 1842) identify several key indicators for this perspective, including Material Efficiency Variance; the ratio of good output to total output in each production process; manufacturing lead time; material scrap loss rate; labour efficiency variance; product defects; the introduction of new products; and the efficiency of product design.

Tuan (2019: 74) categorised this perspective into four main areas, namely process improvement, operational processes, customer management processes, and social process management. Social process management focuses on creating a safe working environment, ensuring employee health, and engaging in social activities. Measuring the processes involves considering time, quality, and the cost of additional materials. This perspective focuses on all the essential activities and processes required for an organisation to efficiently and productively deliver value to customers. In terms of internal business processes, key characteristics include decision-making, staff productivity, and flexibility. Additionally, factors such as information flow, interdepartmental collaboration, forecasting and innovation capabilities, scheduling,

and data collection and processing are also considered important. Other critical aspects include monitoring and reporting, operational efficiency, alignment with strategic goals, communication, customer accessibility, supplier collaboration, and the delivery of products and services.

Having dealt with the measurement and the constituents of organisational effectiveness, it is important to establish the relationship between organisational effectiveness, HRM and subsequently HRIS. The next sections examine the link between HRM and organisational effectiveness, as well as the impact of HRIS on the four perspectives of balanced scorecard being used as a measure of organisational effectiveness in this study.

3.6 HRM CONTRIBUTION TO ORGANISATIONAL EFFECTIVENESS

A key challenge for human resource (HR) professionals, HR management (HRM) research and related literature has been to provide clear, strong evidence demonstrating how HRM systems, processes and functions contribute to organisational effectiveness (Nankervis, Rowley and Salleh, 2016: 1). According to Akpa *et al.* (2020: 63), organisational effectiveness cannot be achieved without the most critical factor in organisational goals achievement being understood and respected, and this is the human resource factor. Several studies have been done to establish the relationship between HRM practices and organisational effectiveness (Teimouri *et al.*, 2016; Mazibuko and Govender, 2017; Teimouri *et al.*, 2018; Kansal and Singhal, 2018; Johnson *et al.*, 2018; Olufade, 2019).

Verma (2018: 140) sought to provide insights into the impact of compensation as an HRM function on employee performance and organisational effectiveness. It was found that compensation has an impact on organisational effectiveness. The study draws strong conclusions that compensation has significant effect on employees' satisfaction, motivation and performance and that the reward systems of an organisation impact positively on employee performance and boost organisational

effectiveness. Teimouri *et al.* (2018: 120) also looked at the effects of HRM practices on Organisational effectiveness and found that there is a positive and significant relationship between effective HRM functions such as training, selection and recruitment, compensation and performance evaluation, and organisational effectiveness.

Tetteh and Asumeng (2020: 168) conducted a similar study to explore the relationship between HR functions, including succession planning, employee retention, career development, and organisational effectiveness in selected organisations in Ghana. Using a quantitative approach, participants completed questionnaires on succession planning, employee retention, career development programs, and organisational effectiveness. The findings indicated that succession planning had a significant impact on both employee retention and organisational effectiveness. Additionally, the results showed that career development programs effectively moderate the relationship between succession planning and employee retention, as well as between succession planning and organisational effectiveness.

These results align with the consistent findings from other studies, which suggest that strong HR practices such as succession planning and compensation not only enhance organisational performance but also contribute to the overall effectiveness of the organisation.

3.7 HRIS ADOPTION AND ORGANISATIONAL EFFECTIVENESS

Several studies have shown the positive impact of HRIS on organisational effectiveness (Esther and Ugwu, 2018; Anupa, 2021; Magege, 2022; Savitri, Buchori and Supratikta, 2024). HRIS, as an effective and efficient way of implementing HR practices, will in no doubt lead to positive impacts on organisational effectiveness. Srinivasa, Kannipamula and Teja (2018: 588) agreed that HRIS results in an increase in both effectiveness and efficiency of the organisation. Scholars have therefore concentrated on examining the impact of HRIS on organisational effectiveness.

Esther and Ugwu (2018: 57) conducted a study on HRIS and its impact on organisational effectiveness using a survey research design. The study concluded that HRIS significantly enhances an organisation's ability to achieve improved returns, greater competitiveness, and sustainable corporate growth. Additionally, it emphasised the importance of organisations being effective and creating a platform for the proper integration of human resource information into their strategic planning process. The study recommended regular training for employees in HR and ICT departments to ensure they acquire relevant skills and information. In a similar study, Siengthai and Udomphol (2016: 48) explored the impact of HRIS on organisational effectiveness in Thailand's textile industry. The findings indicated that HRIS positively impacts organisational effectiveness, particularly in human resource processes, time and cost savings, information management, decision-making and the strategic role of HR.

A study by Bhagwandas (2020) explored the application of the Decision-Making Trial and Evaluation Laboratory (DEMATEL) method in the context of Human Resource Information Systems (HRIS). The research highlights the crucial role of HRIS in managing HR functions and IT applications, examining the interconnections between factors such as software quality, vendor support, technology, and big data analysis. The study offers valuable insights into the complex structure of HRIS and its influence on organisational performance, providing a key resource for understanding how HRIS contributes to organisational success.

Having examined some of the impacts of HRIS adoption on organisational effectiveness in general, it is prudent to explore how specifically, HRIS impacts organisational effectiveness using the Balance Scorecard perspectives. The impacts of HRIS are therefore examined under the four perspectives of the balanced scorecard.

3.7.1 Impact of HRIS adoption on the financial performance of organisations

This section deals with how HRIS impacts the achievement of financial perspective goals and objectives of organisations. The financial perspective is the source of corporate income and expenditure on employee performance in supporting the company's goals (Soundarya, Lavanya and Hemalatha, 2018: 97). Various studies have examined the impact of HRIS on the finances of organisations. These studies have identified, amongst other things, that HRIS leads to cost effectiveness and increased productivity (Namwoonde (2019; Begum *et al.*, 2020; 49; Amara, Bibimoune and Kara, 2022: 258).

Begum *et al.* (2020: 186) investigated the relationship between Human Resource Information Systems (HRIS), employee productivity and HR costs by analysing data from forty banks in Bangladesh. The regression analysis results indicated that, all else being equal, the use of HRIS applications led to increased efficiency in employee productivity and a reduction in HR costs. The study concluded that if HR managers are diligent in selecting appropriate measurements and statistical tools, they can more effectively assess both the financial and non-financial aspects of their organisations through HRIS applications. Namwoonde (2019: 89) similarly conducted a study to evaluate the relationship between information systems and organisational performance at Telecom Namibia. The research found that the use of information systems positively impacted financial performance by improving the real-time monitoring of budget variations; increasing company income and gross profit; and reducing operational costs through lower logistics, production and service delivery expenses.

3.7.2 Impact of HRIS adoption on the customer perspective

As established earlier, the customer perspective is limited to the internal customers of organisations. Thus, this section examines the impact of HRIS on internal customers (employees) performance within an organisation (Khan, Lalitha and Omonaiye, 2017: 182). Namwoonde (2019: 89) opines that the use of information

systems had improved the quality and delivery of goods and services, facilitated better communication amongst employees, helped with customer retention and reduced customer complaints.

Several studies have shown the impact of HRIS on the performance of employees. Hikmawan and Santoso (2020: 578), for instance, conducted a study with the aim to determine the effectiveness of human resources information systems and the level of employee performance. Using the explanatory survey research method, the hypothesis testing shows that HRIS has a positive and significant influence on employee performance. The study further recommended that the use of the HRIS be further improved and optimised so that employee performance can be further increased in accordance with performance standards.

In a similar study, Kaygusuz (2016: 14) investigated the effect of HRIS usage on organisational efficiency and employee performance within the industrial and banking sectors in Ankara and Istanbul. The analysis, which utilised correlation and regression test models, revealed that HR management processes conducted through information systems positively influence organisational efficiency, thereby enhancing employee performance. Mutua, Mokaya and Wamwayi (2022:109) conducted a study to examine the impact of workforce planning HRIS on employee performance at the National Social Security Fund (NSSF) in Kenya. The study focused on how technological components, such as Human Resource Information Systems and other HR technologies, influence employee performance at NSSF. Utilising both qualitative and quantitative approaches, the findings highlighted that workforce planning significantly impacts performance at the National Social Security Fund in Kenya.

Similarly, Pushpasiri and Pushpasiri (2021: 303) investigated the effect of HRIS on employee performance. Using a quantitative approach, along with alpha tests, correlation, and regression analysis methods, the study revealed a positive influence of HRIS on employee performance. The research found that HRIS modules, including

time and attendance systems, training and development systems, performance management systems, and self-service systems, all played a role in enhancing employee performance. The study confirmed that HRIS has become a vital tool in fostering stronger relationships between employees and their organisations, which ultimately boosts employee performance.

3.7.3 Impact of HRIS adoption on the internal process perspective effectiveness

Measuring organisational effectiveness based on internal processes involves examining factors such as decision-making, forecasting and innovation capabilities, enhanced data collection and processing, scheduling, monitoring and reporting. It also includes evaluating service delivery, productivity, flexibility, information flow, communication, goal achievement, process automation and overall operational efficiency (Namwoonde, 2019: 89).

Moussa and El Arbi (2020: 22) assert that HRIS enhances organisational performance, fosters communication between top management and employees, and generates crucial information for decision-making within the company. It also provides top management with access to operational staff and future plans for upcoming projects. ElNakib *et al.* (2021: 175) state that HRIS is designed to improve effectiveness, either by enhancing the accuracy of information or simplifying internal processes using technology. Furthermore, ElNakib *et al.* (2021: 177) highlight that HRIS significantly boosts efficiency and reduces response time for many traditionally labour-intensive HR tasks. It helps eliminate redundant efforts and better organises the work of HR staff. The implementation of HRIS has a positive effect on organisational performance, particularly in internal processes, time efficiency, information management and decision-making effectiveness (Amara, Bibimoune and Kara, 2022: 264).

3.7.4 Impact of HRIS adoption on organisational learning and growth

Organisational learning is a process of generating, acquiring and integrating

knowledge to enhance performance, while also boosting the intellectual capabilities of employees (Kannipamula, 2020: 29). Namwoonde (2019: 89) highlights that HRIS usage has improved information sharing, learning and knowledge management. It has enabled staff and experts, even those based abroad, to collaborate on work challenges, provide coaching and offer mutual support in solving issues, regardless of their location. This collaboration takes place through group discussions and joint problem-solving, meaning employees no longer need to travel to acquire knowledge for task completion, thus saving time and reducing costs.

The innovation and learning perspective emphasises an organisation's intangible assets, focusing on the internal skills and capabilities needed to support valuecreating processes. The application of HRIS enhances the knowledge and skills of the organisation's workforce, which ultimately improves the quality and competence of human resources within the organisation (Lukito, Saleh and Husin, 2016: 527528).

3.8 CHAPTER SUMMARY

This chapter discussed the literature relating to the determinants of organisational effectiveness. The chapter reviewed the various dimensions of organisational effectiveness. Firstly, the meaning of the term organisational effectiveness was interrogated, showing the divergences in the definitions of the term and the uncertainty about what it really stands for. The chapter then looked at various approaches and indicators of organisational effectiveness and a blended approach is suggested as an effective option for the measure of organisational effectiveness for the study. Next, the chapter examined the link between HRIS adoption and organisational.

CHAPTER FOUR

THEORIES UNDERPINNING HRIS ADOPTION: THE DEVELOPMENT OF THE CONCEPTUAL FRAMEWORK

4.1 INTRODUCTION

To alleviate some of the challenges associated with HRIS adoption, several models have been propounded to better explain the usage and implications of HRIS. This chapter delves into the theoretical foundations that underpin HRIS adoption, exploring the various models and frameworks that have been developed to understand and guide the implementation of HRIS. By examining these theories, this chapter aims to provide a comprehensive understanding of the factors influencing HRIS adoption and to lay the groundwork for the development of a conceptual framework that can be applied in various organisational contexts. The insights gained from this exploration will be crucial for organisations seeking to optimise their HR practices through the strategic implementation of HRIS.

4.2 THEORIES UNDERPINNING HRIS ADOPTION

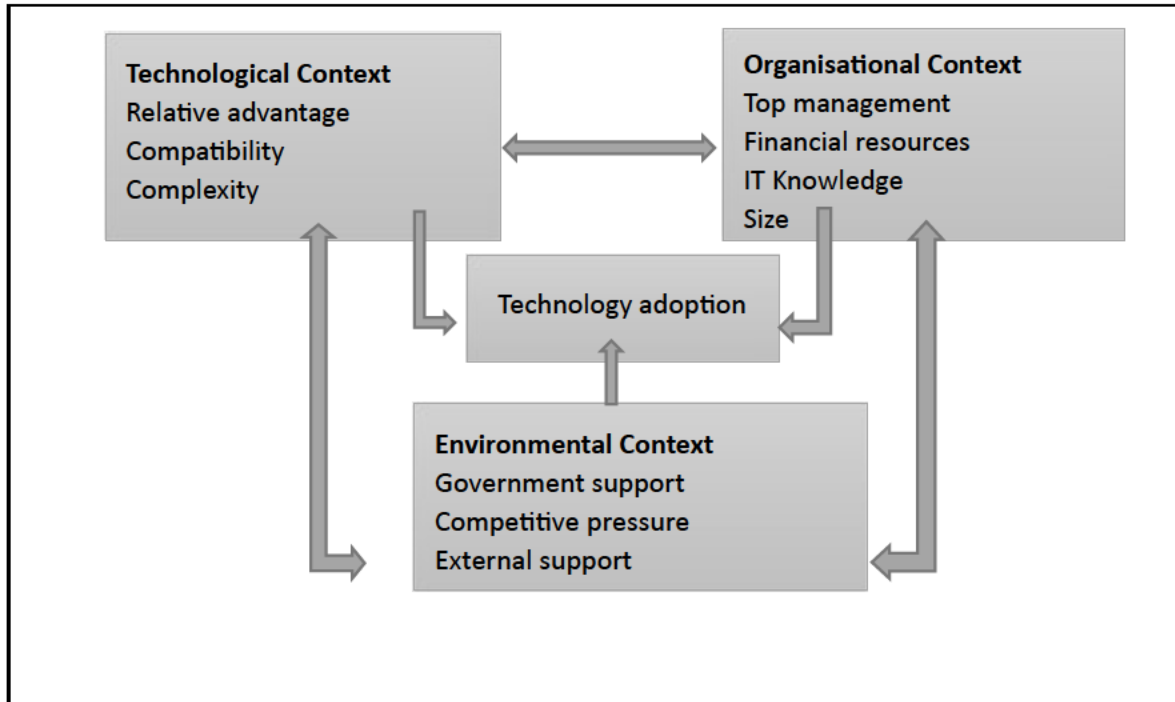
Several theories have been proposed and used to explain the adoption, implementation and success of HRIS. These included but are not limited to, the Theory of Diffusion of Innovations (DIT) by Rogers (1995); the Theory of Tasktechnology fit (TTF) by Goodhue and Thompson (1995); the Theory of Reasonable Action (TRA) by Fishbein and Ajzen (1975); Theory of Planned Behaviour (TPB) by Ajzen, (1985, 1991); Decomposed Theory of Planned Behaviour by Taylor and Todd (1995); the Technology Acceptance Model (TAM) by Davis, Bogozzi and Warshaw (1989); Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh, Morris, Davis and Davis (2003), the Delone and McLean IS success model by Delone and McLean (1992); the Technology, Organisation, and Environment (TOE) framework by Tornatzky and Fleisher (1990); and the Institutional Theory by Meyer and Rowan (1977). This study reviews three of the theories, namely the Technology, Organisation and Environment (TOE) framework, the Technology Acceptance Model (TAM) and the Delone and McLean IS success model. The relevance of these theories is linked with the adoption, implementation and success of HRIS respectively in several studies.

4.2.1 Technology, Organisation and Environment (TOE) Framework

The TOE framework stems from the works of Tornatzky and Fleischer (1990), propounded to describe how the process of adopting technological innovations are influenced by certain factors in organisations. The TOE framework groups factors influencing organisational adoption into technological, organisational and environmental contexts. According to Tornatzky and Fleischer (1990), the Technological context refers to the nature of the technology adopted and investigates the existing technology that is available in the industry to determine the ability of the firm to move on with an innovation initiative.

The organisational context encompasses various attributes of an organisation, including its size, degree of centralisation, formalisation, the quality of its human resources, the complexity of its managerial structure, and the availability of slack resources internally (Moradi and Nia, 2020; Malik, Chadhar, Vatanasakdakul and Chetty, 2021). The environmental context, on the other hand, includes factors such as the industry in which the organisation operates, its competitors, access to external resources, and interactions with government. Bhattacharya and Wamba (2018) summarised these perspectives, stating that the technological context relates to innovation characteristics; the organisational context defines the organisation and its attributes; and the environmental context pertains to the external factors influencing the organisation's operations. Figure 4.1 below illustrates the relationships amongst the variables in the TOE framework that impact the adoption of innovation.

FIGURE 4.1: TECHNOLOGY, ORGANISATION AND ENVIRONMENT (TOE) FRAMEWORK



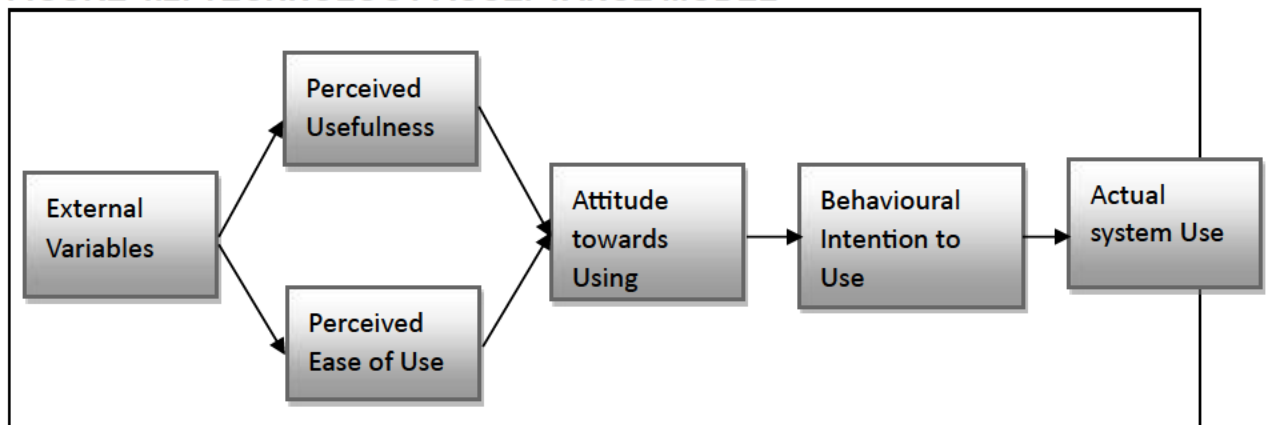
Source: Tornatzky and Fleischer (1990)

Awa *et al.* (2016) applied the TOE framework to analyse the adoption of enterprise resource planning (ERP) software by SMEs in Port Harcourt, Nigeria. Their findings indicated that certain factors posed more challenges for non-adopters than for adopters. While the adoption of ERP by SMEs is effectively explained by the TOE framework, technological factors were found to be more influential than organisational and environmental factors. Awa *et al.* (2016) suggest that their model can assist IS vendors in making investment decisions and designing marketing strategies targeted at non-adopters, who face more challenges, as well as helping adopters move forward in their adoption journey. Similarly, Scupola and Pollich (2019:1) utilised the TOE framework to study the factors influencing HRIS adoption in Danish SMEs, highlighting the significance of perceived benefits, organisational HRIS knowledge, and top management support in driving the adoption decision.

4.2.2 Technology Acceptance Model (TAM)

In 1986, Fred Davis developed the Technology Acceptance Model (TAM) to understand the factors that influence individuals' decisions to adopt or reject technology. The TAM was designed to predict and explain technology usage behaviour by incorporating technological aspects and organisational behaviour concepts (Davis, 1989, as cited in Alomary and Woollard, 2015: 1). The model is based on the idea that when users are introduced to new technology, three key factors determine how and when they will use it. The first factor is perceived usefulness (PU), which refers to the degree to which users believe that using a particular system will improve their job performance. The second factor is perceived ease of use (PEOU), which is the degree to which users feel that using the technology will be effortless. The third factor is the user's attitude towards usage (ATU) (Mugo, 2017: 3). Figure 4.2 illustrates the layout of the technology acceptance model.

FIGURE 4.2: TECHNOLOGY ACCEPTANCE MODEL



Source: Kolatshi (2017: 37)

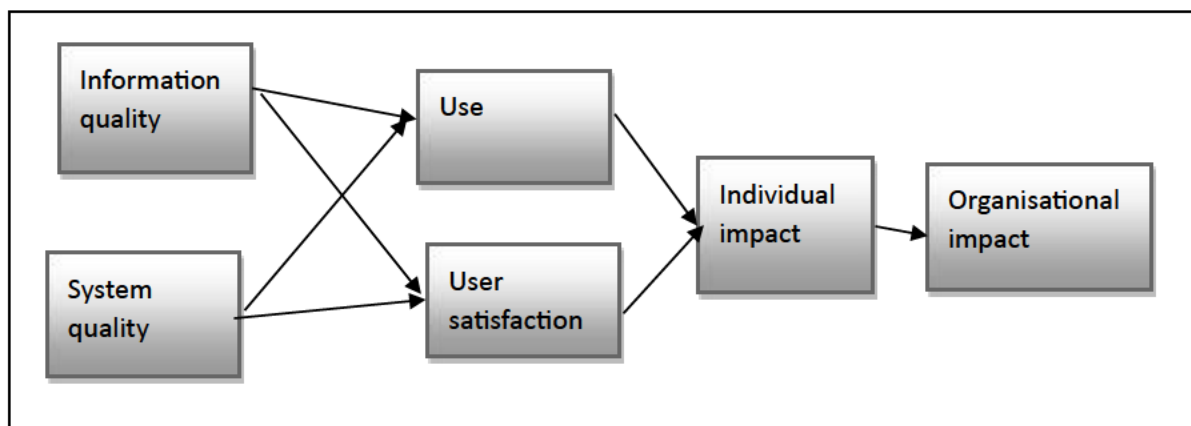
Portz *et al.* (2019: 2) explain that the Technology Acceptance Model (TAM) is a framework for understanding how users adopt and utilise emerging technologies, especially in the workplace, where individuals decide whether to use a technology based on its potential to enhance their work performance. The model also suggests that perceptions of usefulness and ease of use are influenced by external factors, such as individual differences, system characteristics, social influences, and

facilitation conditions. Similarly, Bayraktaroglu *et al.* (2019: 59) applied the TAM to identify key conditions for successful HRIS implementation in small and medium-sized enterprises (SMEs) in Turkey. Their findings revealed significant relationships between user satisfaction and HRIS utilisation success, with users more likely to embrace the system because they believe it is a valuable tool. The study highlighted that system quality and perceived usefulness are the most influential factors in determining user satisfaction.

4.2.3 DeLone and McLean Information System Success Model

The success model developed by DeLone and McLean (1992) was designed to provide a measurable dependent variable for Information Systems (IS) success. According to this model, IS success can be assessed using six interrelated and interdependent dimensions: system quality, information quality, use, user satisfaction, individual impact, and organisational impact (Muturi, Kiflemariam, and Acosta, 2018: 4). The model suggests that system quality, information quality, and service quality collectively influence "use" and user satisfaction, which in turn affect individual impact and, ultimately, organisational impact. Figure 4.3 visually represents the variables included in the DeLone success model.

FIGURE 4.3: DELONE AND MCLEAN INFORMATION SYSTEM SUCCESS MODEL



Source: Kolatshi (2017: 42)

Sancoko *et al.* (2022: 3) explain that 'System Quality' has attributes such as equipment availability, equipment reliability, ease of use, and response time, which are determining factors as to why system information is used or not used. Information quality is the measure of the quality of outputs, such as the quality of the information the system generates in reports in terms of the accuracy, completeness, consistency, ease of understanding, personalisation, relevance, security and timeliness of the information. Service quality is the user's perception of the services provided by the organisation and its parameters are aimed at measuring customer satisfaction.

Yakubu and Dasuki (2018: 184) applied DeLone and McLean's Information Systems Success model to identify the factors influencing students' acceptance of the elearning system (Canvas) at a Nigerian university. The study was based on the idea that system quality, service quality and information quality are key determinants of students' behavioural intention to use the system and their satisfaction with it, both of which impact the actual usage of the system. Data from 366 students were analysed to examine the relationships between the model's constructs. The results partially confirmed that the quality factors affected students' behavioural intention and satisfaction with the system. However, there was full support for the influence of students' behavioural intention and satisfaction on their actual use of the e-learning system.

Puspitarini *et al.* (2018: 27) conducted a study to examine the factors influencing the successful implementation of Human Resources Information System (HRIS) at the Ministry of State-Owned Enterprises (MSOE) using the DeLone and McLean Information System Success Model. The research adopted a quantitative approach and used questionnaires for data collection. The findings revealed that the factors affecting the success of HRIS implementation at MSOE include information quality, service quality, top management support, system quality, and social influence.

Johari and Hashim (2022: 67) conducted a study to assess users' satisfaction with HRIS and explore the relationship between information quality and system quality on HRIS users' satisfaction within a banking institution. Using the DandS Success Model by DeLone and McLean (2003) as the underlying theory to examine the said relationship, the results demonstrated that all assumptions and the problem statement had been satisfactorily addressed. This survey indicates that the Bank's employees as the HRIS users are pleased with the HRIS information quality and system quality. However, information quality predominates over the other variable of the two system criteria. It indicates that users are more concerned with information quality, such as usefulness, completeness, dependability, and timeliness. This denotes that the institution should devote much more attention to enhancing the system quality.

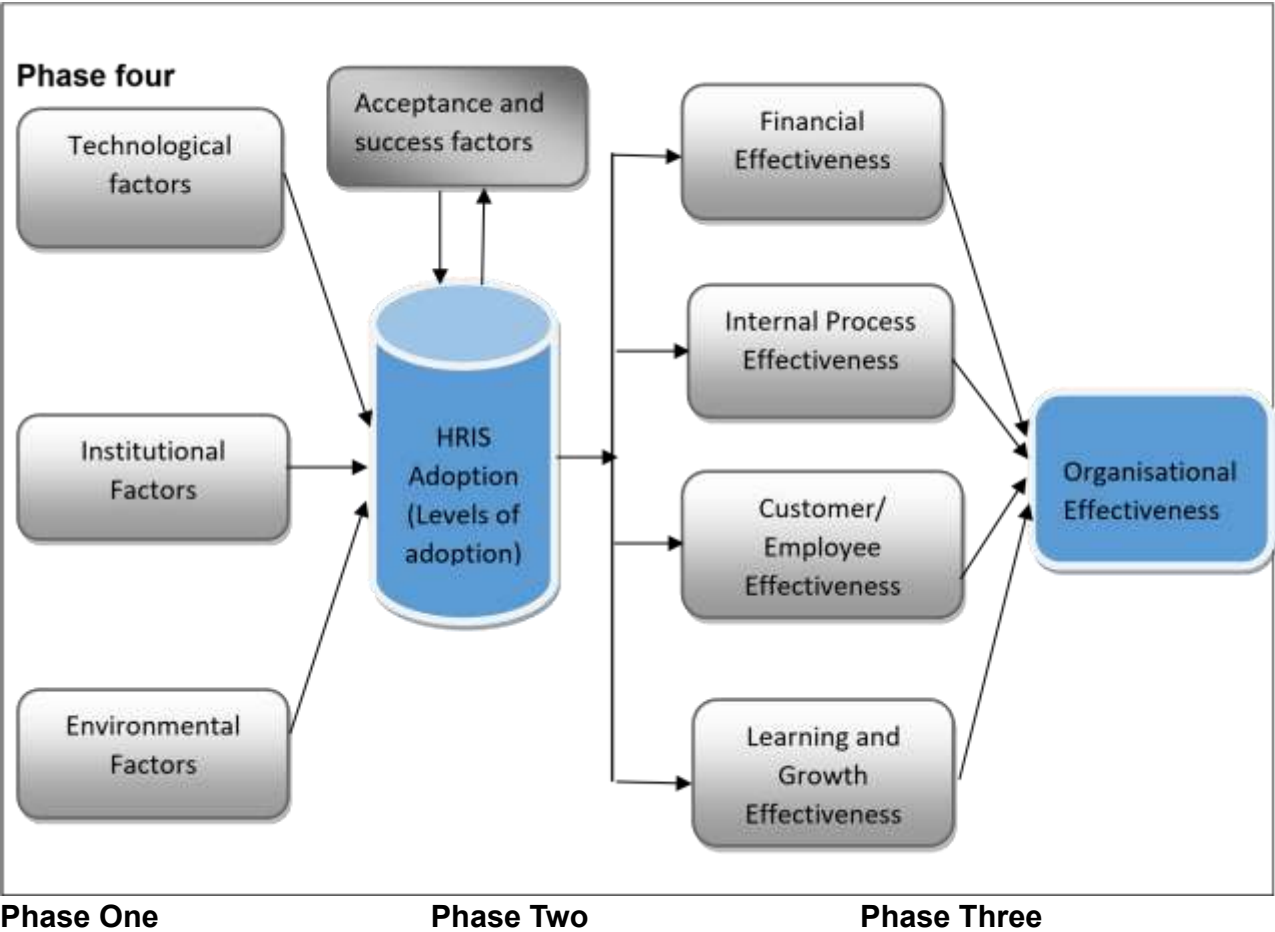
4.3 CONCEPTUAL FRAMEWORK

After reviewing the concepts of HRIS and organisational effectiveness and the theories and approaches that often underpin HRIS adoption and organisational effectiveness, this section now conceptualises a blueprint for the present study. The conceptual research framework addresses the study elements that are pertinent to HRIS adoption and those pertinent to organisational effectiveness in a university context. The conceptual framework for this study has been developed through the integration of the factors that are assumed to influence the adoption of HRIS through to its impact on organisational effectiveness in terms of the balanced scorecard perspective. Thus, four phases are constructed in this regard.

The adoption of HRIS is a function of the interaction of the elements of the TOE model, namely: technological, organisational and environmental factors. This constitutes phase one of the model. The results from these interactions lead to the type of stage of HRIS adoption or otherwise, and this is phase two of this framework. Under phase two, factors such as the acceptance and success factors of HRIS are determined. This in turn will determine the adoption of the next stage of HRIS. In other words, once a certain stage of HRIS is adopted, its acceptance and success factors will

determine whether the university will move to the next stages of HRIS. Figure 4.4 captures these studied elements and places them accordingly.

FIGURER 4.4: CONCEPTUAL FRAMEWORK FOR HRIS ADOPTION FOR ORGANISATIONAL EFFECTIVENESS



Source: Self-generated (2023)

As indicated in Chapter Two, there are mainly three stages of HRIS: operational, tactical and strategic. The extant literature shows that the initial adoption of HRIS is basically at the operational stage where HRIS is used for just record-keeping and information storage. As the system is accepted and its successes are realised, organisations then decide to invest in more sophisticated HRIS which leads to the second stage where HRIS are used for more complex functions such as recruitment,

appraisals and training. Again, the acceptance and successes chalked within this stage will further inform the university on whether to invest more in HRIS or not. The final stage is confirmed when information from HRIS aids in strategic decision making at the managerial level.

After the HRIS adoption and the acceptance and successes of HRIS have been established, the impact on organisational effectiveness is measured using the four perspectives of a balanced scorecard. This constitutes phase three of the model. The impacts of HRIS on the financial, the customer, the internal processes and the learning and growth of the university are established. The final phase, phase four, combines the results from the four perspectives in phase three to determine the overall impact of HRIS on the university's effectiveness. The constructs of each phase and the expected relationship amongst their components are discussed below:

4.3.1 PHASE ONE

This phase of the framework is based on the TOE framework. The three constructs of this phase basically examine the factors that influence the adoption or otherwise of HRIS, namely technological, environmental and organisational factors.

4.3.1.1 Technological factors

The technology context describes the characteristics of both internal and external technologies relevant to an organisation in the adoption of HRIS. Internal technologies are those currently utilised by the organisation, whereas external technologies are available in the marketplace but not yet adopted by the organisation (Al-Hujran 2018: 79). Various technological factors influencing an organisation's decision to adopt any form of information technology have been identified in the literature. For this study, factors under the technological context include complexity, compatibility, relative advantage and security considerations (Bryan and Zuva, 2021: 140).

Complexity refers to how challenging an innovation is perceived to be in terms of understanding and applying it (Stenberg and Nilsson, 2020: 8). Liu (2019: 188) suggests that complexity is negatively correlated with the adoption of innovations. Therefore, it is important for universities to offer user-friendly interfaces and straightforward navigation to encourage widespread adoption. The compatibility factor refers to how well an innovation aligns with the existing values, cultural norms, experiences and needs of potential users. When universities perceive HRIS as being compatible with their current systems and values, they are more likely to continue using it, which supports their goal achievement (Kandil *et al.*, 2018). Another key technological factor is relative advantage, which refers to the perception that an innovation is superior to alternatives (Rogers, 2003, as cited by Stenberg and Nilsson, 2020: 8). It relates to the benefits an innovation can offer, such as increased efficiency and effectiveness (Chong and Olesen, 2017: 5).

Security and privacy concerns involve threats to an organisation's data, such as attacks that compromise information. These concerns reflect the level of confidence an organisation has in its HRIS to safeguard sensitive corporate information. Security is defined as the degree to which an online platform is perceived as vulnerable to risks during digital transactions. As computer networks become more complex, security risks, such as viruses, hacking, or data interception, increase. These security issues are significant barriers for organisations when adopting new technologies or innovations (Setiyani and Rostiani, 2021: 1116). Studies by Alkhater, Walters and Wills (2018: 39) and Xu (2019) confirm that security and privacy issues greatly influence the adoption of new innovations. These studies concluded that privacy and security are important because HRIS stores organisation's sensitive data, which should not be accessible to all the employees.

The TOE framework proposes that organisations should assess the technological characteristics of both their internal and external environments before adopting new technology (Eze *et al.*, 2019; Chau *et al.*, 2020). Chau *et al.* (2020: 24) emphasise

that understanding the current technological infrastructure helps organisations identify limitations and effectively pinpoint the most suitable technology available in the market.

In summary, the adoption of HRIS in a university setting requires careful consideration of various technological factors. The availability and compatibility of hardware and software, usability and accessibility of IT systems, security and privacy considerations, and cost assessments are all integral to successful HRIS adoption. By embracing these technological factors in line with the TOE framework, universities can harness the power of information technology to transform administrative processes, ultimately driving effectiveness in the academic realm.

4.3.1.2 Organisational factors

The organisational context refers to the characteristics and resources of an organisation that influence its decisions to adopt and implement innovations, such as Human Resource Information Systems (HRIS). Key organisational characteristics affecting the adoption of HRIS include organisational structure, organisational culture, top management support, organisational readiness, maturity and performance (Matimbwa and Masue, 2020: 1264).

According to Alsheibani, Messom and Cheung (2020: 5864) and Jayeola *et al.* (2022: 2), top management plays a critical role in supporting staff by assisting with problemsolving; fostering harmonious interactions and cooperation across various job functions; encouraging bottom-up idea generation providing incentives; and directing unit managers to support innovation through clear and consistent communication. The Technology-Organisation-Environment (TOE) framework posits that top management support is a key predictor of innovation adoption. Accordingly, Prabowo *et al.* (2018) and Chatterjee *et al.* (2021) explain that top management support reflects a commitment to integration, marked by key indicators such as a readiness to invest resources, embrace risk, and pursue competitive advantage

The study by Naveed, Suhail and Rana (2021: 25) also identified significant barriers to the adoption of Human Resource Information Systems (HRIS) in public organisations, such as insufficient top management support and a lack of technical knowledge. Naveed *et al.* (2021) shed light on the challenges encountered during HRIS implementation, emphasising the critical role of top management support and technical training for successful adoption. The findings highlight the necessity for organisational leaders to prioritise support for HRIS implementation and to provide essential training for employees to fully leverage the system's potential and enhance organisational performance.

Technology competence arises from internal organisational resources, including the technology infrastructure and personnel, whose characteristics facilitate innovation use. For instance, the adoption of mobile commerce (m-commerce) relies on an existing information systems infrastructure, employees with relevant skills, and training facilities for HR activities (Prabowo *et al.*, 2018; Chau *et al.*, 2020). Organisations with a robust foundation of IT professionals and information systems are better equipped to channel innovations (Chatterjee *et al.*, 2021).

Organisational readiness refers to the preparedness of an organisation to implement new technology, encompassing the availability of infrastructure, financial resources, IT capabilities, and human resources. Therefore, organisational readiness is essentially the technical capability of a company to innovate (Dewi and Nugroho, 2024: 704; Katebi *et al.*, 2022).

4.3.1.3 Environmental Factors

The environmental factors surrounding the university also play a significant role in the adoption of HRIS. Economic factors, such as the availability of funding and resources, play a vital role in the decision-making process. HRIS adoption requires financial investments for hardware, software, infrastructure and ongoing maintenance and

support. Securing funding from various sources, including government grants, private donors, and tuition fees, is often crucial to ensure the successful implementation and sustainability of Information Technology initiatives. Additionally, the legal and regulatory environment can influence HRIS adoption within universities. Complying with data protection and privacy laws, intellectual property regulations, and licensing agreements is essential for universities to ensure the legal and ethical use of HRIS.

The environmental dimensions influencing innovation adoption include competitive pressure, support of partners, business partner pressure, telecommunications infrastructure, and internet service providers (Harfoushi *et al.*, 2016). Understanding competitive pressure is crucial for comprehending the environment in which a company operates. This pressure significantly impacts the strategies a company adopts to achieve and maintain a competitive advantage, thereby improving performance. It has been demonstrated that competitive pressure precedes the application of technical innovation (Chau *et al.*, 2020).

Support from external partners fosters innovation performance through knowledge exchange. Developing employee knowledge, both through their own skills and input from organisational partners, facilitates the adoption of new technology. The knowledge absorbed by employees enhances their ability to use the technology effectively, thus increasing its usefulness. This achievement can be attributed to partner support, as partners contribute to the development of staff knowledge (Awa and Ojiabo, 2016).

The adoption of IT in universities is a complex process that is influenced by a multitude of factors. The TOE framework provides a comprehensive framework to analyse the technological, organisational and environmental factors that shape IT adoption in an educational institution. By considering technological factors such as compatibility, usability and security, universities can ensure a smooth integration of Information Technology into their existing systems. Organisational factors, including leadership

support, effective communication, collaboration and training programmes, are crucial in creating a positive environment for HRIS adoption. Lastly, the environmental factors, such as funding availability and legal compliance, must be considered to ensure the successful implementation and sustainability of HRIS initiatives in universities. Adopting HRIS in universities not only enhances operational efficiency but also provides new opportunities for teaching, research and collaboration. Universities that effectively navigate these organisational factors are better positioned to leverage the benefits of HRIS and prepare their students for the increasingly digital workplace of the future.

4.3.2 PHASE TWO

This phase examines the actual adoption of HRIS and the associated successes that are realised from its adoption. It involves the following components:

4.3.2.1 Levels of HRIS adoption:

The adoption of HRIS in a university setting can be analysed across several levels, each representing a different stage of technological integration and utilisation. These levels or stages have been identified in the literature as the operational, tactical or transformational stage

4.3.2.1.1 Operational level

At the foundational level, HRIS adoption in universities centers on the digitisation of basic administrative tasks, streamlining and enhancing the efficiency of everyday HR operations. According to Olughor (2016: 503), transactional HRIS focuses on routine HR tasks such as maintaining employee records, entering payroll information, managing employee status changes, and administering employee rewards. Similarly, Valcik, Sabharwal and Benavides (2021: 34) and Pieris and Preena (2020: 87) describe operational HRIS as systems that handle daily transactions and events, which require significant time for record-keeping, payroll updates, employee status

updates, and benefits administration. These systems are designed to provide information frequently used by the HR department.

Operational HRIS encompasses various systems within HR, such as the position control system, employee information system (EIS), performance management system, government reporting system, and training systems (Vanishree and Raghavendra, 2017: 130). These systems support the efficient management of HR functions by automating and streamlining routine processes. Maduagwu and Ugwu (2018: 47) also define transactional HRIS as systems that supply managers with data to support routine and repetitive HR decisions. They provide examples of operational HRIS, including Employee Information Systems, Position Control Systems, Applicant Selection and Placement Information Systems, and Performance Appraisal Information Systems. These systems facilitate efficient decision-making by providing accurate and timely information, thereby enhancing the overall effectiveness of HR operations.

By leveraging transactional and operational HRIS, organisations can improve the accuracy and efficiency of HR processes, thereby freeing up HR professionals to focus on more strategic initiatives. This integration not only enhances the day-to-day management of HR tasks, but also contributes to the broader organisational goals by ensuring that HR practices are both efficient and aligned with strategic objectives.

4.3.2.1.2 Tactical Level

Tactical HRIS pertains to the human resource personnel and technology dedicated to executing specific tasks essential to human resource management, aimed at achieving organisational goals and objectives (Votto *et al.*, 2021: 2). This type of HRIS is employed in traditional HR functions such as recruitment, selection, training, compensation and performance management (Pieris and Preena, 2020: 87). Hansen (2022) explains that tactical HRIS encompasses hiring decisions, job analysis and design, training and development, as well as staff compensation plans. Similarly,

Priota (2020: 8) states that tactical HRIS provides data to support decisions regarding the allocation of resources for recruitment, job analysis and design, training and development, and compensation plans.

Maduagwu and Ugwu (2018: 48) emphasise that tactical HRIS are used to assist managers in making decisions related to the allocation of resources for recruitment, job analysis, training and development, and employee compensation plans. Johnson and Carlson (2021: 6) argue that these traditional HR activities can hold strategic value for an organisation if their outcomes align with the organisation's strategic goals. Arun (2021), cited in Alkashami (2023: 385) elaborates that a tactical HRIS typically provides data that aids in making informed decisions about resource allocation for hiring, job design, workplace analytics, training and development, and employee recognition. By utilising tactical HRIS, organisations can enhance the effectiveness of their HR functions and ensure that their HR practices support broader strategic objectives. This system not only optimises routine HR activities but also contributes to the strategic alignment of HR initiatives with the organisation's longterm goals, thereby driving overall organisational success.

4.3.2.1.3 Transformational Level

At this advanced level, HRIS adoption leverages sophisticated analytics and data driven insights to inform HR strategies and decision-making. The use of data analytics allows for a thorough analysis of workforce trends, performance metrics and employee engagement, providing valuable information to guide strategic decisions. According to Bah *et al.* (2022), HRIS has proven to provide timely, cost-effective information for strategic decision-making in human resource management, aligning with the strategic goals of organisations. HRIS enables HR to take on a more strategic role by minimising the time needed for transactional tasks and processes. It facilitates quicker decision-making in HR growth, planning and administration by simplifying the storage, retrieval, updating, categorisation, and analysis of information (Rahman, 2022: 23). In this context, HR plays a crucial role in driving organisational change,

fostering a culture of continuous improvement, and leveraging technology to boost employee engagement and productivity. By integrating these advanced tools and approaches, universities can achieve a more dynamic, responsive and strategic HR function. A study by Safaâ and Mohamed (2020) highlights the critical role of HRIS in supplying decision-making tools vital for strategic positioning in the era of digital transformation. This system enhances information flow, reliability, planning, scheduling, and communication amongst employees, thereby facilitating better information dissemination and increasing access to valuable data. Similarly, a study by Alam and Kashem (2022) examines the relationship between competitive strategies (CSs) and HRIS, as well as their combined influence on organisational performance. It emphasises the importance of HRIS in creating strategic value by aligning HR policies and practices with business objectives. The research offers valuable insights into how effectively HRIS can achieve strategic goals, illustrating the connection between HRIS, competitive strategies, and organisational performance.

The adoption of HRIS in universities progresses through these levels, each building on the previous one to enhance efficiency, integration and strategic capability. By moving through these stages, universities can transform their HR functions from basic administrative roles to strategic partners, driving innovation and fostering an environment conducive to academic and operational effectiveness.

4.3.2.2. Employee acceptance/Satisfaction

Employee acceptance and satisfaction with HRIS adoption are critical for the successful implementation and utilisation of these systems within an organisation, including universities. Understanding the factors that influence acceptance and satisfaction can help HR departments and IT teams tailor their approaches to maximise the benefits of HRIS. Researchers believe that individual factors, like how satisfied someone is with a system, play a role in how HRIS is accepted. Models like TAM and UTAUT suggest that when people are happy with the technology adopted and being used, it helps mediate or influence how much they actually use it, based

on their feelings and social factors (Kolatshi, 2017; Bayraktaroglu *et al.*, 2019; Menant, Gilibert and Sauvezon, 2021: 10).

The willingness of employees within an organisation to embrace and utilise new technologies significantly impacts the decision-making process surrounding the adoption of innovations. One of the primary challenges the organisations encounter when introducing new technologies is employees' resistance to change. Scholars in the literature have identified several factors contributing to this resistance, including fear of job loss, inadequate skills in using new technology, uncertainty about the future and adaptability, low tolerance for change, breach of personal agreements, conflicting commitments, ineffective reward systems, peer pressure, a climate of distrust, organisational politics, poor timing, loss of control, and a lack of support systems (Basyal and Wan, 2017: 353).

Ajibade (2018: 3) notes that employees are more inclined to embrace a technology if they perceive it as useful and easy to use. Therefore, the more employees believe that a system will simplify their tasks, the greater the likelihood that they will adopt and accept the new technology as beneficial. Empirically, research has demonstrated that employee acceptance of technology hinges on various factors such as ease of use, system quality, system usefulness and user satisfaction (Bayraktaroglu *et al.*, 2019; Kannipamula, 2020; Bayraktaroglu *et al.*, 2019).

Employees are more likely to embrace HRIS if they perceive it as a tool that simplifies tasks, such as faster leave applications and streamlined performance reviews, and enhances communication within the organisation. Regular feedback mechanisms that allow employees to provide input and see responsive changes demonstrate that their feedback is valued, fostering a positive attitude. Effective change management through clear communication about the benefits of the HRIS and involving employees in the adoption process, such as through pilot programmes or user testing, can significantly ease transitions and enhance acceptance. Employee acceptance and

satisfaction are pivotal for the successful adoption of HRIS in universities. By focusing on user-friendly design, comprehensive training, perceived benefits, data security, customisation, feedback mechanisms, and effective change management, organisations can foster a positive reception and ensure that their HRIS investments yield the desired benefits in terms of efficiency, productivity, and employee engagement.

4.3.2.3 Success indicators

Evaluating the success of a Human Resource Information System (HRIS) in a university involves looking at various indicators that reflect both quantitative and qualitative improvements. These indicators can help determine whether the HRIS implementation has met its goals in enhancing HR functions, improving efficiency and supporting strategic decision-making. Quaasar *et al.* (2018: 15) argue that a successful HRIS plays a critical role in ensuring that organisations effectively utilise their human resource function by recruiting the best-suited individuals; providing them with appropriate training; and managing them with fair compensation. They further suggest that a well-functioning HRIS can bring about transformative effects that enable a total restructuring of an organisation. Numerous models and theories have been proposed to explain the indicators of HRIS success, and various studies have either validated or challenged these theories. Researchers have also utilised these models to assess the success rate of HRIS implementations in different organisations (Davarpanah and Mohamed, 2013; Chen, 2016; Puspitarini, Handayani, Pinem and Azzahro, 2018).

Davarpanah and Mohamed (2013: 83-84) employed the DeLone and McLean information systems success model to investigate HRIS success factors in a public higher education institution in Malaysia. Through factor analysis and reliability analysis, the researchers discovered that information quality aspects such as timeliness, understandability and completeness were significant HRIS success factors in the institution. Additionally, system quality elements such as responsiveness

and functionality were identified as key success factors. Service quality factors including responsiveness, technical competence and empathy also played a vital role. These findings underscore that information quality, system quality, service quality, structural assurance, and user satisfaction are all crucial components of human information system success.

User satisfaction and adoption rates serve as another key indicator, with high usage rates and positive feedback from faculty, staff and administrators reflecting the system's user-friendliness, intuitive design and accessibility from multiple devices. Savalam and Dadhabai (2018: 81) evaluated the success of an Integrated HRIS by assessing user satisfaction with the system. They considered system quality, information quality, and system use as determinants of user satisfaction. Based on their findings, the researchers concluded that the Integrated HRIS was indeed successful. Similarly, Bali (2019: 221) concluded in a related study that HRIS success is positively linked to user satisfaction, which is influenced by the quality of the HRIS system, information quality, and ease of use. Noutsu *et al.* (2017) also discovered that HRIS adoption can be predicted by the quality of the system, emphasising the importance for organisations to develop a high-quality system to achieve their organisational objectives.

Indicators of HRIS success in a university setting span across several critical dimensions. Operational efficiency is markedly improved through significant reductions in processing time for HR tasks such as payroll, recruitment and leave management. The success of an HRIS in a university can be measured through a combination of operational, strategic and qualitative indicators. These include improvements in efficiency, user satisfaction, data management, compliance, cost savings, and overall employee engagement. Regular assessment using these indicators ensures that the HRIS continues to meet the evolving needs of the university, supports strategic goals, and provides a positive impact on both HR operations and employee experience.

4.3.3 PHASE THREE

The four perspectives of the Balanced Scorecard are used to measure the impact of HRIS. The indicators to be examined under each perspective are listed in Table 4.1 below:

TABLE 4.1: PERSPECTIVE INDICATORS

Perspective	Indicators
Financial	HR- related cost reduction, increase productivity
Customer	Employee performance, reduction in employee complaints, employee satisfaction
Internal processes	Time management, information flow, decision-making
Learning and growth	Facilitation of learning and knowledge transfer, employee participation in training programmes

Source: Researcher's construct

4.3.3.1 Financial effectiveness

The implementation of a Human Resource Information System (HRIS) in a university setting can have a significant impact on the institution's finances. A Human Resource Information System (HRIS) can significantly impact a university's finances by enhancing efficiency, reducing costs, and improving data management. Additionally, transitioning to digital records and workflows minimises the use of paper and related supplies, leading to significant cost reductions in office supplies and storage (Srivastava, Bajaj and Dev, 2022:81).

HRIS streamlines various HR processes such as payroll, benefits administration and employee data management. This automation reduces the need for manual intervention, thereby decreasing labour costs and minimising human errors. For instance, a recruitment module of an HRIS can automate job postings, track applications, and streamline the hiring process. This reduces the costs associated

with recruiting, such as advertising and recruitment agency fees. According to Sikira and Mishael (2024:6054), universities handle large volumes of data related to employees and HRIS centralises this data, making it easier to manage and report. Efficient data management helps in strategic decision-making and budgeting, ultimately contributing to cost-effective operations. A study by Begum *et al.* (2020: 186) found that organisations that implemented HRIS saw a reduction in administrative costs on average.

Compliance with labour laws and regulations is crucial for universities to avoid fines and legal fees. HRIS systems help ensure compliance by maintaining accurate records and automating updates in line with changing regulations. This reduces the risk of non-compliance penalties, which can be financially burdensome (Vijai and Mariyappan, 2023: 32). These systems offer insights into workforce trends, performance metrics and budgeting needs. A study by Karanja, Sang and Ndirangu (2018: 84) show that universities with integrated HRIS systems are better equipped to make strategic financial decisions, often leading to improvement in budget *al.*location efficiency. HRIS can help universities manage compensation and benefits more effectively, ensuring that compensation packages are competitive and aligned with budget constraints. Juma, (2022: 54) highlighted that universities with integrated HRIS can achieve a reduction in overall compensation expenses by identifying and eliminating redundant or outdated benefits plans.

In conclusion, the implementation of HRIS in a university setting can lead to significant financial benefits, including reduced administrative costs, improved efficiency, better decision-making, enhanced compliance, savings in recruitment and optimised compensation management. These benefits not only contribute to the university's financial wellbeing but also support its strategic goals and mission.

4.3.3.2 Customer/Employee effectiveness

HRIS can have a profound impact on employee performance within a university by streamlining HR processes, enhancing communication, providing valuable data insights, and fostering a more engaged workforce. HRIS automates and simplifies many administrative tasks such as payroll, benefits management and leave tracking. This reduces the administrative burden on employees, allowing them to focus more on their core responsibilities. According to Zhang (2023), organisations with HRIS records increase employee productivity due to the reduction in time spent on administrative tasks. Moreover, Wang (2024: 224) corroborates that HRIS leads to an increase in staff productivity as routine administrative tasks are handled more efficiently, allowing employees to devote more time to other tasks.

Additionally, HRIS platforms often include tools for internal communication and collaboration, such as messaging systems and shared calendars. These tools facilitate better coordination amongst staff and departments, leading to more efficient teamwork. Harris (2023: 107) similarly highlighted that universities with HRIS experience an increase in collaborative projects and overall team performance. Ramírez and Ponce (2020) note that implementing human resource information systems (HRIS) in universities has been viewed by stakeholders as enhancing transparency, providing rapid access to information, and improving employee services. This demonstrates HRIS's role in advancing information dissemination and increasing access to valuable data. Similarly, Kemei's (2019) research on HRIS use in private universities in Kenya found that full HRIS implementation leads to significant improvements in employee performance, especially when the self-service portal is readily accessible. HRIS facilitates the efficient management of HR records and internal communication. These findings underscore the practical advantages of HRIS, reinforcing the perspective that HRIS boosts HR management efficiency and enhances employee performance.

Furthermore, HRIS systems often include features that enhance employee engagement, such as self-service portals for managing personal information, benefits

and leave. Increased engagement through self-service options leads to higher job satisfaction. According to a survey by Maamari and Osta (2021: 1284) organisations with robust HRIS platforms normally have high employee engagement scores, which directly correlate with improved performance. Similarly, Harris (2023: 107) reports that institutions implementing HRIS record increases in employee satisfaction due to enhanced self-service options and decreases in employee turnover rates, translating to significant savings in recruitment and training expenses. A study by Shahreki, Ganesan, Raman, Chin and Chin (2019: 1471) reveals that implementing a human resource information system (HRIS) can significantly impact employee satisfaction and turnover intention. This suggests that reducing work duplication through eliminating redundancy because of HRIS implementation can lead to improved employee satisfaction and reduced turnover intention.

The HRIS positively impacts a university's employee performance by automating administrative tasks providing easy access to information; supporting targeted training, enabling continuous performance management; facilitating data-driven decision-making; and enhancing communication and collaboration. These improvements lead to higher productivity, better employee engagement, and more effective performance management.

4.3.3.3 Internal processes effectiveness

The HRIS can substantially help in improving the internal processes by enhancing the efficiency, accuracy, and accessibility of HR-related activities. HRIS provides a centralised database for all employee-related information, making it easier to manage and retrieve data. This centralisation supports better decision-making and ensures that all departments have access to the same up-to-date information. HRIS centralises employee data, making it more accessible and manageable. This centralisation improves data accuracy, reduces the risk of errors and offers advanced reporting capabilities that help organisations generate necessary reports for compliance and strategic planning. This reduces the risk of non-compliance and associated penalties (Kim, 2022; Johnson, 2023).

Kumar (2018) evaluated how HRIS improves organisational efficiency in a comprehensive and interconnected way, focusing on its effects on HR functions, time management, employee relocation and managerial satisfaction. The findings reveal that HRIS significantly boosts overall organisational efficiency and its various components (HR functions, time management, employee relocation and managerial satisfaction), albeit to different extents.

The implementation of HRIS in a university setting leads to significant improvements in internal processes by enhancing data management, improving compliance, optimising recruitment and onboarding, facilitating performance management, enabling efficient resource allocation, improving employee self-service, and supporting strategic planning. These enhancements result in more efficient and effective organisational internal operations (Luciano, 2020: 219).

4.3.3.4 Learning and growth

The learning and growth perspective focuses on an organisation's intangible assets, which are crucial for achieving strategic success. This perspective aims to pinpoint the objectives and indicators that foster the development of the skills necessary for organisational growth (Oliveira, Pinho, and Silva, 2018: 606). According to Iyibildiren and Karasioglu (2018: 18), an organisation's capacity to fulfill expectations such as shareholder growth and profits, as well as delivering new and quality products to customers, hinges on its ability to learn and grow. This perspective emphasises sustainable investment in the future and the professional development of employees.

Key indicators within this perspective include employee participation in training programmes, overall employee satisfaction, the number of employees who have received training, and adherence to organisational regulations (Tuan, 2019: 74). These indicators are essential for assessing and enhancing the organisation's learning and growth capacity. By focusing on these areas, organisations can ensure

that their workforce is continually developing, engaged and capable of meeting both current and future challenges. This approach not only supports the strategic goals of the organisation but also contributes to a culture of continuous improvement and innovation.

In conclusion, the implementation of HRIS in a university setting significantly enhances learning and growth by supporting comprehensive training and development programmes, facilitating continuous learning, improving strategic planning, promoting a learning culture, enhancing collaboration, managing talent effectively, and ensuring efficient resource allocation. These improvements lead to a more capable, engaged, and forward-thinking workforce.

4.4 PHASE FOUR

The outcomes from the four perspectives are evaluated to determine whether HRIS adoption leads to organisational effectiveness or otherwise. From a financial perspective, HRIS contributes to cost savings and improved resource allocation. By streamlining HR processes, automating administrative tasks and reducing errors, HRIS leads to lower operational costs and increased efficiency. This translates into financial benefits such as reduced administrative overhead, lower labour costs and minimised compliance-related expenses. Additionally, HRIS enables better financial planning and decision-making through accurate data analytics and reporting, supporting the university's overall financial health and sustainability.

In terms of the customer perspective, HRIS enhances the experiences of various stakeholders, including employees, faculty, students and external partners. For employees, HRIS provides self-service options, personalised learning experiences and improved communication channels, leading to higher satisfaction and engagement levels. Faculty members benefit from streamlined processes for academic support, training and performance management. Students experience better services related to admissions, enrollment and academic advising. External partners, such as vendors and collaborators, also benefit from efficient procurement

processes and collaborative tools integrated within HRIS. Overall, HRIS contributes to positive relationships and enhanced experiences for all stakeholders.

From the internal process perspective, HRIS optimises HR operations and internal workflows. Automated processes, advanced reporting capabilities and real-time data access streamline administrative tasks, improve data accuracy and facilitate better decision-making. HRIS also supports compliance and risk management, thus ensuring adherence to regulatory requirements and minimising legal risks. Additionally, HRIS fosters a culture of continuous improvement by providing insights into process efficiency, employee performance and organisational effectiveness, leading to enhanced internal processes and operational excellence.

Finally, from the learning and growth perspective, HRIS plays a crucial role in talent development, performance management and organisational learning. By offering learning management systems (LMS) and personalised learning experiences, HRIS supports continuous learning amongst employees, leading to skills development, career advancement and increased engagement. Performance management functionalities within HRIS promote feedback, goal setting, and development planning, thereby fostering a culture of continuous improvement and professional growth. HRIS also facilitates knowledge sharing, collaboration and innovation, driving organisational learning and fostering a culture of learning and growth within the institution.

In conclusion, HRIS has a profound impact on institutional effectiveness across the four perspectives of the Balanced Scorecard. It contributes to financial sustainability; enhances stakeholder experiences; optimises internal processes; and fosters learning and growth within the organisation. By leveraging HRIS effectively, universities can achieve strategic alignment, operational excellence and continuous improvement, ultimately enhancing their overall effectiveness and success. As the study aims to determine the extent to which HRIS adoption impacts organisational effectiveness, the conclusion of the entire study is drawn from this phase.

4.5 Chapter Summary

This chapter explored the theoretical foundations that inform the adoption of Human Resource Information Systems (HRIS) in organisations. The adoption of HRIS is critical for enhancing the efficiency of HR functions and overall organisational performance. Several theories provide insights into the drivers and barriers to HRIS adoption, guiding the understanding of how organisations integrate technology into their human resource management processes. Key theories discussed in this chapter include the Technology, Organisation and Environment (TOE) Framework, Technology Acceptance Model (TAM) and the DeLone and McLean Information System Success Model.

Following the review of these theories, the chapter presented a conceptual framework developed for the study. This framework integrates elements from the discussed theories to form a model that guides the investigation into the factors influencing HRIS adoption. The framework includes key variables such as technological characteristics, organisational readiness, and environmental factors. These components are hypothesised to impact the organisational effectiveness through the four perspectives of the balance scorecard. The conceptual framework serves as a foundation for the study's empirical analysis, providing a structured approach to examining how theoretical concepts translate into practical outcomes in HRIS adoption. The next chapter explores the research methods employed for the study.

CHAPTER FIVE

RESEARCH METHODOLOGY AND DESIGN

5.1 INTRODUCTION

In line with the study's main aim, which is to explore the extent to which Ghanaian Technical Universities have adopted HRIS for organisational effectiveness, the research paradigm and design and the stages that the researcher undertook to achieve the research objectives are presented in this chapter. The chapter discusses the methodology followed and the procedures and techniques that were used in the data collection and analysis. The study uses the pragmatic paradigm, a mixed method approach that allows a combination of methods that could shed light on the actual behaviour of participants and their beliefs. Four technical universities were chosen from the ten Ghanaian technical universities to serve as the study sites. This selection provides a balanced representation of the north, middle and southern institutions in the country. The chapter successively discusses the research paradigm; the research design and rationale; the overview of technical universities; ethical considerations; issues of validity and reliability; documents, data collection instruments; and data processing procedures. The research objectives are outlined in the next section.

5.2 MAIN OBJECTIVES OF THE STUDY

The objectives of this study are to:

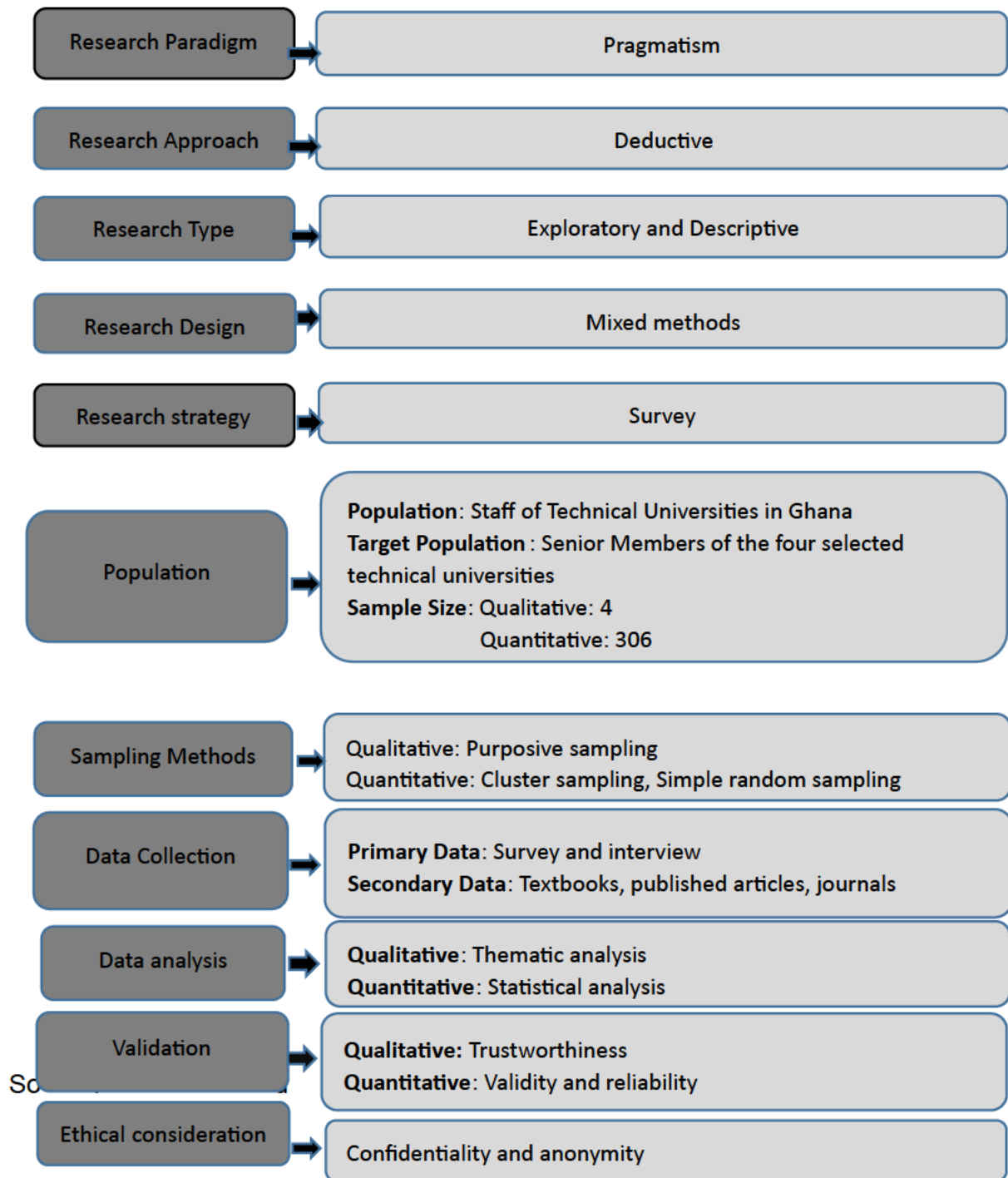
- Analyse the current HR processes and practices in the selected Ghanaian Technical Universities;
- Explore the level of adoption and use of HRIS in Human Resource functions in the selected Ghanaian Technical Universities;
- Explore the factors that influence the adoption of HRIS in the selected Ghanaian Technical Universities;
- Investigate the extent to which HRIS impacts organisational effectiveness;
- Provide a conceptual framework for effective HRIS adoption in the selected Ghanaian Technical Universities; and

- Make recommendations for HRIS improvement in the selected Ghanaian Technical Universities.

5.3 Flow diagram of methodology employed for the study

The methodology and strategies employed to explore the adoption of HRIS for organisational effectiveness are summarised in Figure 5.1. These methodologies and strategies are discussed in the subsequent sections.

FIGURE 5.1: FLOW DIAGRAM OF THE METHODOLOGY EMPLOYED FOR THE STUDY



5.4 RESEARCH PARADIGM

The term paradigm refers to the foundational philosophical assumptions and core beliefs that shape a researcher's worldview and guide their actions (Kaushik and Walsh, 2019: 1). Gaining a solid understanding of research's philosophical

foundations aids researchers in selecting and justifying a specific framework or paradigm. The research philosophy that a researcher follows influences the choice of research methodology, which in turn shapes the research objectives, the development and use of research tools, and the approach to addressing the problem under investigation (Khaldi, 2017: 16). Accordingly, Gannon, Taheri and Azer (2022: 2) explain that conducting thorough research necessitates a keen understanding of the fundamental philosophical principles that guide the investigation.

According to Ugwu, Ekere and Onoh (2021: 119), several paradigms have been discussed in the literature, but there is no agreement as to the acceptable number of classifications. Individual researchers' preferences for qualitative, quantitative or mixed methods in their research are often influenced by their personal beliefs, shaped by various factors. Despite ongoing debates about the worldviews that researchers bring to their inquiries, literature commonly recognises four primary research paradigms (Creswell and Creswell, 2018: 54). This study adheres to Creswell and Creswell's (2018: 54) classification, which identifies four distinct philosophical worldviews: positivism, constructivism, transformative and pragmatism. A discussion of the philosophical assumptions of each paradigm is presented in the next section.

5.4.1 Positivism

The Positivism research paradigm is the most widespread approach in the social sciences, which seeks to explain and predict what happens in the social world by searching for regularities and causal relationships between its constituent elements (Bonache and Festing, 2020: 104). According to Park (2020: 690), the main goal of the positivism paradigm is to generate explanatory associations or causal relationships that ultimately lead to the prediction and control of the phenomena under review. The followers of this paradigm believe that true knowledge can be obtained through observation and experiment (Rahi, 2017: 1). The views of positivism therefore highlight the fact that knowledge is observable and therefore measurable in ways

similar to pure scientific experiments which can be verified through scientific methods (Siddiqui, 2019: 257).

5.4.2 Constructivism

The supporters of the constructivism paradigm subscribe to the notion that knowledge is built or constructed through experiences and social interactions (Creswell, 2018: 56). Sarantakos (2012) in Asafo-Adjei (2020: 57) contends that the constructivism paradigm makes it possible for researchers to develop their subjective viewpoints about the world and interpret research findings based on their personal experiences. Similarly, Kaushik and Walsh (2019: 2) agree that constructivism is usually associated with qualitative methods in which the researcher depends on the participants' view and develops subjective meanings about the phenomena. Methodologically, the interpretive paradigm generally makes use of qualitative research methods such as interviews, observations, document reviews and idiographic descriptions to capture the meaning that people assign to phenomena. The constructive researcher encourages varieties of data and different sources and analysis methods in order to strive for validity. The constructivist perspective argues that knowledge is rooted in cultural traits and is shaped by both individual and societal experiences within various social contexts. It is influenced by personal values, biases and social standing (Gannon, Taheri and Azer, 2022: 7).

5.4.3 Transformative

The Transformative paradigm has emerged as a response to address the limitations observed in the two prevailing paradigms, namely the positivist and constructivist paradigms. This perspective is supported by Held (2019: 4) who contends that the transformative approach involves diversity and interdisciplinary elements. Held (2019: 4) further elucidates that the transformative research paradigm not only extends its insights to academia but also seeks to engage the broader public through activism. Within this paradigm, researchers interact with participants, focusing on discovering agency embedded in social practices, ultimately contributing to liberation and emancipation. Additionally, the paradigm offers a comprehensive understanding of

concepts. As reiterated by Ivankova and Wingo (2018: 987), the transformative paradigm is rooted in addressing social justice issues and endeavors to address societal inequalities, confrontations, resistance, and power dynamics at various levels – social, economic, and political. Kivunja and Kuyini (2017: 35) echoed this when they opined that the transformative paradigm situates its research in social justice issues and seeks to address political, social and economic issues, which lead to social oppression, conflict, struggle, and power structures.

5.4.4 Pragmatism

This paradigm emerged from philosophers who contended that understanding the “truth” about the real world cannot be achieved solely through a single scientific method, as the Positivist paradigm suggests, nor by perceiving social reality solely as a construct, as proposed by the Constructivist paradigm. Advocates of the pragmatic paradigm sought more practical and flexible research approaches that combine multiple methods to better explore participants’ actual behaviours, the beliefs underlying those behaviours, and the likely outcomes of different actions. This led to the rise of the pragmatic paradigm, which promotes the use of mixed methods to understand human behaviour (Kivunja and Kuyini, 2017: 35). The goal of this paradigm is to identify potential weaknesses in the study and address them by employing a mixed-methods approach. Proponents believe that genuine knowledge can be achieved by combining quantitative and qualitative methods, focusing on selecting the most effective techniques and procedures to address the research problem (Rahi, 2017: 1).

Accordingly, the underpinning research philosophy adopted for any research inherently shapes the methodological approach, data collection methods adopted, and analysis techniques deployed. Furthermore, it holds the potential to influence how findings are presented (Gannon, Azer and Taheri, 2022: 12). To this end, Table 5.1 summarises the components of the four paradigms.

TABLE 5.1: COMPONENTS OF THE FOUR RESEARCH PARADIGMS

Positivism	Constructivism
• Determination • Reductionism • Empirical observation and measurement • Theory verification	• Understanding • Multiple participants • Social and historical construction • Theory generation
Transformative	Pragmatism
• Political • Power and justice-oriented • Collaborative • Change-oriented	• Consequences of actions • Problem-centered • Pluralistic • Real-world practice-oriented

Source: Creswell (2018:55). Adapted

- **Research paradigm of the study**

This study followed the pragmatic research paradigm, aligning with a mixed-method approach. Pragmatism as a research paradigm suggests that researchers can adopt the methodological approach most suitable for the specific research problem at hand (Kaushik and Walsh, 2019: 2). It is commonly linked to mixed methods, allowing flexibility in choosing the combination of qualitative and quantitative methods that best fulfill the study's objectives (Maarouf, 2019: 6). Both Dyer (2020: 3) and Moosmayer *et al.* (2019: 921) confirm that the use of a pragmatic approach in their research has been very successful in answering the research questions. Feilzer (2010: 14) as cited in Dawadi, Shrestha and Giri (2021: 26) confirm that pragmatism brushes aside the quantitative/qualitative divide by suggesting that the most important question is whether the research has helped to find out what the researcher wants to know. According to Maarouf (2019: 6), pragmatism prevails over all other research paradigms because it is the paradigm that opens up all the possible options in front of a researcher. The sampling technique, the collection and analysis of data used in

this study involve both quantitative and qualitative processes, which adheres to pragmatism. It is for these reasons that the researcher believes that the study has a closer alignment to a pragmatism philosophy. In summary, amongst the research approaches discussed herein, the pragmatic approach has been proven to be an appropriate approach to undertake this study.

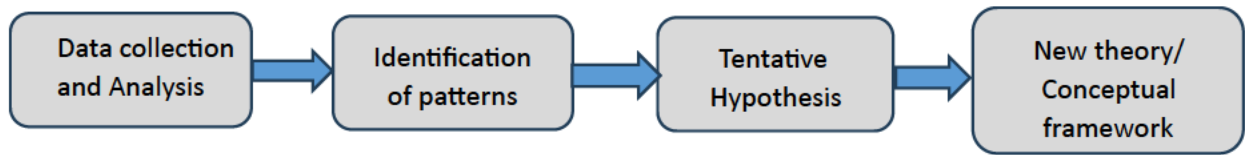
5.5 RESEARCH APPROACHES

In addition to considering paradigms, it is important to also consider whether to employ an inductive or a deductive approach. Despite their distinctiveness, these approaches can also work to complement each other. Meuthea (2019: 15) explains that the inductive approach, or inductive reasoning, begins with observations, with theories emerging later in the research process based on these observations. A research approach reflects the mindset that researchers take toward structuring the research design and carrying out the study.

5.5.1 Inductive Approach

The inductive approach presupposes that explanations about the workings of the world should be based on facts gained from pure, dispassionate and neutral observation, rather than on preconceived notions that nature will reveal itself to a passively receptive mind (Malhotra, 2017:172). The inductive research approach is suitable for the development of a new theory concerning the relationship between dependent and independent variables in a research inquiry. In contrast to the deductive approach, inductive research does not necessitate the formulation of hypotheses at the outset of framing the research question. Instead, it begins with research questions, aims, and objectives that serve as guiding principles throughout the research process, initiated with data collection (Ganesha and Aithal, 2022: 6). The step-by-step advancement of research activities in the inductive research approach is illustrated in the figure below.

FIGURE 5.2: INDUCTIVE RESEARCH APPROACH

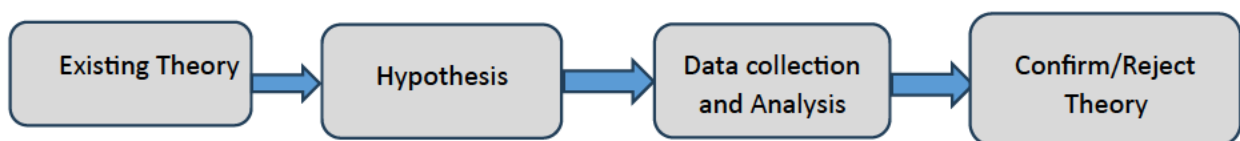


Source: Kapoor *et al.* (2022:20)

5.5.2. Deductive Approach

The deductive approach involves formulating a hypothesis or hypotheses grounded in existing theory, followed by creating a research strategy to test them (Thema, 2024: 77). As noted by Malhotra (2017: 172-173), this approach starts with a tentative hypothesis or series of hypotheses that outline a theoretical explanation for a specific issue, then uses systematic observations to rigorously test these hypotheses. The deductive research approach is appropriate for testing an existing theory regarding the connection between dependent and independent variables in a study. When a series of hypotheses or logical assumptions are made during the formulation of their research question with the intention of confirming or refuting them throughout the research process, a deductive research approach is being utilised. As proffered by Soma (2021: 55), a deductive approach to the research process aims at proving, disproving or lending credence to existing theories. This type of research involves measuring variables and testing relationships between variables to disclose patterns, correlations or causal relationships. The standard progression of research activities in the deductive research approach is delineated in Figure 5.3.

FIGURE 5.3: DEDUCTIVE RESEARCH APPROACH

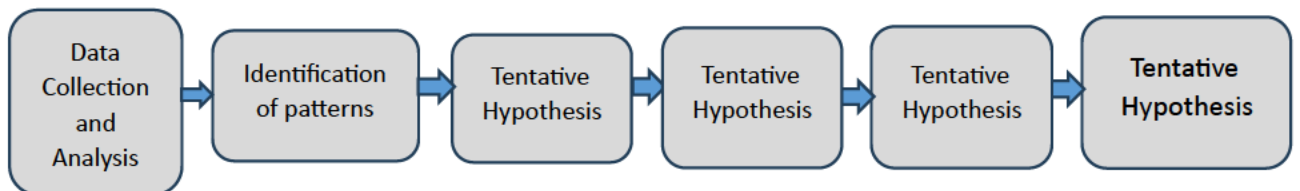


Source: Kapoor *et al.* (2022:20)

5.5.3. Abductive Approach

The third approach is the abductive approach, which focuses on identifying the hypotheses that best explain the observed evidence. Often called the "combination approach", it aims to address the limitations of both deductive and inductive methods (Meuthea, 2019: 15). According to Ganesha and Aithal (2022: 6), the Abductive research approach is suitable for revising an existing theory in a research question. Unlike other approaches, abductive research does not involve the creation of hypotheses during the formulation of the research question. Additionally, it involves exploring a phenomenon related to the dependent variable; identifying themes and patterns; integrating them into a conceptual framework; and subsequently validating that framework through further data collection, amongst other research processes. The typical sequence of research events for an abductive research approach is depicted in Figure 5.4.

FIGURE 5.4: THE ABDUCTIVE APPROACH



Source: Ganesha and Aithal (2022:6)

- **The research approach of the study**

The study adopted both the deductive and inductive research methods. The deductive approach was deemed appropriate because it allows research to incorporate measurable data which can be used to derive conclusions based on the collected data, thereby offering inferences about the research question or problem (Kapoor *et al.*, 2022:20). In essence, the selection of a deductive research approach allowed the researcher to test existing theories, create explicit research questions, employ quantitative techniques, optimise time and build upon established knowledge within the HRM domain. In the same vein, an inductive approach, through qualitative

methods such as interviews allows new patterns and themes to emerge from the data. Using both approaches enhances the robustness of the research. The deductive phase ensures theoretical testing, while the inductive phase ensures practical relevance (Kumar & Ujire, 2024).

5.6 TYPES OF RESEARCH

Different types of research have been identified in the literature. Nayak and Singh (2021:9) categorise research into three main types based on the purpose of the study: exploratory, descriptive and explanatory research.

5.6.1 Exploratory Research

Exploratory research is a fundamental or start-up research that seeks to investigate phenomena that have not yet been investigated (Neuman, 2007 as cited in AsafoAdjei, 2020: 65). It is often conducted in new areas of inquiry, where the purpose of the research is to scope out the magnitude or extent of a particular phenomenon, problem or behaviour; and generate some initial ideas about that phenomenon. It is also used to test the feasibility of undertaking a more extensive study regarding that phenomenon. Accordingly, Nayak and Singh (2021: 9) affirm that exploratory research may not lead to a very accurate understanding of the target problem, but may be worthwhile in scoping out the nature and extent of the problem and serve as a useful precursor to more in-depth research

5.6.2 Descriptive Research

Once the phenomenon has been examined, it is essential to detail the results clearly so that the research community gains a thorough understanding. Descriptive research serves this purpose. According to Atmowardoyo (2018: 198), descriptive research is a method that seeks to represent the current state of phenomena as precisely as possible. Its main aim is to systematically describe the existing phenomena in the study. This type of research focuses on characterising the data and the aspects of

what is being examined by analysing frequencies, averages and statistical measures. Descriptive research is typically employed when a researcher seeks a deeper insight into the subject (Kapur, 2018: 12).

5.6.3 Explanatory Research

Following the description of the phenomenon, the next focus is to provide a comprehensive explanation for why things occurred as observed. This type of research aims to uncover the causes behind observed phenomena, issues or behaviours. While descriptive research addresses the "what", "where" and "when" aspects of a phenomenon, explanatory research seeks to answer the "why" and "how" questions. It strives to create connections in the research by identifying causal factors and outcomes related to the topic under study. Explaining observed events demands a strong theoretical foundation, interpretive skills, intuition, insights and personal experience (Nayak and Singh, 2021: 9).

- **Research type for the study**

An integration of exploratory and descriptive research was adopted for the study. As a research area which has not received much attention in Ghanaian TUs, this study assumes the exploratory approach to explore the level of HRIS adoption, the factors influencing HRIS and the impact of HRIS on organisational effectiveness amongst the selected TUs. Descriptive research is concerned with offering a pictorial account of the phenomenon in order to make it as understandable as possible. It is used to obtain information concerning the status of a phenomenon. In using the descriptive design, the HR processes and practices of the selected Universities were vividly described.

5.7 RESEARCH DESIGN

A research design serves as the plan for conducting research and addressing the research questions, acting as a blueprint for data collection, measurement and analysis, guiding both the researcher and the audience on how all the components of the study are interconnected (Haydam and Steenkamp, 2020: 311). Over time, there

has been ongoing debate regarding the suitability of various research designs in social research. The selection of an appropriate research design is crucial in the research process as it dictates the methods used to gather relevant information for the study. A well-thought-out research design not only determines the methodological approach but also shapes the direction and scope of data collection and analysis. Therefore, understanding the implications of various research designs is crucial for researchers to ensure the overall success of their studies. (Indu and Vidhukumar, 2020: 64). Thus, three research designs are identified in the literature, namely qualitative, quantitative and mixed method designs.

5.7.1 Qualitative design

In contrast to quantitative design, qualitative studies use words and images to communicate their findings, supported by participant quotes, document excerpts and visual materials (Merriam and Grenier, 2019: 15). The research process involves formulating questions and methodologies, collecting data in the participants' natural settings, analysing the data through inductive reasoning by moving from specific details to general themes, and interpreting the significance derived from the data. The final written report follows a flexible structure in its presentation (Creswell and Creswell, 2018:380). The aim is to comprehend and interpret phenomena from the participants' perspectives. Qualitative research relies on three primary sources of data: interviews, observations, and documents/artifacts (Merriam and Grenier, 2019:5). However, it is important to note that the results of qualitative research often cannot be generalised (Poedjiastutie, 2021:8). It is also argued that it will not be possible to conduct the same qualitative research and get the same result at any other time and place. In other words, qualitative research is not replicable as opposed to quantitative research (Sukumar and Metoyer, 2019: 1).

5.7.2 Quantitative design

Quantitative research typically entails a systematic and empirical investigation of phenomena using statistical and mathematical approaches, involving the analysis

and interpretation of numerical data. The essence of quantitative research lies in the systematic estimation of numbers, establishing a crucial connection between observed empirical data and the mathematical representation of quantitative relationships (Basias and Pollalis, 2018: 92).

Flick (2018:122) explains further that quantitative research is distinguished by deductive approaches to the research process aimed at proving, disproving, or lending credence to existing theories. The quantitative design functions as an approach to assess objective theories by exploring the relationships between variables. These variables are typically quantified using instruments, facilitating the examination of numerical data through statistical methods. The final written report adheres to a predefined structure (Creswell and Creswell, 2018:380).

The quantitative design serves as a method to test objective theories by investigating the connections amongst variables. These variables are often measured using instruments, enabling the analysis of numerical data through statistical procedures. The conclusive written report follows a predetermined structure, encompassing sections such as introduction, literature and theory, methods, results, and discussion (Creswell and Creswell, 2018: 380)

5.7.3 Mixed methods design

The mixed-method approach combines both quantitative and qualitative research methods (Creswell, 2014 in Ugwu, Ekere and Onoh, 2021: 119). A mixed-method study involves gathering or analysing both types of data—quantitative and qualitative—either concurrently or sequentially, to better understand the research problem. The integration of qualitative and quantitative research enriches the comprehension of complex phenomena. Each approach brings its own ontology and epistemology, offering the researcher opportunities to generate, confirm and test theories from different perspectives. Using a variety of methodologies across different studies strengthens scientific inquiry and contributes to the body of scientific

knowledge (Dawadi, Shrestha and Giri, 2021: 27). The literature identifies three primary types of mixed-method research designs, namely Convergent Parallel MixedMethods Design; Explanatory Sequential Design; and Exploratory Sequential Design (Plano Clark and Ivankova, 2016; Wilkinson and Staley, 2019). The section that follows examines these types of mixed methods.

5.7.3.1 Convergent Parallel Mixed-Methods Design

The convergent design is a widely used and effective method for combining research approaches (Creswell and Plano Clark, 2018). This design merges both qualitative and quantitative methods to produce triangulated results. In this approach, data from both sets are collected simultaneously and analysed separately using appropriate quantitative and qualitative techniques (Schoonenboom and Johnson, 2017; Shorten and Smith, 2017; Creswell and Plano Clark, 2018). According to Creswell and Plano Clark (2018: 221), the integration in a convergent design can be achieved by presenting the results of the qualitative study first, followed by the quantitative study, or vice-versa. It can also be achieved by converting qualitative data into numerical counts and incorporating these into the quantitative dataset. In this design, the integration of both types of data helps the researcher gain a fuller understanding than either dataset could provide alone. The combined datasets offer a comprehensive view of the issue being studied and allow for the validation of one set of findings with the other, supporting triangulation between the qualitative and quantitative results (Creswell and Plano Clark, 2018).

5.7.3.2 Explanatory Sequential Design

The explanatory Sequential design is carried out in two stages. The first stage involves the collection and analysis of quantitative data, which then informs the second stage—the qualitative phase. The qualitative phase offers deeper insights and explanations for the quantitative results. Together, these two datasets provide a comprehensive perspective on the research issues, adding both breadth and depth

(Schoonenboom and Johnson, 2017; Shorten and Smith, 2017; Creswell and Plano Clark, 2018). Integration in this design occurs in two ways: a) by linking the quantitative findings to the qualitative data collection process, and b) by synthesising the results from both sets of data after the qualitative phase is completed. This design is particularly useful when the phenomenon under investigation is more quantitatively oriented. It is also beneficial when the variable to be measured has already been identified. Additionally, access to participants for qualitative data collection is crucial for this approach. Having the time to collect data in two distinct phases is another key factor. Furthermore, this design is well-suited for a sole investigator who collects and analyses data one at a time (Creswell and Plano Clark, 2018).

5.7.3.3 Exploratory Sequential Design

This design begins with the collection and analysis of qualitative data and based on the qualitative findings, quantitative measures or instruments are developed to test the variables that have been identified in the qualitative findings (Asenahabi, 2019:87). The exploratory sequential design is useful when the research issue is more qualitatively oriented, and the issue is based on a small sample but the researcher wants to test it with a large sample (Creswell and Plano Clark, 2018).

- **Research Design of the Study**

A mixed method approach, specifically the convergent parallel mixed methods was adopted as the most appropriate research methodology since the study contains elements of qualitative as well as quantitative research methodologies. Creswell (2018) outlines the convergent parallel mixed methods design as a methodology employed by researchers to simultaneously gather quantitative and qualitative data, analyse each data set independently, compare or synthesise the distinct outcomes, and formulate an overarching interpretation regarding the degree of confirmation or complementarity between the separate findings. The convergent parallel mixed methods design was considered most appropriate for the study because this study made use of both quantitative and qualitative data. Evaluating the objectives of this research poses a challenge without the integration of both qualitative and quantitative

data. Similarly, drawing inferences regarding the correlation between HRIS adoption and diverse perspectives on organisational effectiveness is problematic without acquiring and analysing a combination of both qualitative and quantitative data.

A mixed method design enhances the robustness of conclusions by combining two approaches, where the strengths of qualitative methods compensate for the weaknesses of quantitative methods, and vice versa (Sharma, Bidari, Bidari, Neupane and Sapkota, 2023: 4). This suggests that the quantitative method excels in areas where the qualitative method may fall short, and the qualitative method strengthens areas where quantitative methods may be lacking. By integrating both approaches, researchers can leverage the strengths of each while mitigating their respective limitations. Thus, the integration of quantitative and qualitative methods is frequently advocated because it allows researchers to leverage the strengths of each method, circumvent their respective limitations, and arrive at a more precise conclusion (Dawadi, Shrestha and Giri, 2021: 28).

5.8 RESEARCH STRATEGY

A research strategy serves as a comprehensive plan for conducting a research study, offering guidance to the researcher in the planning, execution and monitoring of the study. These research strategies can vary depending on the research questions, objectives and methodology being adopted. Thus, the choice of a particular strategy hinges on the specific goals and characteristics of the study. Some research strategies identified in the literature are survey, experiments, archival research, grounded theory, case studies and ethnography.

5.8.1 Survey

According to Coy (2019: 74), survey research is a conventional quantitative approach used to investigate the opinions, attitudes or experiences of one or more groups of people. Similarly, Taherdoost (2021: 25) notes that surveys typically employ questionnaires and interviews to gauge the opinions, attitudes, preferences and

perceptions of individuals relevant to the researcher. Similarly, Mohajan (2020:15) notes that in well-crafted surveys with a carefully selected representative sample, statistical techniques are applied to evaluate the relevance and generalisability of findings to the broader population. Thus, surveys are advantageous when a large amount of information is to be collected from a large population. However, the disadvantage is that a considerable number of negative responses and many problems are encountered during the collection of data. The common problems encountered are receiving incomplete and blank questionnaires and unwillingness on the part of the respondents in terms of providing their responses due to a lack of understanding of the research study (Kapur, 2018: 17)

5.8.2 Experiments

According to Denson, Anderson, Denson and Anderson (2023: 335) experimental methods provide the strongest test of hypothesised causal relationships by allowing researchers to manipulate variables and observe effects, thus establishing causality and testing theoretical relationships effectively. Therefore, Firdaus, Zulfadilla, and Caniago (2021: 11) define experimental research method as a research strategy used to know the effect of a particular action or treatment that is intentionally carried out on one specific condition. The aim of this strategy is to manipulate the independent variable to observe the effect on the dependent variable (Ferreira da Silva and Ebrahimi, 2017). Thus, Mayukh and Al-Giffari (2023: 186) point out that the experimental strategy is rarely utilised in the social sciences due to its controlling nature.

5.8.3 Archival Research

Archival research has been a much underrated and under-utilized method of research in management studies. Data for archival research is gathered and stored prior to the commencement of the research, intended for later use. The primary and most obvious advantages of archival data are of course ease of availability and low cost (Fisher and Chaffee, 2018:79). Archival research can take many forms, including true experiments, natural experiments, quasi-experiments and correlational studies. Such

data tends to occur in natural social settings, which offer social psychologists the opportunity to directly examine real-world phenomena (Das, Jain and Mishra, 2018: 138).

5.8.4 Grounded Theory

Grounded theory is a comprehensive research methodology that encompasses data collection, analysis, categorisation, theoretical sampling, coding, constant comparison, memoing, and saturation. It emphasises maintaining high-quality standards throughout the research process (Mohajan and Mohajan, 2022: 6). According to Urquhart (2022: 6), grounded theory is a methodology for formulating theories that encompass relationships amongst constructs. This method aims to systematically gather and analyze data to develop a theory grounded in empirical evidence. A notable distinction of ground theory from other methods lies in its approach to theory construction (Malhotra, 2017: 178-179). Its application extends to revealing social processes such as group social relationships and behaviours (Mohajan and Mohajan, 2022: 6).

5.8.5 Ethnography

Ethnography examines and interprets behaviors, values, social interactions and beliefs within small communities. Through participation and observation over extended periods, ethnography seeks to describe and analyse a community's culture by identifying and explaining its practices and beliefs. It enables researchers to uncover underlying dynamics, enhance cultural awareness and develop sensitivity to the group's unique context. (Mohajan, 2018: 14). Roshan and Elhami (2024: 3) highlighted that ethnographic research emphasises immersive observation, participant engagement and reflexivity, allowing researchers to gain deep insights into cultural practices while acknowledging their own biases and perspectives. According to Farrow *et al.* (2020: 40), ethnography employs a combination of qualitative and quantitative research methods when examining specific groups within a broader societal context.

5.8.6 Case studies

A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clear (Schoch, 2020: 245). The case study method applies to several research types, each of which has benefits and procedures. Its data may be gathered exhaustively on an entire life cycle of a social unit, or a definite section. Different kinds of case studies such as observational case studies, interview case studies, organisational case studies, life history case studies and multi-site and comparative case studies are identified in the literature (Kapur, 2018: 16).

- **Selected Strategy for the study**

It is evident from the preceding discussions that the survey as a research strategy is more suitable for this study. While surveys are commonly associated with a deductive research approach, they can also be used for descriptive and exploratory studies such as this one. Surveys using questionnaires are common because they can gather standardised and quantifiable data from a large population, are cost-effective and allow an easy comparison of responses amongst individuals and clusters (Bihi, 2022: 42). In this study, the survey method was chosen because of its ability to collect standardised quantitative and qualitative data on the concepts of HRIS and organisational effectiveness in a cost-effective way. Moreover, this strategy can gather diverse data, assess validity and reliability, ensure representative sampling, and facilitate structured analysis while addressing specific research objectives effectively (Prasad, Kumar and Kumar, 2024: 118).

5.9 STUDY POPULATION

A population is defined as the sum of all individuals or entities that can aid a researcher to collect relevant information regarding ongoing research (Ujakpa, 2020: 67). Ahmad, Alias and Razak (2023: 20) affirms that a population comprises the entire group of individuals, objects, or events that share a common characteristic and are the focus of the study. Alex and Nancy (2021:6) accordingly define a target population

as the restricted cluster of potential participants to whom the researcher may have access that represents the nature of the population of interest. In this regard, Zina (2021: 215) emphasised that “the researcher must have a clear and a well-defined population in mind before doing any sampling”.

The target population for the study included the Heads of HR units, teaching and non-teaching senior members of four (4) out of ten (10) Ghanaian Technical Universities as of 2023. These staff groups were targeted because their work and responsibilities are directly related to the application of HRIS, so the belief is that they can provide enough useful data to answer the study’s research questions. The teaching staff consisted of Assistant Lecturers, Senior Lecturers, Associate Professors and Professors. The non-teaching staff counterparts were Junior Assistant Registrars, Assistant Registrars, Senior Assistant Registrars and Deputy Registrars. These staff members often engage in HR-related tasks such as leave applications, promotions, performance appraisals, record updates and workload documentation. With HRIS, these processes become faster, more transparent and less bureaucratic, reducing time spent on administrative duties. The total number of senior members in each university is therefore distributed as per Table 5.2 below.

TABLE 5.2: TARGET POPULATION

Belts	Number of TUS	Number of TUs Selected	Name of TU Selected	Population (Senior Members)
Northern Belt	3	1	TU1	354
Middle Belt	2	1	TU2	228
Southern Belt	5	2	TU3	337
			TU4	494
	10	4		1413

Key informants (Head of Human Resource Units)	4

Source: Self- Generated, 2023

5.10 SAMPLING DEFINED

Sampling involves choosing observations or a subset of the population of interest in a research study to expedite data collection while reducing costs (Turner, 2019: 8; Sheppard, 2020: 15). According to Berndt (2020), sampling is a crucial scientific method employed in systematic studies to select units from a target population, aiming to represent the entire study population. Mweshi and Sakyi (2020:180) also attest that sampling is the process by which a researcher carefully selects, through probability and non-probability methods, individual items from a larger population of interest for closer study.

5.10.1. SAMPLE SIZE DETERMINATION

A sample in research is defined as a subset of a population that is used to represent the entire group which allows researchers to make inferences about a population without having to study the entire population (Rahman, 2022: 45). The researcher adapted the Krejcie and Morgan (1970) sample size model to select the appropriate sample size from a total population of 1413 at the 95% confidence level for this study. The sample size of 306 was therefore determined through the application of the Krejcie and Morgan (1970: 608) model. This model simplified the process of deciding on a sample size by offering a table that researchers can utilise to establish the appropriate sample size for a particular population.

The sample size of 306 was then distributed amongst the four chosen technical universities using proportional allocation. This was done by dividing the total number of senior members for each university by the total population and multiplied by the

sample size of 306. For example, the sample size for technical university 1 was determined as follows:

Total number of senior members in TU1 $\times$ Sample size

Total target population

$$\frac{354 \times 306}{1413} = 77$$

The full results are shown in Table 5.3 below:

Table 5.3: Sample Frame

University	Population	Sample size
TU1	354	77
TU2	228	49
TU3	337	73
TU4	494	107
Total	1413	306

The sample size assigned for each university was again proportionally shared amongst the teaching and non-teaching staff of each university. The results are shown in Table 5.4 below:

Table 5.4: Sample size distribution

University/Category of staff	Population	Sample

<i>TU 1</i>		
Teaching staff (Senior members)	252	55
Non-Teaching staff (Senior members)	102	22
Total	354	77
<i>TU 2</i>		
Teaching staff	153	33
Non-Teaching staff	75	16
Total	228	49
<i>TU 3</i>		
Teaching staff	228	49
Non-Teaching staff	109	24
Total	337	73
<i>TU 4</i>		
Teaching staff	343	74
Non-Teaching staff	151	33
Total	494	107
Sub Total	1413	306
Key informants (Heads of Human Resource Units)		4
Grand Total	1413	310

Source: Field Survey, 2023

**Pseudonyms are used in observance of the universities' rights to anonymity*

A sample size of four (4) was used for the qualitative data collection. This is because each university has one head for its resource department/unit. Thus, one participant from each of the four selected technical university.

5.10.2 SAMPLING METHODS

According to Eichhorn (2021: 15), sampling methods can be classified into two broad categories, namely probability sampling and non-probability sampling methods. Probability sampling methods involve the random selection of participants from the population, ensuring that each member of the population has an equal chance of being included in the sample. On the other hand, non-probability sampling methods do not rely on randomisation and may introduce bias into the sample (Bhardwaj, 2019).

5.10.2.1. Probability Sampling Methods

Probability sampling is grounded in probability theory and encompasses any method where samples are chosen such that each element in the population has a recognised and identical likelihood of being selected (Mweshi and Sakyi, 2020:185). Rahman, Tabash, Salamzadeh, Abduli and Rahaman (2022:47) concurs that probability sampling techniques are employed when every individual in the population has an equitable opportunity of selection. This method stands as the most effective approach to guarantee that all sampling units accurately reflect their respective populations. Probability sampling methods work best when the population of interest is large and when variations from the true population parameters can be identified (Berndt, 2020: 2). Probability sampling methods identified in the literature include simple random, stratified, systematic and cluster sampling methods (Bhardwaj, 2019). The next section elaborates on the probability sampling methods listed in this section.

5.10.2.1.1 Simple random sampling

This method of sampling involves selecting individuals or units from the population at random, with each member having an equal chance of being selected. Simple random

sampling is useful when the population is homogeneous and the researcher wants to ensure that every member of the population has an equal chance of being selected (Mweshi and Sakyi, 2020: 187; Noor, Tajik and Golzar, 2022: 79).

5.10.2.1.2 Stratified random sampling

In this method, the population is divided into sub-groups or strata based on one or more variables. Individuals or units are then selected randomly from each stratum. It is useful when the population is heterogeneous and the researcher wants to ensure that the sample represents the diversity of the population (Jamil, 2020: 7).

5.10.2.1.3 Systematic sampling

Systematic sampling refers to is a statistical method involving the selection of elements from an ordered sampling frame. It entails choosing every n th element from the population after deciding on a beginning point at random (Khan, 2020: 29). If there is no underlying order in the population, this method is simple to use and yields a representative sample (Akpan, 2023: 65).

5.10.2.1.4 Cluster sampling

Cluster sampling involves the initial selection of clusters or groups from the population, followed by the subsequent sampling of elements within those chosen clusters. The key aspect is that these clusters should display heterogeneity, ensuring diversity. However, within each cluster, there should be a comparable distribution of the characteristics present in the overall population under investigation (Sheppard, 2020: 170).

Probability sampling methods are used when the researcher wants to make inferences about the population. Wang and Cheng (2020: 68) therefore concluded that probability sampling methods are preferred over non-probability ones, as the former are more accurate and rigorous. Table 5.5 summaries the types of probability sampling methods, indicating their respective advantages and disadvantages.

TABLE 5.5: TYPES OF PROBABILITY SAMPLING

Sampling method	Description	Advantages	Disadvantages
Simple random sampling	All elements in the population are considered, and each element has an equal chance of being chosen as a subject.	High generalisability of results.	Not as efficient as stratified sampling.
Stratified random sampling	The population is first divided into meaningful segments, then subjects are drawn in proportion to their original numbers in the population.	Most efficient amongst all the probability designs. All groups are adequately sampled and comparisons amongst groups are possible.	Stratification must be meaningful. More time-consuming than simple random sampling or systematic sampling.
Systematic sampling	Every n th element in the population is chosen starting from a random point in the population frame.	Easy to use if the population frame is available.	Systematic biases are possible.
Cluster	Groups that have heterogeneous members are first identified; then some are chosen at random; all the members in each of the randomly chosen groups are studied.	In geographic clusters, costs of data collection are low.	The least reliable and least efficient amongst all probability sampling designs since sub-sets of clusters are more homogeneous than heterogeneous.

Source: Ebenezer and Piate (2023: 77) Adapted

5.10.2.2 Non-probability Sampling methods

Non-probability sampling is a sampling approach in which the selection of the sample is not carried out randomly, and the inclusion probability of each unit is not known even when considering random selection (Kim, 2022: 617). Thus, non-probability sampling is susceptible to selection bias and lacks the randomisation distribution necessary for theoretical inference (Kim, 2022: 617). Non-probability sampling methods identified in the literature are convenience, quota, and purposive snowballing sampling methods.

5.10.2.2.1 Convenience Sampling

Convenience sampling entails selecting elements from the population that are the most accessible or convenient to reach. This involves participants who are quick or readily available to participate in the research (Obilor, 2023: 4). However, studies employing this sampling method may yield biased estimates of population parameters because the individuals included in the sample may not be representative of the overall population, leading to challenges in generalisability (Turner, 2020: 10).

5.10.2.2.2 Purposive Sampling

Purposive sampling involves selecting participants based on specific attributes that are relevant to the study, with the aim of gathering pertinent and valuable information (Campbell *et al.*, 2020: 654). The primary benefit of purposive sampling lies in allowing the researcher to apply expert judgment and guarantee representation in a particular aspect. Nonetheless, it is important to note that purposive sampling is inherently subjective and opportunistic in nature (Baltes and Ralph, 2021:4).

5.10.2.2.3 Quota Sampling

According to Iliyasu and Etikan (2021: 25), quota sampling is one of the most common sampling methods for non-probability sampling. This sampling method involves selecting individuals based on specific characteristics chosen by the researcher, establishing predetermined quotas for sample composition (Bhardwaj, 2019: 162).

5.10.2.2.4 Snowball Sampling

Snowball sampling has gained popularity as a method for recruiting research participants, especially when targeting hard-to-reach populations. These populations may have low numbers, be geographically scattered, lack formal records or prefer anonymity due to stigma. They can also be sensitive, vulnerable and require trust for willing participation (Parker, Scott and Geddes, 2019: 4). Although very useful for hard-to-reach populations, this method is subject to bias due to the lack of control over recruitment and the fact that those with more connections are more likely to be included (Turner, 2019: 10).

In general, non-probability sampling is a method of selecting units from a population using a subjective method and since it does not require a complete survey frame, and it is a fast, easy and inexpensive way of obtaining data (Kim, 2022: 616). The advantages and disadvantages of each non-probability method are summarised in Table 5.6

TABLE 5.6: TYPES OF NON-PROBABILITY SAMPLING

Sampling method	Description	Advantages	Disadvantages
Convenience sampling	The most easily accessible members are chosen as subjects.	Quick, convenient and less expensive.	Not generalisable at all.
Judgement sampling	Subjects are selected based on their expertise in the area being investigated.	Sometimes the only meaningful way to investigate.	Generalisability is questionable; not generalisable to the entire population

Quota sampling	Subjects are conveniently chosen from targeted groups according to some predetermined number or quota.	Very useful where minority participation in a study is crucial.	Not easily generalisable
Purposive Sampling	Strategy allows for the selection of a sampling frame that may be most affected by a specific issue	Aims to maintain rigor and to identify a sampling frame based on specific studydriven variables or characteristics.	Requires collaboration from others to identify participants matching the sought characteristics. It can take time due to specific variables or sought characteristics.
Snowball	Based on a referral approach where a small number of individuals with specific characteristics recruit others with these characteristics from their networks or community.	Reaches participants with the same characteristics. Often used in community engagement research studies and mixed methods approaches. Based on networks and relationships which may lend credibility to research.	Referral contacts may not be effective in identifying diverse individuals. Referral contacts may only identify participants meeting specific characteristics. Participants may not share information freely for fear of privacy or confidentiality issues especially in qualitative study

Source: Akpan (2023:77). Adapted.

- **Sampling methods for the study**

For this study, a mix of probability and non-probability sampling methods was employed. In terms of probability sampling, cluster sampling and the simple random sampling methods were used. According to Mweshi and Sakyi (2019: 189) and Rahman *et al.* (2022: 49), cluster sampling is often beneficial for surveys that are conducted throughout a large geographic area. It is the process of dividing large populations into smaller clusters to make primary data collection more effective, and it allows researchers to study a manageable number of clusters while still obtaining a representative sample of the population. This study used the cluster sampling because the study covers a large geographical area which is Ghana and partitions Ghana into three belts or clusters to obtain a representative sample from a dispersed population. The simple random sampling was then used to select the individual participants. This was done to give each individual staff an equal chance of being selected for the study.

Regarding the non-probability sampling method, the Heads of the Human Resource Units for the universities were selected using the purposive sampling technique. This intentional choice was made because these individuals, in their roles, are positioned to provide pertinent data that addresses specific aspects of the research questions. As opined by Campbell *et al.* (2020: 654), purposive sampling involves selecting participants based on specific attributes that are relevant to the study. The purposive selection of heads of HR for THE study can be justified based on their specific expertise, decision-making authority, and in-depth knowledge of organisational policies and employee management. HR heads are typically responsible for overseeing all HR functions, which positions them as key informants when studying topics related to human resources and organisational effectiveness. Purposive sampling, therefore, ensures that the HR heads are selected based on their relevance and ability to provide rich, detailed information that aligns with the research objectives.

5.10.3 SAMPLING PROCEDURE

The sampling procedure refers to the method used to select a subset of individuals or items from a larger population for research purposes. It involves choosing a representative sample that accurately reflects the characteristics of the entire population. Specifically, the aim of this sampling procedure was to select a representative of senior members from four technical universities across the three belts of Ghana, ensuring at least one university from each belt. Against this backdrop, the sampling procedure for this study was as follows:

- i. The study area, Ghana was partitioned into three belts. Several studies have categorised Ghana into three belts, the Northern Belt, the Middle Belt and the Southern Belt (Abekah-Nkrumah, 2018: 6; Wegmullar *et al.*, 2020: 3; Osei-Owusu, 2022: 64). This study, similarly, adopted these divisions because each of these three belts contains, at least, two TUs. This division was adopted to ensure a fair representation of technical universities across the country. Thus, the northern belt had three technical universities, the middle belt has two while the southern belt has five technical universities.
- ii. The next step was to select at least one technical university from each belt using the simple random sampling (this was done with the use of a random number generator). Thus, one technical university each was selected from the northern and the middle belts, while two technical universities were taken from the southern belt where there are more technical universities (see Table 4.2 above).
- iii. The desired sample size of 306 was proportionally assigned to the four selected universities (see Table 4.3 above).
- iv. This was followed by the listing of the senior members from both the teaching and non-teaching staff in each of the selected technical universities (see Table 4.4 above).
- v. The sample size assigned for each university was then proportionally shared among the teaching and non-teaching staff of each university (see Table 4.4 above).

- vi. A list of all senior members in the university was acquired from the Registrars of the universities and each member was assigned a unique number. A random number generator was then used to select participants for the study.
- vii. The WhatsApp contacts of the selected participants were also obtained from the Registrars and the online survey was sent to their WhatsApp messaging platform. It must be noted that these selected individuals were first contacted to seek their consent before the survey was sent to them.

This structured approach ensured that the sample is representative of the entire population of technical universities in Ghana, allowing for reliable and generalisable research findings.

5.11 SOURCES OF DATA

Data refers to a specific type of information, typically gathered through observations, surveys, inquiries, or generated from human activities for research purposes. In the literature, data is commonly categorised into primary data and secondary data, based on the methods and sources used for its collection (Prada-Ramallal, Roque, Herdeiro, Takkouche and Figueiras, 2018: 2).

5.11.1 Primary data

Primary data is original and firsthand data collected directly by the researcher which are relevant to the research (Sileyew 2019: 3). Primary data is basically the original data that comes directly from the first-hand source and is gathered through experiments, surveys, or observations (Kapoor, 2022: 59). Mazhar, Anjum, Anwar and Khan (2021) explain that primary data refers to data collected for the first time, making it original and fresh. The literature identifies several methods for collecting primary data, highlighting its importance and diverse collection techniques. These include questionnaire, interview, focus group, case study and observation (Sileyew, 2021: 3; Kishore, 2022: 2; Karunarathna, Gunasena, Hapuarachchi and Gunathilake, 2024: 2). The primary data-collection methods used were the questionnaires and interviews. In collecting primary data, questionnaires were administered to 306 staff

across the four technical universities and three heads of the HR units were interviewed.

5.11.2 Secondary data

Secondary data consists of both published and unpublished documents that have been collected and analysed by someone else but can be used for other purposes in other current research (Pederson, Vingilis, Wickens, Koval, and Mann, 2020: 58). Secondary data collection is a cost-effective and straightforward method of gathering pre-existing data by an individual who did not originally generate the data. (Mazhar *et al.*, 2021:7; Goyal, 2022: 55). Secondary data, while not as comprehensive as primary data, provides valuable insights and is convenient, particularly when privacy concerns make primary data collection impractical. However, it has drawbacks such as potential inaccuracies, unreliability, limited applicability to various contexts or timeframes, and potential copyright issues (Taherdoost, 2022: 14: 268; Karunarathna, Gunasena, Hapuarachchi and Gunathilake, 2024: 17). Some sources of secondary data are letters, diaries, journals, government publications and books (Taherdoost 2021: 12). The secondary data used in this study was obtained from an extensive review of journal articles, textbooks, related dissertations and other publications. The secondary data of this study were obtained from an extensive review of journal articles, textbooks, internet articles, related thesis and other publications.

5.11 DATA COLLECTION METHODS

According to Sheppard (2020: 129), the selection of a data collection method is a crucial decision since a wrong choice is likely to hinder the researcher from addressing the research questions. Harris and Brown (2019: 1) for instance, aver that while questionnaires can provide evidence of patterns amongst large populations, qualitative interview data often gather more in-depth insights into participant attitudes, thoughts and actions. The extant literature avers that data can be obtained through two main sources, namely primary data source and secondary data source (Sileyew, 2019: 5; Taherdoost, 2021: 12). Goyal (2022: 55) however echoes that the choice

between primary data collection and secondary data collection depends on the type, scope and location of the research and its objectives.

5.11.1.1 Questionnaire

According to Rathi and Ronald (2022: 7697), a questionnaire is a bunch of questions used to collect information or data from the people in relation to the given problem. It comprises a set of questions and predefined answers that respondents fill out, providing researchers with essential information not available through secondary sources. While questionnaires can gather both qualitative and quantitative data, they are particularly useful for large sample sizes. They serve various purposes, primarily gathering statistical data, especially when personal discussions with each participant are not feasible (Harris and Brown, 2019: 2; Taherdoost, 2022: 8). Kuphanga (2024: 6) outlines that questionnaires are cost-effective even when dealing with a large and widely dispersed population. Questionnaires are classified based on the type of questions used. Two types of questions are usually contained in a questionnaire, namely, open-ended and closed-ended questions (Taherdoost, 2021: 14).

- **Open-ended questions**

Open-ended questions allow respondents to provide answers based on their own understanding and interpretation, without being limited to predefined response options. Weller *et al.* (2018:19) explain that open-ended questions can be used alone or in conjunction with other interview techniques to explore topics in depth, understand processes, and uncover potential causes behind observed correlations. These questions can elicit responses ranging from brief answers to detailed explanations or lists.

- **Closed-ended questions**

Closed-ended questions on the other hand, are the type of questions where the respondent is not provided with adequate choice of answers, rather specific options are strictly given to choose from (Abdullahi, 2019: 5). Rathi and Ronald (2022: 7697) however identified a third type of question called the mixed questions. This type of

question is a mixture of both closed-ended and open-ended questions and they are useful to achieve the objectives of both the open ended and the close-ended types of questions.

5.11.1.2 Observation

Observation is a data collection method that involves a systematic viewing of facts, as they occur with regards to the cause-effect mutual relations. (Kapur, 2018: 33). It is a way of gathering data mostly in qualitative research, by observing the behaviour, events, or noting physical characteristics in their natural setting (Ekka, 2021:17). Observation in research involves the observer or researcher taking notes on various aspects of the observed setting. These notes can range from a chronological log of events to descriptions, records of conversations, or detailed impressions from the fieldwork. Observational data can be diverse, capturing the essence of what unfolds during the research process (Barrett and Twycross, 2018:64; Wick and Gumbinger, 2020: 3).

5.11.1.3 Interviews

An interview is a conversation between two people for the sole purpose of gathering information that is relevant to the purpose of the research. Research interviews are based on purpose and structured conversations that are defined and controlled by the researcher to Goyal (2022: 56). Unlike questionnaires, interviews serve as a direct means of information gathering in contrast to questionnaires with indirectly collected data methodology (Taherdoost, 2021:17). According to Sahoo (2022: 4), there are basically three main kinds of interviews: the structured interview, the unstructured interview, and the semi structured interview.

The structured interview is when the researcher asks respondents to answer predetermined questions in a set order and then compares the different responses given to the same questions. In this approach, the researcher asks a standard set of questions to each participant. There are fewer open-ended questions to minimise

variation in responses. The interviewer remains neutral and refrains from offering personal opinions during the interview. This method is best suited for literate participants who can comprehend the questions and the subject matter of the study (Kishore, 2022: 4).

In a semi-structured interview, the interviewer starts with a set of open-ended questions but spends considerable time probing and encouraging participants to elaborate and clarify their responses. These responses are typically analysed qualitatively (Harris and Brown, 2019: 1). This type of interview is particularly useful when the researcher has only one opportunity to interview a participant. Open-ended questions are usually asked, and it is recommended that the interview be recorded, as it can be challenging for the researcher to take detailed notes during the conversation (Kishore, 2022: 4).

An unstructured interview is an informal type of data collection where the researcher does not prepare the questions prior to the interviews. Data collected this way might be unreliable and biased because if questions are not pre-determined, the researcher might fail to formulate them in the same way when asking each respondent. Comparison of responses will therefore be difficult. In this method, the questions are open-ended, allowing the interviewee to share their views on the topics. Since the responses are detailed, the researcher should record the interview, as it would be challenging to write down the interviewee's answers during the conversation (Kishore, 2022: 4).

5.11.1.4 Focus group discussion

According to Yayeh (2021: 54), a focus group discussion is a data collection method in which a researcher gathers a group of individuals to discuss a particular topic. The goal is to tap into the participants' diverse personal experiences, beliefs, perceptions, and attitudes through a moderated interaction. Focus group discussion is when participants of a study are gathered to address important issues related to a shared

topic of interest. The purpose of these discussions is to delve into concepts, encourage active participation, and leverage the collective experience and expertise of the participants. (Mohd Kassim, Li and Arief, 2023: 7). Typically comprising a small number of individuals and facilitated by a moderator, focus groups are efficient, cost-effective, and provide insights into group interactions. However, moderators must skillfully navigate the discussion to extract meaningful contributions from participants (Dewi, 2021: 31). While advantageous for accessing group dynamics, focus groups may lack individual control and can be unsuitable for sensitive topics that individuals may be hesitant to discuss openly (Wick and Gumbinger, 2020: 3).

- **Data collection methods for the study**

For the purpose of this study, the data collection methods used were questionnaire and interview. The questionnaire contained closed-ended questions which were rated on a 5-Point Likert scale. Connor-Desai and Reimers (2019: 1438) contend that closed-ended questions are fast, easy to answer and yield a rapid completion of the survey. Given the nature of this study, the researcher felt that questionnaire was suitable because questionnaires allow researchers to collect data from many respondents in a relatively short time frame, making them an efficient tool for gathering information (Rashid, 2020). Moreover, questionnaire was appropriate for this study as it was easy to answer and required less writing. Furthermore, the data obtained from the questionnaires were easy to compare, analyse and summarise.

Regarding qualitative data, an interview was also used to obtain information from the heads of the Human Resource Units of the four universities. The interview was useful because it helped the researcher obtain in-depth exploration of HRIS issues, providing rich and detailed data that might have been missed by the questionnaire (Knott, Rao, Summers, Teeger, 2022: 10).

5.12 MEASURING INSTRUMENT

A measuring instrument refers to a tool used to obtain data about specific variables within a study (Sukmawati, 2023: 120). For this study, the qualitative data was

obtained through a semi-structured interview with the Heads of the HR units to ascertain their views on HRIS adoption for organisational effectiveness. The quantitative data was obtained through the formulation and administration of survey questionnaires to senior members of the selected universities.

5.12.1. Survey questionnaire

For this study, the survey questionnaire was developed in Google Form. Google Form is ideal for distributing questionnaires, charting results, and exporting data for analysis in a spreadsheet. It supports various question formats, including text boxes, paragraph texts, multiple choice, checkboxes, scales, and grids. It also allows for custom logic to navigate through questions based on responses and has built-in data validation rules (Nayak and Narayan, 2019: 33). A closed-ended questionnaire was designed to collect data from senior members of the four selected Technical Universities. The questionnaire was rated on a 5-point Likert scale, ranging from strongly disagree to strongly agree. The questionnaire consisted of five (5) sections that included demographics, human resource practices, level of HRIS adoption, factors influencing HRIS adoption and the impact of HRIS on institutional effectiveness. In all, the questionnaire had fifty-seven (57) questions, described as follows:

Section One: Demographic Information:

This section covered questions on demographic information regarding participant respondents' gender, age, experience level of education and rank. The purpose of acquiring demographic data is to understand the characteristics of a population, enabling informed decision-making, targeted strategies, and inclusive representation in research.

Section Two: Human Resource Management practices

The second section of the questionnaire examined the general view of respondents about the HRM practices that are carried out in their universities. Question numbers

2, 3, 4, 5, 6 and 8 under this section were adapted from the scale developed by Coelho *et al.* (2015). Questions 1 and 9 were developed by the researcher while question 7 was adapted from the scale of Ukandu (2015). In all, nine items were used to examine the human resource practices of the universities.

Section Three: Level of HRIS adoption

This section of the questionnaire measured the extent or the level of adoption and use of HRIS in HR functions. Items 1, 2, 3, 4, 5 and 6 were measured using the scale proposed by Ukandu (2015). Item 7 was adapted from Siengthai and Udomphol (2016) while item 8 was from Tesha (2020). Eight items were asked under this section.

Section Four: Factors influencing HRIS adoption

In this section, the questionnaire gathered information on the factors that influence the adoption and usage of HRIS. Question number 1, 2, 3, 5, 8, 11, 12 and 13 were adapted from Kiwango and Omar (2021), items 10 and 14 were from Hagan (2021) and questions 4, 6 and 7 were from Yakusak (2015). Item 9 was however from AlDmour (2014). In all, fourteen items were used.

Section Five: Impact of HRIS on institutional effectiveness

The fifth section of the questionnaire assessed how HRIS adoption has impacted the effectiveness of their respective institutions. Question 1 was adapted from the scales developed by Bartai (2014) while question 2 was adapted from Aletaibi (2016). Question number 3, 4, 6, 7 and 8 were from Al-Dmour (2014) while question 9 was developed by the researcher. Nine questions were examined under this section.

5.12.2 Interview guide

An interview guide was employed to collect data from the Heads of the HR units in the selected universities. The interview guide covered data pertaining to the current HR processes and practices with highlights on the application of HRIS, factors influencing HRIS adoption and usage in the TUs. The questions in the interview guide were adapted from various studies and from the review of literature (Al-Dmour, 2014;

Tesha, 2020). Most of the questions were taken from the questionnaire and modified to get an in-depth Information on the impact of HRIS on organisational effectiveness. In all, fourteen questions were captured in the interview guide.

5.13 DATA COLLECTION PROCEDURE

It was crucial to address ethical concerns before distributing the questionnaires. Therefore, the researcher sought permission from the Registrars of all the four technical universities to conduct the research. Upon receiving approval letters, the data collection process commenced. The WhatsApp contacts of the selected participants were obtained from the Registrars of the universities and the google form link was sent to their WhatsApp messaging platform. It must be noted that these selected individuals were first contacted through telephone calls to seek their consent before the survey was sent to them. Also, a covering letter seeking their consent and explaining the research purpose was attached to the questionnaire. In the same letter, participants were assured of their confidentiality and anonymity.). Participants clicked in the link and completed the questionnaire online. Responses were automatically recorded in Google Forms. Follow-up WhatsApp messages were sent to non-respondents after a specified time frame of three to five days. The participants had approximately 20 minutes to complete the questionnaire. Completed responses were reviewed for accuracy, consistency and exported from the Google Forms to SPSS version 29 for analysis.

Additionally, an interview guide was used to define the line of inquiry and ensure the collection of qualitative data. Semi-structured interviews were conducted to obtain indepth opinions, views, and experiences of the HR Heads regarding the status of HRIS in the universities. The researcher personally contacted the Heads of the HR units via telephone to schedule appointments. Initially, the plan was to conduct the interviews in person at their offices. However, when the researcher called to confirm the appointments, two of the four Heads indicated they would not be available. After rescheduling attempts proved futile, it was agreed to conduct the interviews via

telephone. Each telephone interview lasted approximately fifteen (15) minutes, and it was recorded. Ultimately, three interviews were completed in three of the four selected universities, as one HR Head declined the interview request.

5.13.1 Response rate of respondents

The Researcher successfully retrieved 302 of the 306 administered questionnaires, resulting in a response rate of approximately 99%. As stated by Mugenda and Mugenda (2003) in Adeniran, Jada and Mohammed (2020: 595), a 50% response rate is considered adequate for data analysis and reporting, 60% is good, and 70% or higher is excellent. Therefore, a 99% response rate in this study was more than sufficient for data analysis and reporting. Regarding the interviews, three out of the four respondents participated in the study. This gave an excellent response rate of 75%.

5.14 DELIMITATION

This research was limited to four technical universities: one from the northern belt, and the middle belt of Ghana, and two from the southern belt. Furthermore, the research only extended to only senior members of the universities. Both teaching and non-teaching staff were used for the survey. This next section gives an overview of technical universities in Ghana.

5.15 VALIDITY AND RELIABILITY

Reliability and validity are concepts used to evaluate the quality of research. They indicate how well a method, technique or test measures something (Middleton 2020: 1). According to Patten and Newhart (2018: 136), validity and reliability increase transparency and reduce the tendency of researcher's bias. Validity is the extent to which an instrument measures what it is intended to measure (Pandey and Pandey, 2021: 21), while reliability measures consistency, precision, repeatability, and trustworthiness of a research (Johnson, 2018: 1425). Therefore, in research, the two most important aspects of precision are validity and reliability.

5.15.1 Validity

Validity refers to the extent to which a test accurately measures what it is intended to measure. In essence, it indicates how well a scale reflects reality. High validity in research means that the results align with the actual situation (Bahariniya, Ezatiasar, and Madadzadeh, 2021: 101). Several types of validity have been identified in the literature to assess the accuracy of a measurement tool. These include Predictive Validity, Concurrent Validity, Content Validity, Criterion-Related Invalidity, Internal Validity, External Validity, Construct Validity, Face Validity, Systemic Validity, Theoretical Validity, Jury Validity, Consequential Validity, Cultural Validity, Interpretive Validity, Descriptive Validity, Evaluative Validity, Statistical Conclusion Validity and Translation Validity (Sürücü and Maslakçı, 2020: 2697). While this list can be expanded, face validity, content validity, and construct validity are typically considered the fundamental types (Jhangiani *et al.*, 2019: 95).

- **Construct validity**

Construct validity refers to how accurately an instrument measures the intended trait or theoretical construct. Roy, Sukumar, Philip and Gopalakrishna (2023: 5) describe it as the extent to which an instrument effectively assesses the abstract characteristic it is supposed to represent. Similarly, Rebellon (2021: 17) defines construct validity as the degree to which an empirical measure truly reflects the theoretical concept it aims to measure. Mochon and Schwartz (2020: 4) explain that construct validity can be evaluated by checking if the measure aligns with theoretically expected relationships. Essentially, researchers confirm construct validity by verifying that the measure behaves in accordance with theoretical predictions.

- **Content validity**

Content validity refers to how well the items or tests represent the behaviour being studied (Cohen and Swerdlik, 2018; Slaney, 2017). It involves ensuring that various elements, skills, and behaviours are adequately and effectively measured. To achieve this, a study might include several types of questionnaires and interview questions,

reviewed by different experts (Dobakhti, 2020: 63). Generally, content validity encompasses the wording, format, and presentation of items. A test is considered to have content validity when its items accurately measure the construct. Additionally, it is important to use a representative number of items to measure constructs without excess (Roebianto, 2023: 6).

- **Face validity**

According to Oluwatayo (2012), as cited in Shafie, Abd Majid, Damio and Hoon (2020: 1058), face validity involves the researcher's subjective assessment of whether the items are relevant, practical, unambiguous, and clear for the study. Face validity involves testing the questionnaire with a selected group of respondents to assess how easily they can understand the items or questions. This includes evaluating the feasibility, formatting, readability, and clarity of the language used. Essentially, face validity ensures that the questionnaire's format and the way items are presented are appropriate for use as a measurement tool, confirming that the questions are clear, reasonable, and easy to comprehend and respond to (Architha and Sreeramana, 2020: 9).

In this study, validity was ensured through a pilot test and consultation with literature. The questionnaire was reviewed and validated by the researcher, the supervisor, and a statistician to ensure it covered all relevant constructs. To maintain validity, the study included questions that were closely aligned with the research objectives and based on factors commonly discussed in the literature, such as HR practices, HRIS adoption levels, and the factors influencing HRIS adoption and implementation. The questions were carefully phrased to avoid ambiguity, ensuring that respondents could easily understand and answer them. Additionally, interviews were conducted to enhance the quality of the research, and the reliability of the study was also assessed.

Statistically, researchers often use validity tests such as bivariate Pearson, corrected item-total correlation and factor analysis with the SPSS programme to test the validity

of a data collection instrument (Hajjar, 2018: 53). In this study, factor analysis was performed using SPSS version 29 to validate the data collection instruments. Factor analysis is a powerful statistical tool used to identify and group the underlying factors that influence the adoption of HRIS. Reducing the multitude of variables into distinct and manageable factors, this analysis aims to uncover patterns that highlight key influences shaping HRIS adoption in these institutions. Ultimately, the factor analysis shed light on HRIS adoption in the Ghanaian technical education sector.

TABLE 5.7: KMO AND BARTLETT'S TEST

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.695
Bartlett's Test of Sphericity	Approx. Chi-Square	460.095
	df	21
	Sig.	.000

Source: Field Survey, 2024

The results from the Kaiser-Meyer-Olkin (KMO) and Bartlett's tests in Table 4.5 are essential in assessing the suitability of data for factor analysis. The KMO measure of sampling adequacy is .695, which is above the acceptable threshold of 0.5. As stipulated by Reddy and Kulshrestha (2019: 4), a KMO value above 0.5 is acceptable. This suggests that the data set has adequate common variance among variables for a reliable factor analysis. Here, the value of .695 indicates a moderate level of commonality but is still acceptable for performing factor analysis. As stipulated by Reddy and Kulshrestha (2019: 4), a KMO value of 0.5 is acceptable. The Bartlett's Test of Sphericity has an approximate Chi-Square value of 460.095 with 21 degrees of freedom and a significance level (Sig.) of .000. This test checks the assumption that the correlation matrix is an identity matrix, which would indicate that variables are unrelated and unsuitable for structure detection. A significance level of .000 firmly demonstrates that the variables are indeed correlated, and that the data is suitable for factor analysis.

5.15.2 Reliability

Reliability pertains to the dependability of a measuring tool and its ability to produce consistent outcomes over time. In essence, it is the capability of a measurement instrument to yield similar results when used repeatedly at different intervals (Sürücü and Maslakçi 2020: 2707). Cohen, Manion and Morrison (2018) describe reliability as 'the consistency with which the measuring instrument yields a certain result when the entity being measured has not changed'. In general, Clifton (2020: 259-270) posits that reliability increase transparency and decrease the gap for research bias in the data collection process. Different methods are used to determine the Reliability of the scales used in empirical research. The most frequently applied methods are test-retest reliability, alternative forms and internal consistency tests.

Test-retest Reliability refers to the consistency of the results obtained when the measuring instrument is applied to the same sample group at different times. Test-retest reliability ensures consistency of results as studies with high test-retest reliability will produce similar results every time it is administered (Aldridge, Dovey and Wade, 2017: 5). Test-retest reliability is estimated by using reliability co-efficient. The most used reliability formula for assessment of test-retest reliability is the Pearson's coefficient correlation formula (Konjengbam and Meitei 2020: 13). According to Segal and Coolidge (2018: 2), test-retest reliability correlation coefficients values of 0.90 or higher are deemed excellent, while values of 0.80 or higher are considered good. A test-retest reliability coefficient of 0.50 indicates a lower reliability.

In terms of alternative reliability, the first measuring instrument is administered to the participants, followed by a second alternative form, with the results being analysed to determine the reliability coefficient. The focus is on comparing the similarity of the results obtained from both instruments and assessing how closely they align. This technique is like the test-retest method, but instead of using the same instrument, two different measuring tools are used to assess the same behaviour or characteristic (Sürücü and Maslakçi, 2020: 2709). Internal consistency reliability refers to the

degree of consistency among different items within the same construct. It evaluates how consistently the items within the instrument measure a specific characteristic, reflecting how well a set of items captures the intended attribute of the test (Segal and Coolidge, 2018: 3).

Different methods have been used for determining reliability. However, among the existing methods, Taber (2018: 1296) argued that the most preferred and widely used method to determine the reliability of a questionnaire is the Cronbach's alpha value. Devlieger, Tallon and Rossell (2019) clarify that Cronbach's alpha gauges the effectiveness of a set of items in measuring a single first-order construct. It is not a statistical test but a reliability and consistency indicator for items.

The reliability of the study's findings was ensured through a thorough review of the literature, which helped define the research problem, aims, and objectives. This review provided the researcher with valuable insights into the methodological and theoretical gaps in existing studies on the topic, guiding the development of the research methodology. Additionally, similar questions were posed in both the questionnaire and interviews across the different universities involved in the study. To further ensure consistency and accuracy in the findings, four technical universities in Ghana were selected for the study. All participants underwent the same selection process, which contributed to the accuracy of the data collected from them.

The Reliability test that was employed in this study was the Cronbach's alpha test. As elucidated by Ngah, Hairon, Hamzah, Noordin and Shafei (2022: 11), a reliability coefficient of 0.60 or above is usually considered as an indication of good internal consistency of an instrument. In the context of this study, a Cronbach's α coefficient of ≥ 0.7 is the criterion for indicating a reliable set of items. Consequently, all sections of the administered questionnaire are considered reliable. The table below shows the Cronbach's Alpha reliability of constructs.

TABLE 5.8: CRONBACH'S ALPHA RELIABILITY CONSTRUCT

Constructs	Number of items	Cronbach's Alpha Coefficient
Human Resource Practices	9	0.847
Level of HRIS adoption	8	0.913
Factors influencing HRIS adoption	14	0.745
Impact of HRIS on organisational effectiveness	9	0.821

The results obtained from the Cronbach's alpha revealed a high reliability of .847 on the nine items used to measure human resource practices of the selected universities. The eight items of the level of HRIS adoption yielded a high reliability score of .913. A high reliability of .745 was also recorded on the fourteen items of the factors influencing HRIS adoption. Additionally, the impact of HRIS adoption on organisational effectiveness resulted in an acceptable reliability of .821 on nine items.

5.15.3 Trustworthiness

The concept of trustworthiness in qualitative research comprises various essential elements that help to enhance the quality of research. These elements are identified in the literature as credibility, transferability, dependability and confirmability (Ahmed 2024: 1).

Credibility measures the degree to which the findings accurately reflect participants' actual experiences. To establish credibility, researchers engage extensively, maintain persistent observation, and employ triangulation methods (Dodgson, 2019: 221). Extended involvement requires dedicating substantial time to the field, actively interacting with participants, and closely examining their actions to gain comprehensive insights. Persistent observation includes continuous self-reflection throughout the study. Additionally, triangulation, integrating multiple data sources or approaches, validates findings and enhances their credibility (Adler, 2022: 599).

Transferability refers to how well research findings can be applied to different contexts or situations Kakar, Rasheed, Rashid and Akhter (2023:169). In qualitative research, researchers aim to provide detailed descriptions of the study's setting, participants, and methods to enhance the possibility of transferability. By offering clear explanations, researchers enable readers to evaluate whether the findings are relevant to similar contexts, thereby improving the study's transferability.

Dependability is concerned with the consistency and reliability of research results over time (Kakar, Rasheed, Rashid and Akhter, 2023:169). To ensure dependability, researchers carefully document their research processes, including methodologies, data collection techniques and analysis procedures. By maintaining detailed records of their decisions throughout the study, they allow for replication, which supports the reliability of the results (Kakar, Rasheed, Rashid and Akhter 2023: 157).

Confirmability refers to the objectivity and neutrality of the research findings, ensuring they are not influenced by the researchers' personal biases or preferences (Kakar *et al.*, 2023:169). Researchers use strategies like peer debriefing, member checking, and reflexive journaling to enhance confirmability (Amin *et al.*, 2023; Rose and Johnson, 2020). Peer debriefing involves getting feedback from colleagues or experts to verify interpretations and minimise bias. Member checking, where participants review and verify the accuracy of the findings, further supports confirmability. Reflexive journaling, where researchers document their thoughts, biases, and reflections, promotes transparency and reduces subjectivity.

In this study, trustworthiness was established through the following strategies:

- Credibility was ensured by verifying interviewee responses through repetition and cross-checking transcriptions with recordings.
- Transferability was achieved by purposefully selecting participants.
- Confirmability was addressed by triangulating interview data with quantitative data and literature review.
- Dependability was ensured by thoroughly documenting procedures for result generation and analysis.

5.16 PILOT STUDY

Immediately after the questionnaire was formulated, a pilot study was conducted using thirty (30) employees as a sample to assess the reliability and understandability of the items. Accordingly, Bujang, Omar and Foo (2023: 7) report that a minimum sample size of at least 30 respondents is sufficient to assess the reliability of a questionnaire for a pilot study. These thirty employees are senior members who were randomly selected from a different university. This number is substantial enough to offer valuable insights while still being small enough to manage resources efficiently. (Teare, Dimairo, Shephard, Hayman, Whitehead and Walters, 2014: 12). It was important to pay attention to the reliability of the instrument to enhance the reliability in terms of making sure that the questions were appropriate to the issues under investigation. The feedback from the pilot study revealed that the questions were phrased correctly, and the instructions were easy to follow. Some respondents however, commented that some of the questions were too lengthy and too technically worded. The questions were therefore re-phrased and shortened in line with the observations. The pilot study revealed that the twenty (20) minutes allocated for the completion of the questionnaire was very adequate. This pilot study was undertaken to strengthen the reliability and validity of the research instrument. After data collection, the next line of action was to process the data for better understanding.

5.17 DATA PROCESSING

Data Processing involves extracting valuable information by organising, indexing, and manipulating data. In this context, information refers to meaningful relationships and patterns that can aid in addressing relevant problems (Olaitan, 2024: 6). Kumar (2022:79) therefore identifies three stages in data processing, namely data editing and data coding and data classification.

5.17.1 Data editing

Editing is the process of cleaning the data to get rid of all incomplete responses, inconsistencies and errors in the data. Data editing ensures that the obtained data is

complete, accurate, follows the research objectives, is uniformly entered, and organised to code and tabulate (Alem, 2020: 3). The questionnaires in this study underwent the editing process twice and three uncompleted questionnaires were excluded from the study. These excluded questionnaires did not affect the study.

5.17.2 Data Coding

Creswell (2018: 308) concurs that coding is a quantitative process in which the researcher makes sense out of data, divides it into text or numbers, labels the segments and examines codes for data analysis. In simple terms, coding is a method used to organise data so that underlying messages portrayed by the data may become clear to the researcher (Mezmir, 2020: 18). Regarding this study, data was categorised and captured in SPSS version 29. A number or code was assigned to each question on the questionnaire. Numbers were assigned for respondents' response on a Likert scale. For instance, strongly disagree was equated to 1 and strongly agree was assigned number 5. Before entering the data onto the spreadsheet, each questionnaire was numbered for future reference and verification purposes. The data was then analysed once it was processed.

5.17.3 Data classification

Most research studies result in a large volume of raw data which must be reduced into homogeneous groups to get meaningful relationships (Kotronoulas *et al.*, 2023: 2). Thus, data classification is the process of arranging data in groups or classes based on common characteristics. Data with common characteristics are placed in one class, making it possible to divide the entire data set into several groups or classes (Alem, 2020: 4). For this study, the questionnaire was designed in such a way that the data collected were already classified under specific headings.

5.18 DATA ANALYSIS

Data analysis involves organising and interpreting textual or visual information to uncover both evident and hidden insights, aiming to derive significance from the content and its representations. It involves exploring participants' viewpoints, methods, comprehension, awareness, beliefs, emotional responses, and experiences to assess the formation of a phenomenon (Mezmir, 2020:15). This study used the convergent mixed-method approach that makes it possible for the quantitative and qualitative data to be analysed independently and then integrated (Creswell, 2018: 343). The researcher therefore used a side-by-side comparison approach to combine quantitative and qualitative data. This comparison approach requires that the researcher reports the quantitative results first, followed by the qualitative results, which either confirms or disconfirms the quantitative results. According to Wilson (2017), mixed methods help to analyse data in the same research so that the strengths of each help offset the limitations of the other.

5.18.1 Quantitative data analysis

For the quantitative data analysis, the data obtained from the survey questionnaire administration was first checked for completeness and consistency. The responses were then coded and inputted into a Statistical Package for Social Science (SPSS) for the analysis. The latest version of SPSS (29.0) was used for the analysis. Various descriptive analyses such as means, range, frequency distribution, percentages and coefficient were derived from the analysed data. Inferential statistics was also used to show the nature and magnitude of relationships established between variables to answer questions pertaining to the current HR practices, level of adoption, factors affecting HRIS adoption and the impact of HRIS adoption on organisational effectiveness. The combination of descriptive statistics, ANOVA, and other relevant statistical tests provided a robust framework for analyzing the research data. Descriptive statistics offered a clear summary of the data, ANOVA facilitated comparisons between groups, and other relevant statistical tests enriched the analysis by exploring relationships and associations within the data. This

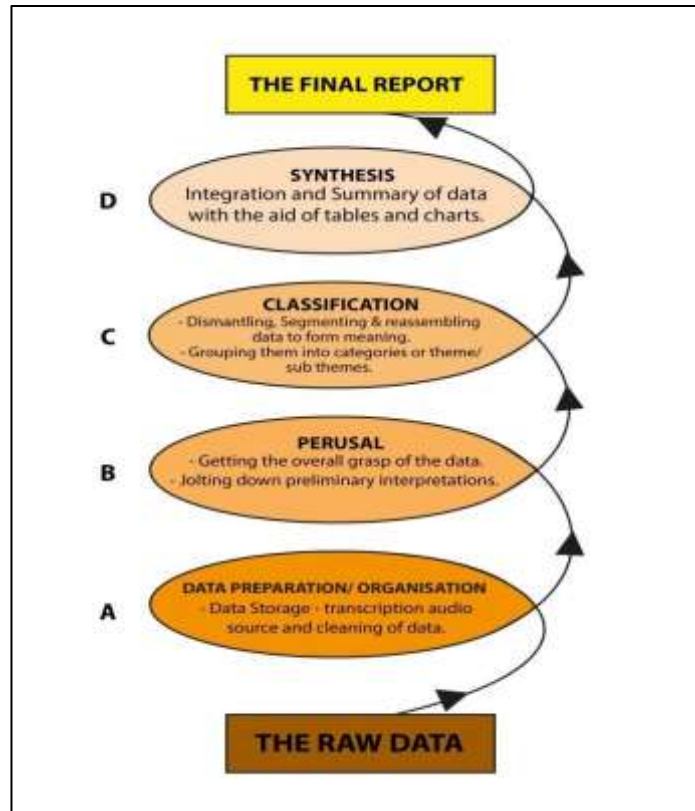
comprehensive approach ensured a thorough and accurate interpretation of the research findings, leading to valid and reliable conclusions.

5.18.2 Qualitative data analysis

Qualitative data obtained from the respondents were transcribed by the researcher using Microsoft Word. The transcribed interviews were then imported into QSR NVivo 12 to streamline the analysis process. NVivo assisted in organising the coded data into themes and subthemes based on the interview guide, promoting efficient data management and categorisation. Thematic coding is an excellent method to analyse qualitative data if a researcher is trying to obtain insight about participants' opinions, knowledge, and experiences about the research problem (Caulfield 2019). This study therefore used thematic analysis for the qualitative data of the study. Creswell and Poth's (2018: 255) Analysis Spiral Plan was employed to process the data collected through the semi-structured interviews. As shown in Figure 4.4, the spiral loop involves several stages. In Stage 'A', the data was compiled and broken down into smaller segments. Stage 'B', the perusal phase, enabled the researcher to identify key concepts and ideas within the data, as well as make initial interpretations. During Stage 'C', the classification phase, the data was further categorised into themes and sub-themes based on the interpretations derived from coding. In Stage 'D', the synthesis phase, the data was integrated, summarised, and connected with existing empirical literature during the discussion section of the study. The researcher also used direct quotations from the raw data to augment the findings. The underlisted themes were therefore developed and analysed for the qualitative data:

- Responsibility for HR Functions
- Technology and Human Resource Information Systems (HRIS),
- Integration of Technology in Specific HR Functions
- Challenges to Technology Adoption
- Impact of Technology on HR and University Operations

FIGURE 5.4: ANALYSIS SPIRAL PLAN



Source: Creswell and Poth (2018: 255)

5.19 ETHICAL CONSIDERATIONS

Prior to the commencement of the study with selected universities, Gatekeeper's permission to conduct research was obtained from these participating institutions' relevant offices. This followed the issuing of the ethical clearance by the institutional research ethics committee within which the study is registered (IREC). The researcher adhered to all the Durban University of Technology ethical consideration requirements and obtained ethical clearance approval. Participants of this study were informed that the researcher is guided and working under university ethical framework. Participants were provided with a letter containing information regarding the nature of the study, the research purpose, the use of research findings and the extent of participant involvement, including confidentiality. On receipt of confirmation from the Heads of HR units of the selected universities of their willingness to participate in the interview,

appointments were arranged and an interview schedule was electronically forwarded to familiarise the interviewees with the anticipated lines of inquiry. It was made clear to the participants that during the study, they might withdraw without penalty or any offense should they need to. It was also made clear to participants that all data obtained during the data collection phase would be confidentially kept and securely stored and would be accessible to the researcher only.

5.19.1 Confidentiality and Anonymity

Kang and Hwang (2023) highlight the crucial role that anonymity and confidentiality play in research, as they help generate high-quality and objective results. Protecting confidentiality involves safeguarding primary data and only sharing aggregated findings that cannot be traced back to specific individuals or organisations (Thompson, Stringfellow, Maclean and Nazzal, 2021: 16). Coffelt (2017) explains that anonymity entails ensuring participants' private information remains undisclosed, so their identities cannot be linked to the data collected. Upholding these ethical principles is essential for securing informed consent and protecting participants' personal information (Kang and Hwang, 2023).

The researcher gave participants the assurance that their identity would not be disclosed under any circumstances. The names TU1, TU2, TU3 and TU4 are pseudonyms used in place of the real names of the selected universities to ensure confidentiality and anonymity. These rigorous confidentiality practices not only complied with ethical standards but also fostered an environment where participants felt safe to provide honest and candid responses, ultimately enhancing the integrity and reliability of the research findings.

5.20 CHAPTER SUMMARY

This chapter discussed the research design and methodologies adopted for this study. It expounded on the theoretical orientation of the qualitative methods approach within a pragmatist paradigm. The chapter outlined how qualitative and quantitative methods

are used to achieve the purpose of the study. The chapter also discussed the research strategy employed, which included the study design, data collection processes, data collection instruments and methods used for data analysis. In addition, it explained how the survey questionnaire was used as the main data collection method. Interviews were used to obtain the views of HR heads on HRIS adoption, its influences and the impact on organisational effectiveness. The chapter explained how the data gathered through interviews were analysed using qualitative thematic analysis. Finally, strategies were explored through which the trustworthiness of the study could be established and the ethical issues considered.

CHAPTER SIX DATA ANALYSIS AND PRESENTATION OF RESULTS

6.1 INTRODUCTION

This chapter presents the analysis of the data, organised into five thematic areas aligned with the study's objectives. These thematic areas are crucial for understanding the role and implementation of human resource information systems (HRIS) within the selected Ghanaian technical universities. The first theme examines current HR processes and practices, providing a foundation for understanding the operational environment and context within these institutions. The second theme explores the level of adoption and use of HRIS in human resource functions, giving insight into how modern technology is being integrated into HR management and what gaps might exist. The third theme assesses the factors influencing the adoption of HRIS, identifying both the drivers and barriers that play a role in the implementation process. This understanding is essential for shaping effective strategies to encourage the adoption of HRIS across different universities.

The fourth theme investigates the extent to which HRIS impacts organisational effectiveness. It considers various dimensions like productivity, efficiency and employee satisfaction to evaluate the real-world benefits and challenges of HRIS. These thematic areas collectively aim to provide a comprehensive understanding of HRIS in Ghanaian technical universities and offer recommendations for future policy and practices. Data analysis was conducted using SPSS version 29.0, with results presented in tables supplemented by detailed descriptions. Descriptive statistics such as the measure of central tendency and the measure of dispersion were employed in this study. the one-way analysis of variance as well as factor analysis were also employed in this study.

The qualitative results of the study were also incorporated into the analysis. These qualitative findings were analysed according to the same five themes identified for the quantitative analysis. For each theme, the qualitative results were used to either confirm or contradict the corresponding quantitative findings for that specific theme.

6.2 RESPONSE RATE ANALYSIS

The study explored the human resource information system adoption for organisational effectiveness in Ghanaian Technical Universities. The Researcher successfully retrieved 302 of the 306 administered questionnaires, resulting in a response rate of approximately 99%, as highlighted in Table 6.1. In survey research, the response rate, also known as the completion or return rate, is calculated by dividing the number of completed questionnaires by the total distributed, usually expressed as a percentage. A response rate of at least 50% is considered adequate for analysis and reporting, while 60% is regarded as good and 70% or higher is considered excellent. Thus, the response rate in this study significantly surpasses these benchmarks, providing a strong foundation for credible analysis and ensuring that the findings accurately reflect the views of the respondents.

TABLE 6.1: RESPONSE RATE ANALYSIS

Total number of questionnaires distributed	Numbers of questionnaires returned/responded n (%)	Number of questionnaires non-responded n (%)
306	302(99%)	4 (1%)

Source: Field Survey, 2024

6.3 DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

The primary purpose of this section was to describe the participants in this study who completed the survey with respect to the following demographic variables: name of technical university, gender, age, length of service, staff category, rank and highest qualification. The descriptive information, which involves simple descriptive statistics, frequencies, measures of central tendency and measures of dispersion, is presented in the following table and subsequent charts. Table 6.2 presented the demographic characteristics of the 302 survey respondents from the four technical universities

TABLE 6.2: DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Variables	Frequency=302	Percent=100
Name of institution		
TU1	69	22.8
TU2	52	17.2
TU3	74	24.5
TU 4	107	35.4
Gender		
Male	177	58.6
Female	125	41.4

Age Category

20 years to 29 years	22	7.3
30 years to 39 years	59	19.5
40 years to 49 years	123	40.7
50 years and above	98	32.5

Length of Service

Less than 1 year	32	10.6
1-10 years	105	34.8
11-20 years	129	42.7
21-30 years	30	9.9
above 30 years	6	2.0

Staff category

Teaching Staff	178	58.9
Non-Teaching	125	41.1

Rank

Full Professor	3	1.0
Associate Professor	22	7.3
Senior Lecturer	72	23.8
Lecturer	62	20.5
Assistant Lecturer	33	10.9

Deputy Registrar	6	2.0
Senior Assistant Registrar	23	7.6
Assistant Registrar	46	15.2

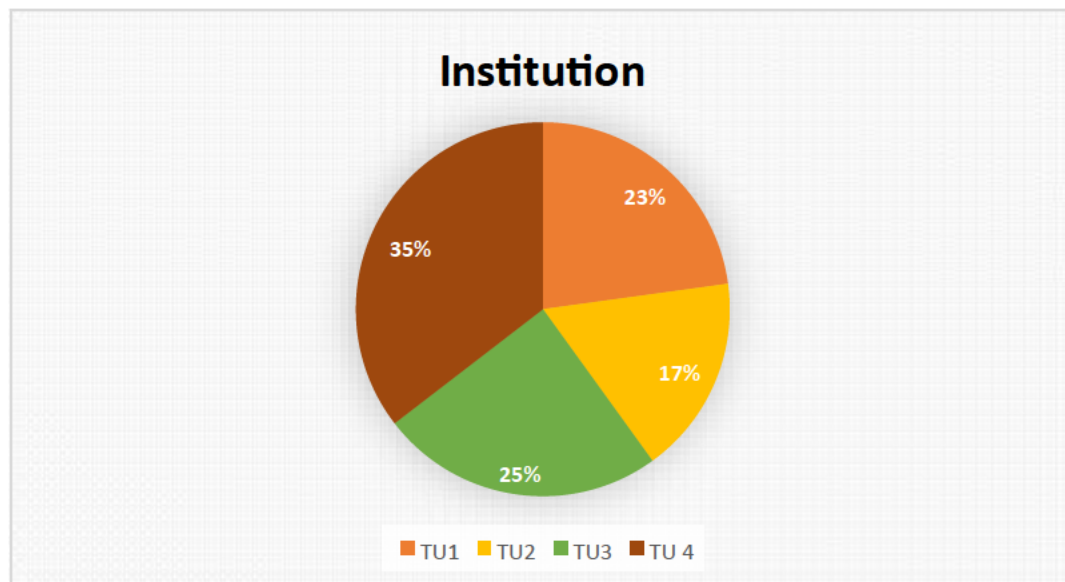
Junior Assistant Registrar	35	11.6	Highest Qualification
PhD		71	23.5
Master's Degree		213	70.6
First Degree		8	2.6
Diploma		10	3.3

Source: Field Survey, 2024

- **Selected Technical Universities**

The breakdown by institution showed that the largest proportion of participants was from TU4 (35.4%), followed by TU3 (24.5%), TU1 (22.8%) and TU2 (17.2%). This is depicted in the pie chart below.

Figure 6.1: Institution

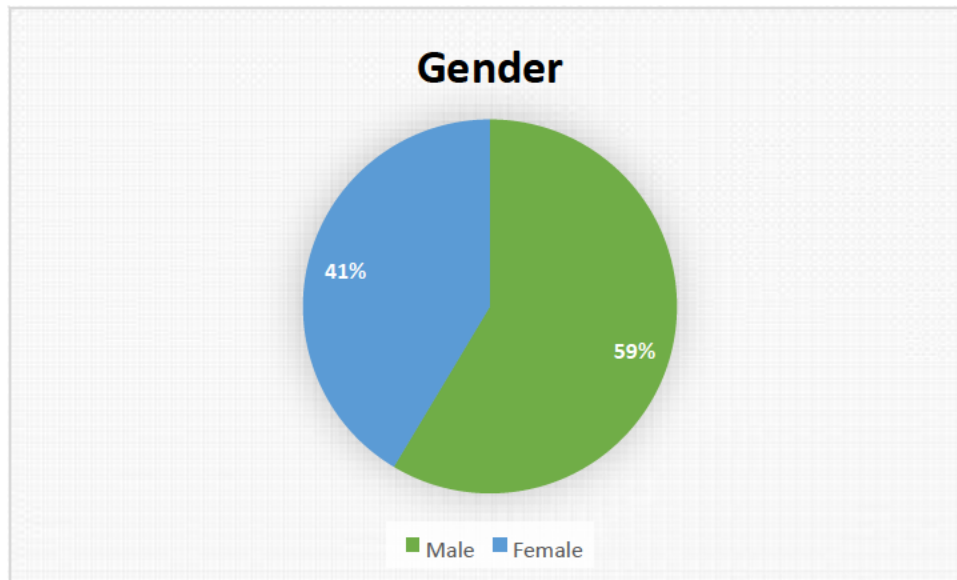


The sample size for each university was aligned with the total number of senior members in each of the selected technical universities. Obviously, TU4, which has the largest number of senior members, was bound to have most of the respondents.

- **Gender**

Regarding gender, males represented most respondents (58.6%), while females constituted 41.4%. This is depicted in the pie chart below.

Figure 6.2: Gender

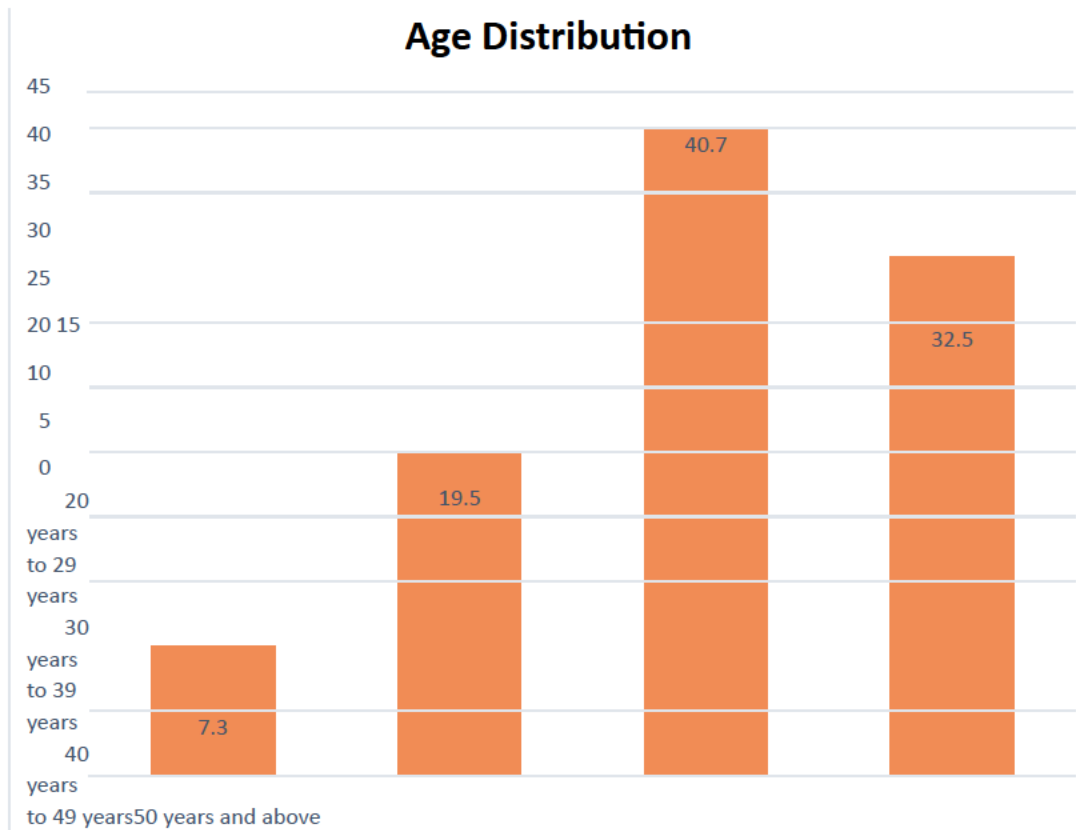


The result shows that there are more males than females amongst the respondents. This finding highlights a gender imbalance amongst the senior members of the selected universities, suggesting a need for the universities to explore initiatives aimed at encouraging greater female participation and representation.

- **Age distribution**

The largest age category was 40 to 49 years (40.7%), followed by those 50 years and above (32.5%), 30 to 39 years (19.5%), and 20 to 29 years (7.3%). This is depicted in the bar chart below.

Figure 6.3: Age distribution

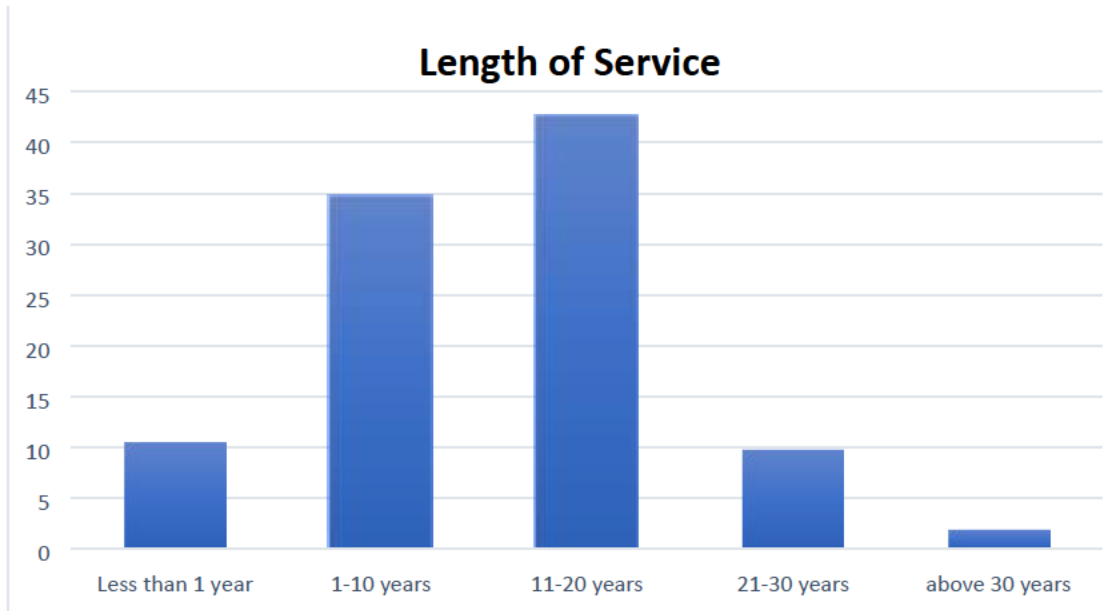


The bar chart indicates that most respondents fall within the age range of 40 to 49 years. This suggests that senior members in the selected universities are much matured. Consequently, the universities should consider implementing strategies to hire and recruit younger individuals to succeed the current ageing senior members.

- **Length of service**

In terms of length of service, most respondents had 11 to 20 years of experience (42.7%). Those with 1 to 10 years followed (34.8%), and a few had less than 1 year of service (10.6%), 21 to 30 years (9.9%), or over 30 years (2%).

Figure 6.4: Length of service

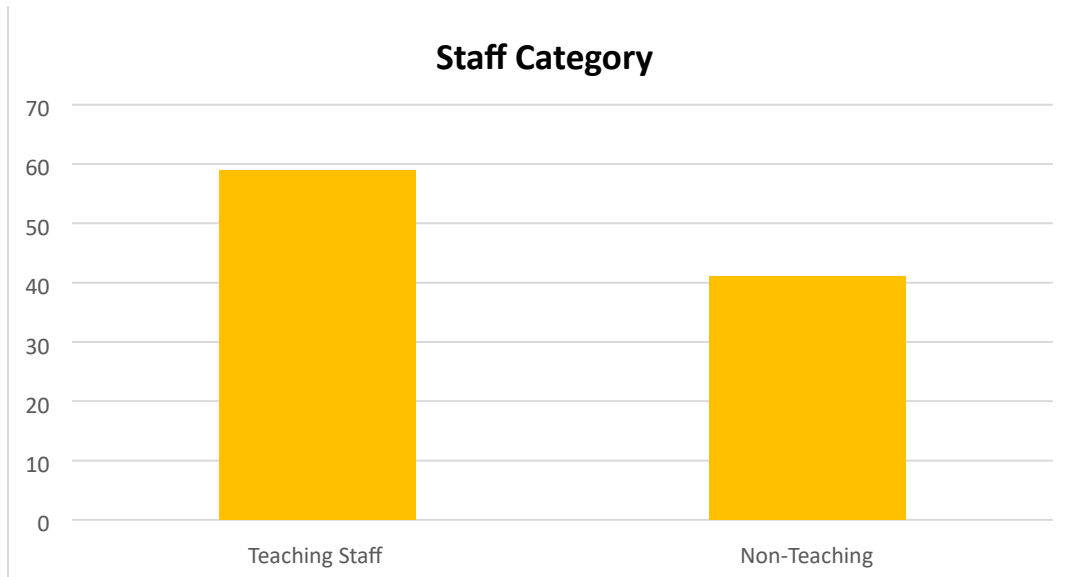


The distribution of respondents' lengths of service reveals a workforce with substantial experience, as the majority (42.7%) have served between 11 to 20 years. This suggests a stable and seasoned employee base, likely to adopt innovation and new technologies. A significant portion (34.8%) has between 1 to 10 years of experience, and fewer respondents have less than 1 year of service (10.6%), indicating recent hires and the potential for new perspectives. Those with 21 to 30 years (9.9%) and over 30 years (2%) highlight the presence of long-term, highly experienced staff, albeit in smaller numbers.

- **Staff category**

The staff category was primarily teaching staff (58.9%), while non-teaching staff made up the remaining 41.1%. This is shown in the chart below.

Figure 6.5: Staff category



The composition of the staff indicating most teaching staff suggests a strong focus on teaching roles within the universities. The presence of non-teaching staff highlights the essential support functions required to maintain and enhance the educational environment. This balance reflects the institutions' emphasis on both teaching and non-teaching capacities.

In terms of rank, senior lecturers formed the largest group (23.8%), followed by lecturers (20.5%), junior assistant registrars (11.6%) and assistant lecturers (10.9%). The ranks of full professors and deputy registrars were the least represented, each accounting for only 1% and 2% of respondents, respectively. Lastly, regarding educational qualifications, the majority held a Master's degree (70.6%), followed by PhDs (23.5%), Diplomas (3.3%) and first degrees (2.6%).

In summary, the respondents can be described as an ageing population, well educated, holding various positions and having significant working experience. These diverse features are likely to provide useful insights into perceptions and acceptance of HRIS.

6.4 CURRENT HR PROCESSES AND PRACTICES IN THE SELECTED GHANAIAN TECHNICAL UNIVERSITIES

This section focused on the current human resource processes and practices at the selected Ghanaian technical universities. Understanding these practices is crucial as they form the foundation of the human resource framework, directly influencing the efficiency, satisfaction, and productivity of the workforce. This section examines how technical universities handle recruitment, training, performance management and other HR functions. Analysing these existing processes, the study aims to identify the gaps, strengths, and opportunities that may affect the adoption of Human Resource Information Systems (HRIS) for organisational effectiveness. An analysis of the human resource (HR) processes and practices across four Ghanaian technical universities: TU1, TU2, TU3 and TU4 was carried out. The data collected provided a detailed comparison, highlighting the variations and similarities in HR practices among these universities. In view of this, Tables 6.3, 6.4, 5.5 and 6.6 outline the findings from the study, which included the percentages, mean scores and standard deviations (SD) for various HR practices and processes at each institution.

TABLE 6.3: CURRENT HR PROCESSES AND PRACTICES IN TU1

Statement	No.	Likert Scale					Mean	StD
		SD	D	Neutral	A	SA		
The HR Department/Unit is responsible for all HRM practices in my university.	69	1.4%	8.7%	10.1%	53.6%	26.1%	3.94	0.92
Performance Appraisal is an HRM practice in my university.	69	2.9%	4.3%	8.7%	59.4%	24.6%	3.99	0.88
Training and Development is an HRM practice in my university.	69	2.9%	8.7%	15.9%	53.6%	18.8%	3.77	0.96

Recruitment and Selection is an HRM practice in my university.	69	1.4%	5.8%	13.0%	56.5%	23.2%	3.94	0.86
Compensation Management is an HRM practice in my university.	69	5.8%	15.9%	24.6%	44.9%	8.7%	3.35	1.04
Employee Record Keeping is an HRM practice in my university.	69	1.4%	1.4%	10.0%	60.9%	21.1%	4.09	0.74
I consider my HR Department to be effective in carrying out its practices.	69	1.4%	13.0%	17.4%	55.1%	13.0%	3.65	0.92
There is consistency between what the HR Department advocates and what it actually implements.	69	2.9%	11.6%	24.6%	53.6%	7.2%	3.51	0.90
I am happy about the services offered by the HR Unit in my institution.	69	2.9%	20.3%	23.2%	46.4%	7.2%	3.61	0.83

As depicted in Table 6.3, it was observed that a majority of respondents (79.1%) agreed with the statement that the 'HR department is responsible for all HRM practices in the university'. There was high agreement that performance appraisal (84.5%), training and development (72.4%), and recruitment and selection (79.7%) were all HRM practices being carried out in the university. Similarly, compensation management (53.6%) and employee record-keeping (82%) were also accepted as HRM practices at the university. With respect to the statement 'I consider my HR department to be effective in carrying out its practices', 68.1% of the respondents agreed. Equally, 60.8% agreed that there is consistency between what the HR department advocates and what is actually implemented. Finally, 53.6% of the

respondents indicated that they are happy with the services being offered by the HR department.

The survey results from TU1, reflecting perceptions of HR practices, showed a generally positive view, with areas for improvement. The HR department was seen as largely responsible for HRM practices, with a mean score of 3.94 and a standard deviation of 0.92, indicating a strong consensus amongst respondents. Performance appraisal practices were well-regarded, receiving the highest approval with a mean of 3.99. Training and development, while positive, had a slightly lower perception (mean = 3.77), suggesting some variability in how these opportunities were administered or perceived. Recruitment and selection processes were also rated positively (mean = 3.94), demonstrating effectiveness in these areas.

However, compensation management showed less satisfaction (mean = 3.35) and the highest variability (standard deviation of 1.04), highlighting it as an area needing attention. Conversely, employee record-keeping was viewed most favourably (mean = 4.09), with the lowest variability (standard deviation = 0.74), indicating consistent satisfaction with this practice. Regarding the effectiveness of the HR department, the mean score of 3.65, along with a standard deviation of 0.92, suggested a moderate level of approval but also indicated room for improvement. This sentiment was echoed in the views on consistency between HR policies and their implementation, which scored a mean of 3.51. Satisfaction with HR services scored similarly (mean = 3.61), underscoring a general contentment with HR services.

TABLE 6.4: CURRENT HR PROCESSES AND PRACTICES IN TU2

Statement	No.	Likert Scale					Mean	StD
		SD	D	Neutral	A	SA		
The HR Department/Unit is responsible for all HRM practices in my university.	52	5.8%	0.0%	9.6%	53.8%	30.8%	4.04	0.97

Performance Appraisal is an HRM practice in my university.	52	5.8%	1.9%	9.6%	57.7%	25.0%	3.94	0.98
Training and Development is an HRM practice in my university.	52	0.0%	5.8%	7.7%	71.2%	15.4%	3.96	0.68
Recruitment and Selection is an HRM practice in my university.	52	1.9%	1.9%	17.3%	50.0%	28.8%	4.02	0.85
Compensation Management is an HRM practice in my university.	52	0.0%	13.5%	34.6%	48.1%	3.8%	3.42	0.78
Employee Record Keeping is an HRM practice in my university.	52	0.0%	3.8%	7.7%	57.7%	30.8%	4.15	0.72
I consider my HR Department to be effective in carrying out its practices.	52	0.0%	7.7%	21.2%	48.1%	23.1%	3.87	0.86
There is consistency between what the HR Department advocates and what it actually implements.	52	3.8%	7.7%	28.8%	48.1%	11.5%	3.56	0.94
I am happy about the services offered by the HR Unit in my institution.	52	5.8%	3.8%	28.8%	50.0%	11.5%	3.42	0.87

Results in Table 6.4 show that the majority of respondents (84.6%) agreed with the statement that the 'HR department is responsible for all HRM practices in the university'. There was also high agreement that performance appraisal (82.7%), training and development (86.6%), and recruitment and selection (78.8%) were all HRM practices being carried out in the university. Likewise, compensation

management (51.9%) and employee record-keeping (88.5%) were also accepted as HRM practices at the university. With respect to the statement 'I consider my HR department to be effective in carrying out its practices', 71.2% of respondents agreed. Equally, 59.6% agreed that there is consistency between what the HR department advocated and what is actually implemented. Finally, 61.5% indicated that they are happy about the services being offered by the HR department.

The survey results from TU2 showed a generally positive perception of the HR processes, with some areas identified for improvement. The responsibility of the HR Department for all HRM practices was well acknowledged, as evidenced by a high mean score of 4.04 with a standard deviation of 0.97, suggesting strong agreement amongst respondents but with some variability. Scores for performance appraisal (3.94 mean, 0.98 SD), training and development (3.96 mean, 0.68 SD), and recruitment and selection (4.02 mean, 0.85 SD) were also favourable, indicating effective practices in these areas. The relatively lower standard deviation for training and development suggested a more consistent perception amongst respondents compared to other areas.

However, compensation management was perceived less positively, scoring a mean of 3.42 with a standard deviation of 0.78. This indicated some level of dissatisfaction and potential for improvement in how compensation was managed within the university. Employee record-keeping was viewed particularly well, with a mean score of 4.15 and a standard deviation of 0.72, reflecting strong satisfaction and less variability in opinions. This suggested that the processes involved in maintaining employee records were efficient and satisfactory to the staff.

Perceptions of the effectiveness of the HR department were also relatively positive (3.87 mean, 0.86 SD), although there was room for improvement. The consistency between what the HR department advocated and what was implemented scored lower (3.56 mean, 0.94 SD), indicating noticeable gaps between policies and their

practical application. Satisfaction with HR services was moderate, with a mean score of 3.42 and a standard deviation of 0.87, again pointing to areas where HR services could be enhanced to increase overall employee satisfaction.

TABLE 6.5: CURRENT HR PROCESSES AND PRACTICES IN TU3

Statement	No.	Likert Scale					Mean	StD
		SD	D	Neutral	A	SA		
The HR Department/Unit is responsible for all HRM practices in my university.	74	10.8 %	12.2 %	9.5%	43.2 %	23.0 %	4.26	0.11
Performance Appraisal is an HRM practice in my university.	74	2.7%	12.2 %	13.5%	51.4 %	20.3 %	3.74	1.01
Training and Development is an HRM practice in my university.	74	2.7%	9.5%	14.9%	51.4 %	21.6 %	3.80	0.98
Recruitment and Selection is an HRM practice in my university.	74	6.8%	6.8%	12.2%	52.7 %	21.6 %	3.76	1.08
Compensation Management is an HRM practice in my university.	74	2.7%	14.9 %	20.3%	51.4 %	10.8 %	3.53	0.97
Employee Record Keeping is an HRM practice in my university.	74	2.7%	6.8	12.2%	52.7 %	24.3 %	4.58	0.90
I consider my HR Department to be effective in carrying out its practices.	74	4.1%	16.2	24.3%	37.8 %	17.6 %	3.49	1.09

There is consistency between what the HR Department advocates and what it actually implements.	74	5.4%	14.9	27.0%	41.9 %	10.8 %	3.38	1.04
I am happy about the services offered by the HR Unit in my institution.	74	1.4%	13.5	31.1%	51.4	2.7%	3.41	0.81

As highlighted in Table 6.5, 66.2% of the respondents agreed with the statement that the 'HR department is responsible for all HRM practices in the university'. It was also agreed that all the listed HRM functions were HRM practices in the university [performance appraisal (71.7%), training and development (70%), recruitment and selection (74.3%), compensation management (62.2%) and employee recordkeeping (77%)]. With respect to the statement 'I consider my HR department to be effective in carrying out its practices', 55.4% of the respondents agreed. Equally, 52.7% agreed that there is consistency between what the HR department advocates and what is actually implemented. Additionally, 54.1% of the respondents indicated that they were happy with the services being offered by the HR department.

The results from TU3 indicated that the HR Department was strongly perceived to be responsible for all HRM practices, with a high mean score of 4.26 and a very low standard deviation of 0.11, suggesting uniformity in responses and clear agreement amongst employees on this matter. Performance appraisal, training and development, and recruitment and selection practices scored similarly, with means of 3.74, 3.8, and 3.76, respectively. The relatively higher standard deviations (around 1.0) for these practices implied some variability in perceptions, possibly due to differences in personal experience or expectations. Compensation management was perceived less favourably, with a mean of 3.53 and a standard deviation of 0.97, indicating a consensus of needing improvement in this area. Conversely, employee record-keeping was rated highly at 4.58, with a standard deviation of 0.9, reflecting strong satisfaction with this aspect of HR management.

The effectiveness of the HR department was considered moderate, with a mean of 3.49 and a higher standard deviation of 1.09, suggesting differing opinions on how well the HR department carried out its functions. Consistency between HR policies and their implementation scored a mean of 3.38 with a standard deviation of 1.04, indicating some dissatisfaction and room for improvement in ensuring that policies were consistently applied. Lastly, satisfaction with the HR services provided had a mean of 3.41 and a standard deviation of 0.81, again showing moderate satisfaction but highlighting potential areas for enhancement to increase employee satisfaction.

TABLE 6.6: CURRENT HR PROCESSES AND PRACTICES IN TU4

Statement	No.	Likert Scale					Mean	StD
		SD	D	Neutral	A	SA		
The HR Department/Unit is responsible for all HRM practices in my university.	107	5.6%	4.7%	6.5%	57.9 %	25.2%	3.93	1.01
Performance Appraisal is an HRM practice in my university.	107	6.5%	5.6%	3.7%	57.0 %	27.1%	3.93	1.06
Training and Development is an HRM practice in my university.	107	1.9%	7.5%	13.1%	57.9 %	19.6%	3.86	0.88
Recruitment and Selection is an HRM practice in my university.	107	1.9%	3.7%	15.9%	57.9 %	20.6%	3.92	0.83
Compensation Management is an HRM practice in my university.	107	1.9%	8.4%	26.2%	46.7 %	16.8%	3.68	0.92
Employee Record Keeping is an HRM practice in my university.	107	1.9%	5.6%	12.1%	51.4 %	29.0%	4.00	0.90

I consider my HR Department to be effective in carrying out its practices.	107	0.9%	11.2 %	18.7%	55.1 %	13.1%	4.16	0.94
There is consistency between what the HR Department advocates and what it actually implements.	107	1.9%	14.0 %	31.8%	43.9 %	8.4%	3.43	0.90
I am happy about the services offered by the HR Unit in my institution.	107	2.8%	14.0 %	22.4%	58.9 %	1.9%	3.52	0.76

The majority of respondents (83.1%) agreed with the statement that the 'HR department is responsible for all HRM practices in the university'. Regarding the HRM functions of the university, there was agreement that performance appraisal (84.1%), training and development (77.5%), and recruitment and selection (78.5%) were all HRM practices being carried out in the university. Similarly, compensation management (63.5%) and employee record-keeping (80.4%) were also accepted as HRM practices at the university. With respect to the statement, 'I consider my HR department to be effective in carrying out its practices', 68.2% of the respondents agreed while 49.3% agreed that there is consistency between what the HR department advocated and what is actually implemented. Lastly, 60.8% indicated that they are happy with the services being offered by the HR department.

The overall responsibility of the HR department was affirmed with a mean score of 3.93 and a standard deviation of 1.01, indicating a fairly consistent recognition of the HR department's role in HRM practices. Performance appraisal and recruitment and selection were viewed similarly positively, with mean scores of 3.93 and 3.92, respectively, and standard deviations suggesting a reasonable consensus amongst the respondents. Training and development also received a favourable rating with a mean of 3.86, although the slightly lower standard deviation of 0.88 implied a more uniform opinion amongst employees. Compensation management scored slightly

lower at 3.68, with a standard deviation of 0.92, indicating a degree of dissatisfaction or variability in how compensation practices were perceived across the university.

Employee record-keeping was rated highly at a mean of 4.00, coupled with a standard deviation of 0.90, suggesting that this practice was well-established and satisfactory for most employees. Significantly, the perceived effectiveness of the HR department in implementing its practices was rated quite highly at 4.16, albeit with a standard deviation of 0.94, which still showed a good level of agreement amongst respondents. This suggested that the HR department was generally considered effective in its role. However, the consistency in what the HR department advocated versus what it implemented was seen as less satisfactory, with a mean score of 3.43 and a standard deviation of 0.90. This indicated that there might be some gaps between policy and practice. Lastly, satisfaction with the HR services provided received a mean score of 3.52 and a standard deviation of 0.76, reflecting moderate contentment with the services but also highlighting possible areas for service enhancement.

In summary, the quantitative side of the study proved that HR practices across the four Ghanaian technical universities, TU1, TU2, TU3 and TU4, showed generally positive perceptions with notable areas for improvement. All universities demonstrated a strong acknowledgment of the HR department's responsibility for HRM practices, with consistently high mean scores. Employee record-keeping was another area of strength across the board, receiving high satisfaction ratings. However, compensation management consistently emerged as a weaker area, with all universities indicating a need for improvement. Training and development, performance appraisal, and recruitment and selection were viewed positively, but with varying degrees of satisfaction and consistency in implementation. Notably, the effectiveness of HR departments and satisfaction with HR services showed moderate scores with room for enhancement, particularly in ensuring that policies were consistently applied. Overall, while there were areas of strong performance, each

university showed specific aspects of HR practices that could benefit from focused improvements to boost overall employee satisfaction and policy consistency.

TABLE 6.7: ANOVA-TEST FOR HR PROCESSES AND PRACTICES

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	0.0290	3	0.009676	0.1077	0.955	2.9011
Within Groups	2.8742	32	0.08982			
Total	2.9032	35				

Source: Field Survey, 2024

The ANOVA test in Table 6.7 conducted for HR processes and practices in the four technical universities in Ghana aimed to identify significant differences between them. The results reveal that the variation between the groups, represented by the sum of squares (SS) of 0.0290 across 3 degrees of freedom, led to a mean square (MS) of 0.009676. In comparison, the variation within each university, with a sum of squares of 2.8742 across 32 degrees of freedom, resulted in a mean square of 0.08982. The total variation, calculated by combining both between and within groups, amounts to 2.9032. The computed F-statistic of 0.1077 is significantly lower than the critical value of 2.9011 at a 0.05 significance level. Furthermore, the P-value of 0.955 is much higher than 0.05, confirming that there is no statistically significant difference in HR processes and practices across the four universities. This result suggests that the HR processes and practices in these institutions are largely consistent and similar.

6.5 Level of adoption and use of HRIS in Human Resource functions in the four Ghanaian Technical Universities

This section delves into the level of adoption and utilisation of Human Resource Information Systems (HRIS) within human resource functions at the selected Ghanaian technical universities. Understanding the adoption and usage patterns of

HRIS is crucial as it reveals the extent to which these universities have embraced digital tools for managing HR functions. This section aims to identify the current implementation level, highlight gaps, and assess the degree to which these universities leverage HRIS to optimise HR operations. It offers insights into how digital transformation is re-shaping HR practices in higher education institutions and sheds light on areas that require further enhancement for improved efficiency and effectiveness. Tables 6.8, 6.9 and 6.10 and 6.11 provide a comprehensive analysis of the adoption and utilisation of Human Resource Information Systems (HRIS) across four Ghanaian technical universities. These tables break down the data into means and standard deviations (SD) for each institution, offering insights into how extensively HRIS tools were integrated into their human resource functions. The data reflected the varying degrees of HRIS integration within these universities, highlighting differences in usage levels that may have influenced the efficiency and effectiveness of HR operations.

TABLE 6.8: LEVEL OF ADOPTION AND USE OF HRIS IN HUMAN RESOURCE FUNCTIONS IN TU1

Statement	No	Likert Scale					Mean	StD
		SD	D	Neutr al	A	SA		
My institution has integrated information technology into their HRM practices.	69	2.9%	26.1 %	14.5 %	50.7%	5.8%	3.30	1.02
My university uses information technology in their recruitment and selection practices	69	0.0%	23.2 %	29.0 %	44.9%	29.0 %	3.28	0.86
My university uses information technology in their performance management practices	69	1.4%	26.1 %	17.4 %	52.2%	2.9%	3.29	0.94

My university uses information technology in their training and development practices	69	1.4%	17.4%	23.2%	52.2%	5.8%	3.43	0.90
My university uses information technology in their compensation management practices	69	0.0%	30.4%	24.6%	40.6%	4.3%	3.19	0.93
My university uses information technology in their employee record keeping practices	69	2.9%	20.3%	11.6%	59.4%	5.8%	3.51	0.98
The HR unit of my university uses information technology for their day-to-day administrative activities	69	2.9%	24.6%	7.2%	56.5%	8.7%	3.50	1.05
Information generated from HR Information system helps in strategic decisions making	69	1.4%	7.2%	20.3%	58.0%	13.0%	3.74	0.83

Table 6.8 indicates that 56.5% agreed with the statement 'My institution has integrated information technology into their HRM practices. Regarding the use of HRIS in the listed HRM functions, there was agreement that performance management (55.1%), training and development (58%), and recruitment and selection (73.9%) practices have been integrated with HRIS. Similarly, compensation management (44.9%), employee record-keeping (65.2%) and administrative activities (65.2%) were all seen as incorporating HRIS at the university. With respect to the statement 'Information generated from HR Information system helps in strategic decisions-making', 71% of the respondents were in agreement.

The results from TU1 provided an overview of how various HR functions had integrated Human Resource Information Systems (HRIS). The highest mean score (3.74) was observed in the use of HRIS for aiding strategic decision-making, suggesting that HRIS was most valued in areas that supported strategic objectives and decisions at the university. This was followed by high scores in employee recordkeeping and training and development practices, with means of 3.51 and 3.50 respectively, showing that these areas also significantly benefited from the adoption of HRIS. Conversely, the use of HRIS in compensation management practices had the lowest mean score (3.19), indicating a lower level of adoption or satisfaction with HRIS in this function compared to others. Similarly, recruitment and selection and performance management practices had lower mean scores of 3.28 and 3.29, respectively, suggesting that these areas might not have been leveraging HRIS to its full potential. The standard deviations, which ranged from 0.83 to 1.05, pointed to moderate variability in responses. This variability might have indicated differing experiences or perceptions of HRIS effectiveness amongst the faculty and staff at the university, particularly in day-to-day administrative activities where the standard deviation was the highest at 1.05.

TABLE 6.9: LEVEL OF ADOPTION AND USE OF HRIS IN HUMAN RESOURCE FUNCTIONS IN TU2

Statement	No	Likert Scale					Mean	StD
		SD	D	Neutral	A	SA		
My institution has integrated information technology into their HRM practices.	52	5.8%	19.2%	25.0%	48.1%	1.9%	3.21	0.98
My university uses information technology in their recruitment and selection practices	52	7.7%	13.5%	34.6%	40.4%	3.8%	3.19	0.99

My university uses information technology in their performance management practices	52	3.8%	19.2%	28.8%	42.3%	5.8%	3.27	0.97
My university uses information technology in their training and development practices	52	5.8%	15.4%	28.8%	44.2%	5.8%	3.29	1.00
My university uses information technology in their compensation management practices	52	5.5%	19.2%	36.5%	28.8%	9.6%	3.17	1.04
My university uses information technology in	52	3.8%	21.2%	26.9%	42.3%	5.8%	3.25	0.99
their employee record keeping practices								
The HR unit of my university uses information technology for their day-to-day administrative activities	52	3.8%	13.5%	19.2%	59.2%	3.8%	3.46	0.92
Information generated from HR Information system helps in strategic decisions making	52	3.8%	9.6%	28.8%	42.3%	15.4%	3.56	1.00

Table 6.9 shows that 50% of respondents agreed with the statement, "My institution has integrated information technology into their HRM practices". Regarding the use of HRIS in specific HRM functions, there was agreement that performance management (48.1%), training and development (50%), and recruitment and selection (44.2%) practices have been integrated with HRIS. Similarly, respondents noted that HRIS has been incorporated into compensation management (34.4%),

employee record-keeping (48.1%) and administrative activities (63%) at the university. Additionally, 57.7% of respondents agreed with the statement, "Information generated from the HR Information system helps in strategic decision making".

The results from TU2 revealed the level of adoption and use of Human Resource Information Systems (HRIS) across various HR functions. The mean scores, which fluctuated between 3.17 and 3.56, suggested a moderate to high level of HRIS integration into HR practices. The highest mean score of 3.56, associated with the impact of information generated by HRIS on strategic decision-making, indicated a strong appreciation for HRIS in supporting strategic aspects of the university's operations. This was followed by the HR unit's use of technology in daily administrative activities, which scored 3.46, suggesting the effective utilisation of HRIS in routine administrative tasks.

Conversely, the lowest scores were observed in compensation management practices and recruitment and selection practices, with mean scores of 3.17 and 3.19, respectively. These scores highlighted areas where HRIS integration was perceived as less effective, potentially indicating gaps in system capabilities or implementation in these specific functions. The standard deviations, ranging from 0.92 to 1.04, indicated moderate variability in the responses. This variability could have reflected different levels of user satisfaction or diverse experiences with HRIS across the university. The highest variability was observed in compensation management practices, suggesting that experiences in this area were particularly mixed, possibly due to different expectations or the complex nature of integrating HRIS effectively into compensation strategies. Overall, the results suggested that while HRIS was highly valued for strategic decision-making and administrative activities at TU2, its adoption was not uniformly effective across all HR functions, with recruitment and compensation management needing further attention to enhance their integration and effectiveness.

TABLE 6.10: LEVEL OF ADOPTION AND USE OF HRIS IN HUMAN RESOURCE FUNCTIONS IN TU3

Statement	No.	Likert Scale					Mean	StD
		SD	D	Neutral	A	SA		
My institution has integrated information technology into their HRM practices.	74	9.5%	27.0%	24.3%	31.1%	8.1%	3.01	1.14
My university uses information technology in their recruitment and selection practices	74	10.8%	24.3%	24.3%	35.1%	5.4%	3.00	1.12
My university uses information technology in their performance management practices	74	6.8%	31.1%	17.6%	40.5%	4.1%	3.04	1.08
My university uses information technology in their training and development practices	74	5.4%	16.2%	20.3%	48.6%	9.5%	3.41	1.05
My university uses information technology in their compensation management practices	74	4.1%	21.6%	32.4%	33.4%	9.5%	3.22	1.02
My university uses information technology in their employee record keeping practices	74	6.8%	20.3%	16.2%	47.3%	9.5%	3.32	1.11
The HR unit of my university uses information technology for their day-to-day administrative activities	74	6.8%	16.2%	14.9%	52.7%	9.5%	3.42	1.09

Information generated from HR Information system helps in strategic decisions making	74	5.4%	13.5%	36.5%	37.8%	6.8%	3.27	0.97

According to Table 6.10, 39.2% of respondents agreed that their institution had integrated information technology into its HRM practices. Regarding the use of HRIS in specific HRM functions, there was consensus that HRIS had been incorporated into performance management (44.6%), training and development (58.1%), recruitment and selection (40.5%) and compensation management (42.9%). Similarly, 56.8% agreed that HRIS was used in employee record-keeping while 62.2% indicated its use in administrative activities. Additionally, 44.6% of respondents agreed that information generated from the HR Information System aids in strategic decision-making.

The results from TU3 reflected the level of adoption and use of Human Resource Information Systems (HRIS) across various HR functions. The mean scores generally ranged from just above 3.00 to 3.42, indicating a moderate level of integration of HRIS into HR practices at the university. The highest adoption of HRIS was seen in the HR unit's day-to-day administrative activities, with a mean score of 3.42, suggesting that HRIS was most effectively utilised in managing everyday administrative tasks. This was closely followed by the training and development practices, which had a mean score of 3.41, indicating the strong utilisation of HRIS in enhancing training and development processes. On the lower end, the integration of information technology into recruitment and selection practices and performance management practices had the lowest mean scores of 3.00 and 3.04 respectively. These scores suggested a lesser degree of satisfaction or effectiveness in the use of HRIS in these areas, possibly pointing to challenges or limitations in the system's capabilities or its implementation in these specific functions.

The standard deviations, ranging from 0.97 to 1.14, indicated a relatively high level of variability in responses. This variability could have reflected differing perceptions of

HRIS effectiveness across different user groups within the university. Notably, the standard deviation was highest for the integration of IT into general HRM practices, which may have indicated a diverse range of experiences or expectations amongst staff regarding how HRIS supports broader HRM functions. HRIS was seen as a beneficial tool in certain administrative and developmental capacities at TU3, but the results suggested that its impact was not uniformly felt across all HR functions, with areas like recruitment and performance management not leveraging the potential benefits of HRIS as effectively as others.

TABLE 6.11: LEVEL OF ADOPTION AND USE OF HRIS IN HUMAN RESOURCE FUNCTIONS IN TU4

Likert Scale								
Statement	No	SD	D	Neutral	A	SA	Mean	StD
My institution has integrated information technology into their HRM practices.	107	10.3%	20.6%	20.6%	43.9%	4.7%	3.12	1.11
My university uses information technology in their recruitment and selection practices	107	7.5%	21.6%	26.2%	39.2%	5.6%	3.14	1.06
My university uses information technology in their performance management practices	107	5.6%	20.6%	21.5%	43.9%	8.4%	3.18	1.00
My university uses information technology in their training and development practices	107	5.6%	20.6%	21.5%	43.9%	8.4%	3.29	1.06

My university uses information technology in their compensation management practices	107	7.5%	18.7%	30.8%	37.4%	5.6%	3.15	1.04
My university uses information technology in their employee record keeping practices	107	4.7%	23.4%	18.7%	48.6%	4.7%	3.25	1.02
The HR unit of my university uses information technology for their day-to-day administrative activities	107	0.9%	15.9%	23.4%	50.5%	9.3%	3.51	0.90
Information generated from HR Information system helps in strategic decisions making	107	0.9%	15.0%	27.1%	47.7%	9.3%	3.50	0.89

Table 6.11 indicates that 48.6% agreed with the statement 'My institution has integrated information technology into their HRM practices'. Regarding the use of HRIS in the listed HRM functions, there was agreement that performance management (52.3%), training and development (52.3%), and recruitment and selection (44.8%) practices have been integrated with HRIS. Similarly, compensation management (43%), employee record-keeping (53.3%) and administrative activities (59.8%) were all seen as incorporating HRIS at the university. With respect to the statement 'Information generated from HR Information system helps in strategic decisions making', 57% of the respondents agreed.

The data from TU4 illustrated the adoption and utilisation levels of Human Resource Information Systems (HRIS) across different HR functions. The mean scores ranged from 3.12 to 3.51, reflecting a moderate overall integration of HRIS into HR practices. The highest scores were observed for the use of HRIS in the HR unit's day-to-day

administrative activities and in supporting strategic decision-making, both scoring 3.51. This suggested that HRIS was particularly effective in enhancing administrative efficiency and contributing valuable insights for strategic decisions at the university.

On the lower end, the integration of HRIS into the institution's HRM practices scored the lowest mean of 3.12, indicating a somewhat lower level of technological integration in general HRM functions. Similarly, scores for recruitment and selection practices and compensation management practices were also on the lower side, at 3.14 and 3.15 respectively, highlighting areas where HRIS integration may not have been fully optimised or perceived as particularly beneficial. The standard deviations, ranging from 0.89 to 1.11, suggested moderate to significant variability in perceptions of HRIS effectiveness across these functions. The highest variability was seen in the integration of IT into HRM practices, indicating diverse experiences or satisfaction levels with HRIS in these broader management areas. This variability could have been attributed to different levels of user familiarity, system functionality, or implementation challenges within these functions.

The findings indicated that while HRIS was effectively utilised for administrative tasks and strategic decision-making at TU4, its integration into core HR functions like recruitment, selection, and general HRM practices could have been improved. Enhancing these aspects could have helped in achieving a more uniform and effective use of HRIS across all areas of HR management.

In summary, the adoption and utilisation of Human Resource Information Systems (HRIS) across the four Ghanaian technical universities revealed varied integration and satisfaction levels across different HR functions. TU1 showed a high appreciation of HRIS for strategic decision-making, with notable effectiveness also in employee record-keeping and training, although compensation management and recruitment saw lower satisfaction. TU2 valued HRIS highly for strategic decisions and administrative tasks, yet faced challenges in compensation and recruitment. TU3

reflected moderate HRIS integration, particularly effective in daily administrative tasks and training, yet struggling in recruitment and performance management. Finally, TU4 demonstrated good use of HRIS in administrative and strategic areas but showed lower integration in general HRM, recruitment and compensation practices. Across all universities, there was a trend of high variability in responses, indicating diverse experiences and perceptions of HRIS effectiveness, with common areas for improvement in recruitment, compensation management, and broader HRM integration.

TABLE 6.12: ANOVA-TEST FOR THE LEVEL OF ADOPTION OF HRIS IN HUMAN RESOURCE FUNCTIONS

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	0.132363	3	0.044121	1.71742	0.186139	2.946685
Within Groups	0.719325	28	0.02569			
Total	0.851688	31				

Source: Field Survey, 2024

The ANOVA test in Table 6.12 was conducted to compare the levels of adoption of Human Resource Information Systems (HRIS) across four technical universities. The analysis showed that the differences in HRIS adoption between these universities were not statistically significant. The calculated F-value was 1.7174, which was lower than the critical value of 2.9467. Additionally, the associated p-value of 0.1861 was greater than the typical threshold of 0.05, meaning that there was insufficient evidence to reject the null hypothesis. Therefore, the test results indicated that there were no significant differences in the level of HRIS adoption amongst the four universities, suggesting similar adoption levels across their human resource functions.

6.6 Factors that influence the adoption of HRIS in the selected Ghanaian Technical Universities

This section aimed to explore the factors that influence the adoption of Human Resource Information Systems (HRIS) within the four Ghanaian technical universities. Understanding these factors is critical for improving the efficiency and effectiveness of human resource management practices. This section delves into various internal and external elements shaping HRIS adoption, including organisational factors, technological factors and environmental factors. In view of this, Tables 6.13, 6.14, 6.15 and 6.16 give a detailed description of the results.

TABLE 6.13: FACTORS INFLUENCING THE ADOPTION OF HRIS IN TU1

Statement	No	Likert Scale					Mean	StD
		SD	D	Neutral	A	SA		
My institution lacks a reliable internet connection	69	7.2%	13.0%	18.8%	46.4%	14.5%	3.48	1.12
to enhance the adoption of HR Information System.								
My institution lacks ICT infrastructures to facilitate the full adoption of HR Information System.	69	7.2%	37.7%	7.2%	39.1%	7.2%	3.45	3.79
I believe that HR Information System are very complex to use.	69	7.2%	34.8%	33.3%	15.9%	8.7%	2.84	1.07
Issues with data security hinders HR Information System adoption in my university.	69	5.8%	34.8%	23.2%	26.1%	10.1%	3.00	1.12

I believe that integrating the HR Information System into current working process is a big challenge.	69	2.9%	31.9%	18.8%	36.2%	10.1%	3.19	1.09
Lack of support from top management hinders achieving full potential of HR Information System.	69	2.9%	15.9%	27.5%	42.0%	11.6%	3.43	0.99
Adoption and use of new Information technology/ system face resistance from employees in my institution.	69	7.2%	44.9%	24.6%	23.2%	0.0%	2.64	0.92
High cost of setting up and maintaining information technology hinders the adoption and use of HR Information System.	69	10.1%	13.0%	30.4%	40.6%	5.8%	3.19	1.07
Top management is likely to invest funds in HR Information System applications.	69	5.8%	11.6%	34.8%	37.7%	10.1%	3.35	1.01
Our ICT unit lacks the technical expertise to adopt HR Information System.	69	10.1%	44.9%	13.0%	23.2%	13.0%	2.75	1.18
The country's fibre optic cable and ICT which enables us to access the internet for the adoption of the HRIS is weak.	69	13.0%	24.6%	17.4%	31.9%	7.2%	3.07	1.28

There is adequate financial aid from government to support adoption of HR Information System applications.	69	8.7%	34.8%	24.6%	24.6%	7.2%	2.87	1.11
Competitive pressures from other institutions have influence the adoption/use of HR Information System in my university	69	5.8%	14.5%	21.7%	50.7	10.1%	3.39	1.02
Vendor supports in terms of quality of technical expertise encourages us to adopt HR Information System.	6.9%	0.0	5.8%	42.0%	42.0	10.1%	3.57	0.76

Table 6.13 consists of responses in respect of the factors that influence the full adoption of HRIS in the university. The first five items were used to obtain responses for technological factors. The next five items were used to measure organisational factors, while the last four items were for environmental factors. With respect to the influence of internet availability on HRIS adoption, 60.9% of the respondents agreed that a lack of internet connectivity influences the use of HRIS. Likewise, 46.3 also indicated that a lack of ICT infrastructure hinders HRIS adoption. However, 42% disagreed that HRIS is a complex system to use while 46.3 % agreed that integrating HRIS into already existing processes can be challenging. Moreover, 40.6% disagreed that data security can hinder HRIS adoption.

Furthermore, 53.6% of the respondents agreed with the statement that a lack of management support influences HRIS adoption while 52.1% disagreed that employee resistance affects the adoption of HRIS. 55% disagreed that a lack of technology

expertise hinders HRIS adoption Moreover, 46.4% agreed that high costs of setting up and maintaining technology influence the adoption of HRIS.

Regarding environmental factors, 39.1% of the respondents agreed that the country's fibre optic cable and ICT are weak, which in turn affects the adoption of HRIS in the university. Additionally, 43.5% disagreed with the statement that 'there is adequate financial aid from government to support the adoption of HR Information Systems'. However, 60.8% however agreed that Competitive pressures from other institutions have influence the adoption. Lastly, 52.1% of the respondents agreed that vendor supports in terms of the quality of technical expertise encourages the adoption of HR Information Systems.

The survey from TU1 on the factors influencing the adoption of Human Resource Information Systems (HRIS) revealed several critical insights. Infrastructural challenges such as unreliable internet connectivity (mean: 3.48, SD: 1.12) and inadequate ICT infrastructure (mean: 3.45, SD: 1.79) were significant obstacles to HRIS adoption, suggesting substantial variability in responses, particularly for ICT infrastructure, hence indicating that experiences varied widely across the institution. Perceptions about the complexity and integration challenges of HRIS were also noteworthy. HRIS was seen as complex to use (mean: 2.84, SD: 1.07) and difficult to integrate into current processes (mean: 3.19, SD: 1.09). Data security concerns (mean: 3.00, SD: 1.12) and lack of top management support (mean: 3.43, SD: 0.99) further hindered the adoption of HRIS, pointing to significant internal barriers that needed addressing.

Resistance from employees towards new technology (mean: 2.64, SD: 0.92) and the high costs associated with setting up and maintaining such systems (mean: 3.19, SD: 1.07) were additional challenges, with employee resistance perceived as less of an issue compared to other factors. Conversely, there was moderate belief in the likelihood of investment from top management in HRIS (mean: 3.35, SD: 1.01),

indicating some optimism about future support. Other factors, such as the country's weak ICT infrastructure (mean: 3.07, SD: 1.28) and insufficient financial aid from the government (mean: 2.87, SD: 1.11), showed less impact but still contributed to the hesitancy in fully adopting HRIS. However, competitive pressures (mean: 3.39, SD: 1.02) and strong local vendor support (mean: 3.57, SD: 0.76), particularly the latter, indicated external incentives and facilitators that encouraged HRIS adoption.

TABLE 6.14: FACTORS INFLUENCING THE ADOPTION OF HRIS IN TU2

Statement	No	Likert Scale					Mean	StD
		SD	D	Neutral	A	SA		
My institution lacks a reliable internet connection to enhance the adoption of HR Information System.	52	5.8%	17.3%	21.2%	44.2%	11.5%	3.38	1.09
My institution lacks ICT infrastructures to facilitate the full adoption of HR Information System.	52	5.8%	17.3%	26.9%	44.2%	5.8%	3.27	1.01
I believe that HR Information System are very complex to use.	52	3.8%	42.3%	25.0%	21.2%	7.7%	2.87	1.05
I believe that integrating the HR Information System into	52	10.9%	42.3%	19.2%	34.6%	1.9%	2.92	0.97
current working process is a big challenge.								
Issues with data security hinders HR Information System adoption in my university.	52	0.0%	38.5%	30.8%	25.0%	5.8%	2.98	0.94

Lack of support from top management hinders achieving full potential of HR Information System.	52	9.6%	21.2%	34.6%	21.2%	13.5%	3.08	1.17
Adoption and use of new Information technology/ system face resistance from employees in my institution.	52	9.6%	36.5%	23.1%	28.8%	1.9%	2.77	1.04
High cost of setting up and maintaining information technology hinders the adoption and use of HR Information System.	52	1.9%	25.0%	28.8%	40.4%	3.8%	3.19	0.93
Top management is likely to invest funds in HR Information System applications.	52	0.0%	15.4%	21.2%	53.8%	9.6%	3.58	0.87
Our ICT unit lacks the technical expertise to adopt HR Information System.	52	3.8%	34.6%	30.8%	23.1%	7.7%	2.96	1.03
The country's fibre optic cable and ICT which enables us to access the internet for the adoption of the HRIS is weak.	52	7.7%	15.4%	57.7%	17.3%	1.9%	2.90	0.85
There is adequate financial aid from government to support adoption of HR Information System applications.	52	9.6%	30.8%	38.5%	17.3%	3.8%	2.75	0.99

Competitive pressures from other institutions have influence the adoption/use of HR Information System in my university	52	0.0%	19.2%	50.0%	26.9%	3.8%	3.15	0.78
Vendor supports in terms of quality of technical expertise encourages us to adopt HR Information System.	52	1.9%	11.5%	48.1%	34.6%	3.8%	3.27	0.79

With respect to the statement “My institution lacks a reliable internet connection to enhance the adoption of the HR Information Systems”, 55.7% of the respondents agreed that lack of internet connectivity influences the use of HRIS. Likewise, 50% also indicated that a lack of ICT infrastructure hinders HRIS adoption. However, 46.1% and 52.9% respectively disagreed that HRIS is a complex system and integrating HRIS into an already existing processes can be challenging. Additionally, 38.8% also disagreed that data security can hinder HRIS adoption.

Regarding organisational factors, 34.7% of the respondents agreed with the statement that a lack of management support influences HRIS adoption, while 46.1% disagreed that employee resistance affects the adoption of HRIS. A further 55% disagreed that a lack of technology expertise hinders HRIS adoption, while 44.2% agreed that high cost of setting up and maintaining technology influences the adoption of HRIS.

Regarding environmental factors, 57.7% of the respondents were unsure on the statement that the country’s fibre optic cable and ICT are weak and this in turn affects the adoption of HRIS in the university. Moreover, 40.4% disagreed with the statement that ‘there is adequate financial aid from government to support adoption of HR Information System’. However, 50% were uncertain that Competitive pressures from

other institutions influence adoption. Similarly, 48.1% of the respondents were neutral on the statement that vendor support in terms of quality of technical expertise encourages the adoption of the HR Information System.

The survey results from TU2 revealed several factors influencing the adoption of Human Resource Information Systems (HRIS), with varied impacts. Infrastructure deficiencies were significant, as indicated by the lack of reliable internet connectivity (mean: 3.38, SD: 1.09) and inadequate ICT infrastructure (mean: 3.27, SD: 1.01), both of which hindered effective HRIS adoption. The perceived complexity of HRIS (mean: 2.87, SD: 1.05) and challenges integrating these systems into existing workflows (mean: 2.92, SD: 0.97) were seen as moderate barriers, suggesting some resistance to change and adaptation issues within the university. Data security concerns (mean: 2.98, SD: 0.94) also presented a moderate obstacle, emphasising the need for secure and trustworthy systems. A notable issue was the lack of support from top management (mean: 3.08, SD: 1.17), which was seen as a significant barrier, while resistance from employees towards new technology (mean: 2.77, SD: 1.04) was somewhat lower, suggesting a potential openness amongst staff that could be capitalised upon with better managerial backing. The cost implications of implementing and maintaining HRIS (mean: 3.19, SD: 0.93) also posed a substantial challenge. Despite these obstacles, there was a positive outlook regarding top management's willingness to invest in HRIS (mean: 3.58, SD: 0.87), which contrasted with the perceived lack of technical expertise in the ICT unit (mean: 2.96, SD: 1.03) and general infrastructure challenges. Other external factors like the country's weak ICT infrastructure (mean: 2.90, SD: 0.85) and limited government financial support (mean: 2.75, SD: 0.99) further complicated HRIS adoption. Competitive pressures (mean: 3.15, SD: 0.78) and support from local vendors (mean: 3.27, SD: 0.79) suggested that some external motivations and assistance were in place, potentially driving HRIS adoption despite the challenges.

TABLE 6.15: FACTORS INFLUENCING THE ADOPTION OF HRIS IN TU3

Statement	No	Likert Scale					Mean	StD
		SD	D	Neutral	A	SA		
My institution lacks a reliable internet connection to enhance the adoption of HR Information System.	74	12.2%	18.9%	24.3%	35.1%	9.6%	3.11	1.19
My institution lacks ICT infrastructures to facilitate the full adoption of HR Information System.	74	6.8%	33.8%	18.9%	32.4%	8.1%	3.01	1.13
I believe that HR Information System are very complex to use.	74	5.4%	41.9%	28.4%	16.2%	8.1%	2.80	1.05
I believe that integrating the HR Information System into current working process is a big challenge.	74	8.1%	37.8%	23.0%	21.6%	9.5%	2.86	1.14
Issues with data security hinders HR Information System adoption in my university.	74	4.1%	31.1%	27.0%	32.4%	5.4%	3.04	1.01
Lack of support from top management hinders achieving full potential of HR Information System.	74	4.1%	23.0%	32.4%	31.1%	9.5%	3.19	1.03
Adoption and use of new Information technology/ system face resistance	74	10.8%	27.0%	32.4%	25.7%	4.1%	2.85	1.06
from employees in my institution.								

High cost of setting up and maintaining information technology hinders the adoption and use of HR Information System.	74	4.1%	32.4%	17.6%	35.1%	10.8%	3.16	1.12
Top management is likely to invest funds in HR Information System applications.	74	5.4%	18.9%	18.9%	47.3%	9.5%	3.36	1.07
Our ICT unit lacks the technical expertise to adopt HR Information System.	74	10.8%	29.7%	28.4%	14.9%	1.4%	3.34	3.70
The country's fibre optic cable and ICT which enables us to access the internet for the adoption of the HRIS is weak.	74	6.8%	25.7%	36.5%	18.9%	12.2%	3.04	1.10
There is adequate financial aid from government to support adoption of HR Information System applications.	74	14.9%	27.0%	41.9%	14.9%	1.4%	2.61	0.96
Competitive pressures from other institutions have influence the adoption/use of HR Information System in my university	74	5.4%	20.3%	40.5%	23.0%	10.8%	3.14	1.04
Vendor supports in terms of quality of technical expertise encourages us to	74	5.4%	18.9%	48.6%	25.7%	1.4%	2.99	0.85
adopt HR Information System.								

Regarding the influence of internet availability on HRIS adoption, 44.7% of the respondents agreed that a lack of internet connectivity influences the use of HRIS. Likewise, 40.1% also indicated that a lack of ICT infrastructure hinders HRIS adoption. However, 47.3% disagreed that HRIS is a complex system to use, while 45.9% also disagreed that integrating HRIS into an already existing processes is challenging. However, 37.8% agreed that data security can hinder HRIS adoption.

In terms of organisational factors, 40.6% of the respondents agreed with the statement that a lack of management support influences HRIS adoption, while 37.8% disagreed that employee resistance affects the adoption of HRIS. In addition, 55% disagreed that a lack of technology expertise hinders HRIS adoption while 45.9% agreed that the high cost of setting up and maintaining technology influences the adoption of HRIS.

Regarding environmental factors, 36.5% of the respondents were unsure about the statement that the country's fibre optic cable and ICT are weak which in turn affects the adoption of HRIS in the university. Moreover, 41.9% were neutral on the statement that 'there is adequate financial aid from government to support adoption of HR Information System'. Furthermore, 40.5% were uncertain about the statement that competitive pressures from other institutions have influenced adoption. Lastly, 48.6% were unsure that vendor supports in terms of quality of technical expertise encourages the adoption of HR Information Systems.

The results from TU3 regarding factors influencing the adoption of Human Resource Information Systems (HRIS) revealed several challenges and perceptions amongst the university's staff. Infrastructure issues, such as unreliable internet connections (mean: 3.11, SD: 1.19) and insufficient ICT infrastructure (mean: 3.01, SD: 1.13), were significant barriers to HRIS adoption, indicating that basic technological requirements were not fully met. Perceptions regarding the complexity of HRIS (mean: 2.80, SD:

1.05) and integration challenges into existing processes (mean: 2.86, SD: 1.14) were also notable, with respondents feeling that HRIS was complex and difficult to incorporate into daily operations. Data security concerns (mean: 3.04, SD: 1.01) further complicated the adoption process, highlighting a need for enhanced security measures.

A lack of support from top management (mean: 3.19, SD: 1.03) and resistance from employees (mean: 2.85, SD: 1.06) were other significant challenges, with resistance from employees being slightly less perceived as a barrier compared to managerial support. The cost associated with setting up and maintaining HRIS (mean: 3.16, SD: 1.12) was also seen as a hurdle. Top management's willingness to invest in HRIS (mean: 3.36, SD: 1.07) suggested some level of commitment to overcoming these barriers, although this was tempered by a perceived lack of technical expertise within the ICT unit, which showed an unusually high variance in responses (mean: 3.34, SD: 0.7).

External factors such as weak national ICT infrastructure (mean: 3.04, SD: 1.1) and limited government financial support (mean: 2.61, SD: 0.96) also impacted HRIS adoption. Competitive pressures (mean: 3.14, SD: 1.04) and local vendor support (mean: 2.99, SD: 0.85) indicated some influence from external institutional dynamics but suggested that improvements in support and infrastructure could better facilitate HRIS adoption. TU3 faced several significant barriers to effective HRIS adoption, ranging from infrastructural deficiencies and high costs to internal resistance and a lack of expertise, all of which needed to be addressed in order to fully leverage HRIS capabilities.

TABLE 6.16: FACTORS INFLUENCING THE ADOPTION OF HRIS IN TU4

Statement	No	Likert Scale				Mean	StD
		SD	D	Neutral	A	SA	

My institution lacks a reliable internet connection to enhance the adoption of HR Information System.	107	1.9%	20.6%	20.6%	31.8%	25.2%	3.58	1.13
My institution lacks ICT infrastructures to facilitate the full adoption of HR Information System.	107	5.6%	22.4%	17.8%	37.4%	16.8%	3.37	1.17
I believe that HR Information System are very complex to use.	107	7.5%	36.4%	29.0%	19.6%	7.5%	2.83	1.07
I believe that integrating the HR Information System into current working process is a big challenge.	107	5.6%	33.6%	26.2%	23.4%	11.2%	3.01	1.12
Issues with data security hinders HR Information System adoption in my university.	107	9.3%	26.2%	34.6%	22.4%	7.5%	2.93	1.08
Lack of support from top management hinders achieving full potential of HR Information System.	107	6.5%	22.4%	31.8%	28.0%	11.2%	3.15	1.10
Adoption and use of new Information technology/ system face resistance from employees in my institution.	107	16.8%	33.6%	24.3%	22.4%	2.8%	2.61	1.10

High cost of setting up and maintaining information technology hinders the adoption and use of HR Information System.	107	1.9%	23.4%	40.2%	26.2%	8.4%	3.16	0.94
Top management is likely to invest funds in HR Information System applications.	107	5.6%	15.0%	37.4%	31.8%	10.3%	3.26	1.02
Our ICT unit lacks the technical expertise to adopt HR Information System.	107	9.3%	29.9%	25.2%	26.2%	9.3%	2.96	1.15
The country's fibre optic cable and ICT which enables us to access the internet for the adoption of the HRIS is weak.	107	5.6%	27.1%	31.8%	21.5%	14.0%	3.11	1.13
There is adequate financial aid from government to support adoption of HR Information System applications.	107	14.0%	27.1%	34.6%	19.6%	4.7%	2.74	1.08
Competitive pressures from other institutions have influence the adoption/use of HR Information System in my university	107	3.7%	19.6%	36.4%	33.6%	6.5%	3.20	0.96
Vendor supports in terms of quality of technical expertise encourages us to adopt HR Information System.	107	1.9%	20.6%	47.1%	24.3%	5.6%	3.11	0.86

Table 6.16 shows that 57% of the respondents agreed with the statement that the lack of internet negatively influences HRIS adoption. Likewise, 54.5% also indicated that a lack of ICT infrastructure hinders HRIS adoption. However, 35.5% disagreed that HRIS is a complex system to use and 39.2% also disagreed that integrating HRIS into an already existing process is challenging. Additionally, 35.5% of the respondents disagreed that data security can hinder HRIS adoption.

Thirty nine percent of the respondents agreed with the statement that a lack of management support influences HRIS adoption while 50.4% disagreed that employee resistance affects the adoption of HRIS. A further 39.2% disagreed that the lack of technology expertise hinders HRIS adoption while 40.2% were unsure that high costs of setting up and maintaining technology influence the adoption of HRIS.

Concerning environmental factors, 35.5% of the respondents agreed with the statement that the country's fibre optic cable and ICT are weak, which in turn affects the adoption of HRIS in the university. Furthermore, 41.1% disagreed with the statement that 'there is adequate financial aid from government to support adoption of HR Information System' and 40.1% agreed that Competitive pressures from other institutions have influenced adoption. Lastly, 47.1% of the respondents were neutral on the statement that vendor supports in terms of the quality of technical expertise encourages the adoption of HR Information Systems.

The data from TU4 on the factors influencing the adoption of Human Resource Information Systems (HRIS) showcased various institutional and external challenges. Infrastructure issues were notable, with a lack of reliable internet connection (mean: 3.58, SD: 1.13) and inadequate ICT infrastructure (mean: 3.37, SD: 1.17) posing significant barriers to the adoption of HRIS. The complexity of HRIS was perceived as moderately challenging (mean: 2.83, SD: 1.07), and integrating these systems into existing workflows was also seen as a considerable hurdle (mean: 3.01, SD: 1.12).

Data security concerns (mean: 2.93, SD: 1.08) further exacerbated reluctance towards HRIS adoption, reflecting apprehensions about data integrity and safety. The university experienced internal resistance, both from top management, who were perceived as not being fully supportive (mean: 3.15, SD: 1.1), and from employees who were resistant to adopting new technologies (mean: 2.61, SD: 1.1). The latter was one of the lower mean scores indicating less intense resistance compared to other factors. Financial constraints related to the setup and maintenance of IT systems (mean: 3.16, SD: 0.94) also hindered HRIS adoption. However, there was a moderate expectation that top management might invest in HRIS (mean: 3.26, SD: 1.02), although the technical expertise of the ICT unit was questioned (mean: 2.96, SD: 1.15). Weak national ICT infrastructure (mean: 3.11, SD: 1.13) and inadequate government financial support (mean: 2.74, SD: 1.08) were additional obstacles. Despite these challenges, competitive pressures (mean: 3.20, SD: 0.96) and support from local vendors (mean: 3.11, SD: 0.86) suggested external factors that encouraged HRIS adoption, indicating that the university was influenced by industry standards and available local expertise. TU4 faced significant challenges in HRIS adoption, including infrastructure deficiencies, internal resistance and financial constraints.

In summary, TU1, TU2, TU3 and TU4 revealed varied challenges in the adoption of Human Resource Information Systems (HRIS). Common across all universities were infrastructure issues like unreliable internet and inadequate ICT infrastructure, which significantly hindered HRIS adoption. The perceived complexity and integration difficulties of HRIS, along with data security concerns, were also notable barriers. Resistance from employees and a lack of support from top management further complicated adoption, although there was moderate optimism regarding future investments in HRIS. Financial constraints and the high costs associated with setting up and maintaining HRIS systems were pervasive concerns. External factors such as weak national ICT infrastructure, limited government support, competitive pressures, and local vendor support also influenced adoption rates, with vendor support providing some encouragement. Despite these challenges, there was an underlying

acknowledgment of the necessity and potential benefits of adopting HRIS within these institutions.

TABLE 6.17: ANOVA-TEST FOR FACTORS THAT INFLUENCE THE ADOPTION OF HRIS

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	0.112834	3	0.037611	0.587338	0.626029	2.7826
Within Groups	3.329921	52	0.064037			
Total	3.442755	55				

Source: Field Survey, 2024

The ANOVA test in Table 6.17 was conducted to analyse the factors influencing the adoption of Human Resource Information Systems (HRIS) across the four technical universities. The test aimed to identify if significant differences existed in HRIS adoption rates amongst the institutions. The results showed that the between-group sum of squares (SS) was 0.112834, while the within-group SS was 3.329921. This considerable difference suggests greater variability within the individual groups than among them. The mean square (MS) for between groups was 0.037611, while the MS for within groups was 0.064037. The F-value calculated was 0.587338, which, when compared with the critical F-value of 2.7826 at a significance level of 0.05, revealed no statistically significant differences between the groups. The P-value of 0.626029 supports this finding, as it exceeds the conventional threshold of 0.05, indicating that the differences observed in HRIS adoption amongst the universities were not statistically significant. In conclusion, the ANOVA test suggests that the factors influencing HRIS adoption do not vary significantly across the four technical universities studied.

Rotated component matrix

The Rotated Component Matrix from the Principal Component Analysis (PCA) with Varimax rotation at the university shows distinct groupings of factors that influence the adoption of Human Resource Information Systems (HRIS). The analysis in Table 6.18 reveals three main components:

TABLE 6.18: ROTATED COMPONENT MATRIX

	Componen		
	1	2	3
There is adequate financial aid from government to support adoption of HR Information System applications.	0.795		
Local vendor supports in terms of quality of technical expertise encourages us to adopt HR Information System.	0.779		
Competitive pressures from other institutions have influence the adoption/use of HR Information System in my university	0.644		
Top management is likely to invest funds in HR Information System applications.		0.797	
High cost of setting up and maintaining information technology hinders the adoption and use of HR Information System.		0.666	
I believe that integrating the HR Information System into current working process is a big challenge.			0.896
Issues with data security hinders HR Information System adoption in my university.			0.789

Rotation converged in 4 iterations.

External Support and Pressures: The first component includes variables related to the influence of external factors on HRIS adoption. It suggests that financial aid from the government (loading: 0.795), support from local vendors in terms of technical expertise (loading: 0.779), and competitive pressures from other institutions (loading: 0.644) significantly affect the decision to adopt HRIS. This component highlights the importance of external support and a competitive environment in facilitating or hindering HRIS integration.

Financial and managerial support: The second component focuses on the internal financial and administrative aspects impacting HRIS adoption. It is strongly influenced by top management's willingness to invest in HRIS (loading: 0.797) and the financial burdens associated with setting up and maintaining such systems (loading: 0.666). This indicates that internal financial support and cost considerations are critical in the decision-making process for HRIS adoption.

Operational Challenges: The third component captures the operational hurdles within the institution, particularly focusing on the integration of HRIS into current processes (loading: 0.896) and data security concerns (loading: 0.789). This component suggests that operational issues, especially those related to adapting current practices to accommodate new systems and ensuring data security, are significant barriers to HRIS implementation. Overall, these components delineate the multifaceted influences on HRIS adoption, emphasising the roles of external support, internal financial backing, and operational challenges in shaping institutional decisions and strategies regarding HRIS.

6.7 Extent to which HRIS Impacts Organisational Effectiveness

This section investigates how Human Resource Information Systems (HRIS) affect organisational effectiveness at the four technical universities in Ghana. As technology

continues to transform the workplace, HRIS has emerged as a pivotal tool for managing human resources efficiently. This analysis delves into the specific ways in which HRIS adoption and use influence key dimensions of organisational effectiveness, such as employee productivity, data accuracy, and strategic decisionmaking. The impact of HRIS adoption on organisational or institutional effectiveness was considered under the four perspectives of the balance scorecard, namely financial effectiveness; employee effectiveness; internal processes effectiveness; and learning and growth effectiveness. The first statement was used to measure financial effectiveness while the subsequent second statement was used to measure internal processes effectiveness. The remaining statements were used to assess employee effectiveness and learning and growth effectiveness. A detailed comparison of the impact of Human Resource Information Systems (HRIS) on organisational effectiveness across the four Ghanaian technical universities: TU1, TU2, TU3 and TU4 was represented in terms of the mean and standard deviation (SD) responses to various statements related to the impact of HRIS on organisational effectiveness. In view of this, Tables 6.19, 6.20, 6.21 and 6.22 detailed the results.

TABLE 6.19: EXTENT TO WHICH HRIS IMPACTS ORGANISATIONAL EFFECTIVENESS IN TU1

Statement	NO	Likert Scale					Mean	StD
		SD	D	Neutral	A	SA		
I believe the use of information systems in HR activities has reduced the overall HR expenses.	69	5.8%	7.2%	31.9%	44.9%	10.1%	3.51	0.98
HR Information System has helped my university improve the efficiency of internal operations	69	1.4%	10.1%	21.7%	60.9%	5.8%	3.59	0.81

The HR Information System has simplified and improved the quality and timeliness of employees.	69	1.4%	7.2%	21.7%	66.7%	2.9%	3.62	0.73
The HR information system has reduced paperwork in the university	69	2.9%	13.0%	11.6%	58.0%	14.5%	3.68	0.98
Information generated from HR information system has helped improve my performance.	69	1.4%	5.8%	31.9%	52.2%	8.7%	3.61	0.79
I believe HR information systems can improve our institution's competitive advantage.	69	1.4%	7.2%	18.8%	63.8%	8.7%	3.71	0.79
HR Information System has enhanced information sharing, learning and knowledge management in my institution.	69	0.0%	5.8%	21.7%	53.6%	18.8%	3.86	0.79
HR Information System has enhanced my participation in HR activities.	69	0.0%	10.1%	30.4%	53.6%	5.8%	3.55	0.76
I believe the employees at HR unit appear to be satisfied with the information technology being used.	69	0.0%	10.1%	46.4%	39.1%	4.3%	3.38	0.73

In response to whether HRIS has helped to reduce overall HR expenses, 55% of the respondents agreed and 66.7% agreed that HRIS helps to improve the efficiency of internal operations. In terms of employee effectiveness, 69.6% agreed that the HR Information System helps simplify and improve the quality and timeliness of

employees; 72.5% also agreed that HRIS helps to reduce paperwork in the university; and 60.9% agreed that information generated from the HR information system has helped improve employee performance. Highlighting the responses for learning and growth effectiveness, the respondents agreed that HRIS improves competitive advantage (72.5%), learning and knowledge management (72.1%) and enhances employee participation in HR activities (59.4%). In all, 49.4% of the respondents were unsure whether staff at the HR department are satisfied with the HR information systems being used in the department.

The results from TU1 regarding the impact of the Human Resource Information System (HRIS) on organisational effectiveness revealed positive evaluations across various functions. The HRIS was seen as beneficial in reducing overall HR expenses, with a mean score of 3.51 and a standard deviation indicating some variability ($SD = 0.98$). It has also notably improved the efficiency of internal operations and enhanced the quality and timeliness of the services provided by the HR department, with scores of 3.59 and 3.62, respectively, suggesting a strong consensus on these aspects. The system was credited with reducing paperwork in the HR department (mean = 3.68, $SD = 0.98$) and improving strategic decision-making by top management (mean = 3.70, $SD = 0.77$). Additionally, HRIS had a positive impact on the institution's competitive advantage (mean = 3.71, $SD = 0.79$) and significantly enhanced information sharing, learning, and knowledge management within the institution (highest score of 3.86, $SD = 0.79$).

Further benefits noted included improved personal performance (mean = 3.61, $SD = 0.79$) and increased employee participation in HR activities (mean = 3.55, $SD = 0.76$). The system also helped position the HR department as a strategic partner within the institution (mean = 3.64, $SD = 0.84$). However, the lowest score pertained to the satisfaction of HR unit employees with the technology used (mean = 3.38, $SD = 0.73$), indicating some room for improvement in user satisfaction or system usability. The feedback underscored the effectiveness of HRIS in enhancing various dimensions of

HR operations at TU1, highlighting its role in improving operational efficiency, strategic involvement and overall institutional competitiveness.

TABLE 6.20: EXTENT TO WHICH HRIS IMPACTS ORGANISATIONAL EFFECTIVENESS IN TU2

Statement	No.	Likert Scale					Mean	StD
		SD	D	Neutral	A	SA		
The use of information systems in HR activities has	52	3.8%	11.5%	36.5%	10.4%	7.7%	3.47	0.93
reduced the overall HR expenses.								
HR Information System has helped my University improve the efficiency of internal operations	52	1.9%	7.7%	28.8%	53.8%	7.7%	3.58	0.82
The HR Information System has simplified and improved the quality and timeliness of the HR department's services to employees.	52	1.9%	13.5%	23.1%	57.7%	3.8%	3.48	0.85
The HR information system has reduced paperwork in the HR department	52	5.8%	21.2%	23.1%	38.5%	11.5%	3.49	1.11
Information generated from HR information system has helped improve my performance.	52	5.8%	11.5%	40.4%	32.7%	9.6%	3.49	1.00

HR information systems have improved our institution's competitive advantage.	52	1.9%	13.5%	34.6%	40.4%	9.6%	3.42	0.91
HR Information System has enhanced information sharing, learning and knowledge management in my institution.	52	5.8%	13.5%	28.8%	38.5%	13.5%	3.40	1.07
HR Information System has enhanced my participation in HR activities.	52	1.9%	19.2%	34.6%	28.8%	15.4%	3.37	1.03
The employees at HR unit appear to be satisfied with	52	0.0%	9.6%	48.1%	36.5%	5.8%	3.38	0.75
the information technology being used.								

Regarding financial effectiveness, 36.5% of respondents were unsure on the statement that HRIS helps to reduce overall HR expenses. For internal process effectiveness, 61.5% concurred that HRIS improved the efficiency of internal operations. In terms of employee effectiveness, 61.5% agreed that HRIS simplified and enhanced the quality and timeliness of employees. Additionally, 50% agreed that HRIS reduced paperwork within the university, and 42.3% believed that information generated from HRIS improved employee performance.

For learning and growth effectiveness, respondents agreed that HRIS improved competitive advantage (50%); facilitated learning and knowledge management (52%); and increased employee participation in HR activities (44.2%). However, 48.1% of respondents were uncertain about whether the HR department staff were satisfied with the HRIS in use at the university.

The survey results from TU2 showed a generally positive reception towards the impact of the Human Resource Information System (HRIS) on organisational effectiveness, with mean scores ranging from 3.37 to 3.58. These scores indicated a moderate level of effectiveness across various HR functions, suggesting that while HRIS had brought improvements, there was still room for enhancement. The highest rated impact of HRIS was on improving the efficiency of internal operations, with a mean score of 3.58 and a relatively low standard deviation of 0.82, highlighting a strong consensus about its effectiveness in this area. Similarly, HRIS was seen as effectively reducing overall HR expenses and simplifying the quality and timeliness of HR services, with scores of 3.47 and 3.48 respectively.

A reduction in paperwork within the HR department was also noted, with a mean of 3.49, although the higher standard deviation of 1.11 suggested varying experiences amongst staff members. HRIS's role in improving strategic decision-making by top management and enhancing personal performance received lower mean scores of 3.37 and 3.49 respectively, indicating moderate impact but with some inconsistencies in perceptions (standard deviations around 1.00). HRIS was viewed as having a moderate effect on improving the institution's competitive advantage (mean = 3.42) and enhancing information sharing, learning, and knowledge management (mean = 3.40). Employee participation in HR activities and the strategic role of the HR department was also perceived as moderately enhanced by HRIS, with scores of 3.37 and 3.50.

The lowest score was for employee satisfaction with the information technology used in the HR unit at 3.38, with a standard deviation of 0.75, indicating some dissatisfaction and potential areas for improvement in user experience and system effectiveness. HRIS was positively impacting various HR functions at TU2. The results also pointed to the need for improvements in user satisfaction and the system's contribution to strategic decision-making and competitive advantage.

TABLE 6.21: EXTENT TO WHICH HRIS IMPACTS ORGANISATIONAL EFFECTIVENESS IN TU3

Statement	No.	Likert Scale					Mean	StD
		SD	D	Neutral	A	SA		
The use of information systems in HR activities has reduced the overall HR expenses.	74	4.1%	21.6%	36.6%	32.3%	5.4%	3.46	0.96
HR Information System has helped my University improve the efficiency of internal operations	74	5.4%	13.5%	29.7%	45.9%	5.4%	3.42	0.97
The HR Information System has simplified and improved the quality and timeliness of employees.	74	2.7%	20.3%	25.7%	47.3%	4.1%	3.40	0.93
The HR information system has reduced paperwork in the HR department	74	6.8%	23.0%	20.3%	36.5%	13.5%	3.47	1.16
Information generated from HR information system has helped improve my performance.	74	6.8%	14.9%	37.8%	29.7%	10.8%	3.43	1.05
HR information systems have improved our institution's competitive advantage.	74	8.1%	16.2%	39.2%	29.7%	6.8%	3.11	1.03

HR Information System has enhanced information sharing, learning and knowledge management in my institution.	74	8.1%	13.5%	31.1%	36.5%	10.8%	3.28	1.09
HR Information System has enhanced my participation in HR activities.	74	1.4%	14.9%	36.5%	35.1%	9.5%	3.31	0.98
The employees at HR unit appear to be satisfied with the information technology being used.	74	9.5%	5.4%	45.9%	31.1%	8.1%	3.23	1.01

In terms of financial effectiveness, there was some agreement amongst 37.8% of respondents regarding the statement that HRIS contributes to reducing overall HR expenses. Regarding internal processes effectiveness, a majority of 51.3% agreed that HRIS has enhanced the efficiency of internal operations. Regarding employee effectiveness, 51.4% acknowledged that HRIS has simplified and improved the quality and timeliness of employee-related tasks. Furthermore, half of the respondents (50%) expressed that HRIS has successfully minimised paperwork within the university, while 40.5% believed that the information generated from HRIS has had a positive impact on employee performance.

In terms of learning and growth effectiveness, respondents were unsure as to whether HRIS has led to improved competitive advantage (39.2%) but agreed that HRIS has aided better learning and knowledge management (47.3%) and encouraged increased employee participation in HR activities (44.6%). However, a notable 45.9% of respondents were unsure about the satisfaction levels of the HR department staff with the HRIS currently being utilised at the university.

The survey results from TU3 suggested that the Human Resource Information System (HRIS) had had a moderately positive impact on various HR functions, although with significant variability in perceptions indicating areas for improvement. The HRIS was viewed as somewhat effective in reducing HR expenses, with a mean score of 3.46 and a standard deviation of 0.96, pointing to varying degrees of impact amongst respondents. It had also moderately improved the efficiency of internal operations and the quality and timeliness of HR services, with scores of 3.42 and 3.40 respectively. Despite these benefits, the impact of reducing paperwork in the HR department showed a higher variance in responses (mean of 3.47, SD of 1.16), suggesting differing experiences amongst employees. Similarly, enhancements in competitive advantage were rated the lowest (mean of 3.11), reflecting a significant area of concern.

However, HRIS seemed to moderately improve personal performance and participation in HR activities, with scores of 3.43 and 3.31 respectively. Information sharing, learning, and knowledge management improvements were perceived as modest (mean of 3.28). Notably, HRIS’s role in making the HR department a strategic partner was acknowledged but not strongly emphasised (mean of 3.40). Employee satisfaction with the HRIS technology within the HR unit scored the lowest at 3.23, highlighting dissatisfaction and possible usability or effectiveness issues. Overall, while HRIS provided some organisational benefits at TU3, the variability in satisfaction levels across different areas suggested a need for targeted improvements to fully leverage the system's capabilities.

TABLE 6.22: EXTENT OF HRIS IMPACTS ON ORGANISATIONAL EFFECTIVENESS IN TU4

Statement	No.	Likert Scale					Mean	StD
		SD	D	Neutral	A	SA		

The use of information systems in HR activities has reduced the overall HR expenses.	107	2.8%	7.5%	49.5%	31.8%	8.4%	3.46	0.85
HR Information System has helped my University improve the efficiency of internal operations	107	1.9%	15.0%	29.95	45.8%	6.5%	3.69	3.09
The HR Information System has simplified and improved the quality and timeliness of the HR department's services to employees.	107	1.9%	18.7%	26.2%	46.7%	5.6%	3.74	4.03
The HR information system has reduced paperwork in the HR department	107	11.2%	15.9%	22.4%	41.1%	9.3%	3.41	1.17
Information generated from HR information system has helped improve my performance.	107	7.5%	18.7%	32.7%	31.8%	9.3%	3.47	1.08
HR information systems have improved our institution's competitive advantage.	107	8.4%	13.1%	31.8%	34.6%	12.1%	3.29	1.11
HR Information System has enhanced information sharing, learning and knowledge management in my institution.	107	8.4%	12.1%	25.2%	41.1%	12.1%	3.45	1.39

HR Information System has enhanced my participation in HR activities.	107	9.3%	21.5%	27.1%	30.8%	11.2%	3.13	1.16
The employees at HR unit appear to be satisfied with the information technology being used.	107	1.9%	12.1%	51.4%	28.0%	6.5%	3.45	0.83

For financial impact, 49.5% of participants were uncertain if HRIS contributes to reducing overall HR costs. For internal processes, a notable majority of 52.3% acknowledged that HRIS has improved the efficiency of internal operations. Regarding employee effectiveness, the same percentage (52.3%) agreed that HRIS has streamlined and enhanced the quality and timeliness of employee functions. Additionally, 50.4% of respondents confirmed that HRIS has helped reduce paperwork within the university, while 41.1% believed that data from HRIS positively impacted employee performance.

Concerning the impact on learning and growth, respondents reported that HRIS has improved competitive advantage (46.7%) facilitated learning and knowledge management (53.2%) and increased employee engagement in HR activities (42%). Despite these positive findings, 51.4% of participants were uncertain about the satisfaction levels of HR department staff with the current HRIS implementation at the university.

The survey results from TU4 on the impact of the Human Resource Information Systems (HRIS) on organisational effectiveness showed moderate effectiveness with considerable variability in some areas, suggesting divergent perceptions or experiences amongst respondents. The HRIS was seen as moderately effective in reducing overall HR expenses (mean: 3.46, SD: 0.85) and had notably helped improve the efficiency of internal operations (mean: 3.69), although the very high standard deviation (SD: 3.09) for this statement suggested an outlier or data entry

error that skewed the interpretation. A similar issue arose with the claim that HRIS had simplified and improved the quality and timeliness of HR services (mean: 3.74, SD: 4.03), where the standard deviation again indicated significant variability or potential data errors.

More consistent perceptions were observed in areas like reducing paperwork in the HR department (mean: 3.41, SD: 1.17) and improving strategic decision-making (mean: 3.30, SD: 0.98). Both scores suggested moderate satisfaction but also room for improvement. HRIS's impact on personal performance and the institution's competitive advantage was seen as moderate (means: 3.47 and 3.29 respectively), with standard deviations over 1.0, indicating some inconsistency in these experiences. Information sharing, learning and knowledge management were perceived to be somewhat enhanced by HRIS (mean: 3.45, SD: 1.39), pointing to benefits but also significant variability in how these benefits were experienced. Employee participation in HR activities and the strategic role of the HR department due to HRIS implementation scored lower (means: 3.13 and 3.44), suggesting that these areas were less positively impacted. However, employee satisfaction with the IT used in the HR unit was relatively positive (mean: 3.45, SD: 0.83), indicating a fair level of approval. HRIS had a positive impact on several aspects of HR management at TU4. The high variability in certain scores could indicate issues with data quality, system implementation, or user experiences that needed further investigation.

In summary, TU1 experienced notably positive outcomes from HRIS implementation, with the system effectively reducing HR costs, improving internal operations, and enhancing strategic decision-making. The highest praise was for its role in information sharing and strategic alignment, although there was room for improvement in user satisfaction with the technology. TU3 reported moderate benefits from HRIS, such as reductions in HR expenses and enhancements in operational efficiency. However, there were significant variations in perceptions, especially in strategic decision-making and competitive advantage, which were seen as less effective. This variability

pointed to areas needing targeted improvements to fully leverage HRIS capabilities. TU2 showed a generally positive reception towards HRIS, with the best outcomes in improving operational efficiency and reducing HR expenses. Nevertheless, some inconsistencies in user experience and strategic impacts suggested the need for enhancements to maximise HRIS benefits. TU4 observed the moderate effectiveness of HRIS, with good support for internal operations and personal performance. However, the results indicated considerable variability, particularly in how HRIS simplified and improved HR services, hinting at possible data quality issues or disparities in user experiences. Across all institutions, HRIS was valued for enhancing various HR functions, though with varying levels of effectiveness and satisfaction. Common challenges included achieving consistent strategic impacts and user satisfaction.

TABLE 6.23: ANOVA-TEST FOR HRIS IMPACTS ORGANISATIONAL EFFECTIVENESS

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	0.4336	3	0.144542	9.449182	0.00	2.838745
Within Groups	0.6118	40	0.015297			
Total	1.0455	43				

Source: Field Survey, 2024

The ANOVA test results presented in Table 6.23 evaluate the differences between groups regarding the impact of Human Resource Information Systems (HRIS) on organisational effectiveness in the four technical universities. The results indicate that the between-group variation (sum of squares, SS = 0.4336) is greater than the withingroup variation (SS = 0.6118), implying that there are observable differences in

the impact of HRIS on organisational effectiveness amongst these universities. The calculated F-value is 9.4492, which is significantly higher than the F-critical value of 2.8387. The corresponding p-value is less than 0.05, confirming statistical significance. This result suggests that the observed differences in HRIS impact are unlikely to have occurred by chance. Therefore, one can conclude that HRIS has significantly different impacts on organisational effectiveness across the four technical universities analysed. A multiple comparisons test was conducted in Table 5.11 ascertain which of the four technical universities, HRIS, has significantly different impacts on organisational effectiveness.

6.8 Comparisons amongst the four selected universities

There is need to examine how each university perceived the impact of HRIS on organisational effectiveness. The multiple comparisons test was performed on the extent of HRIS impact on organisational effectiveness amongst the universities. The results are depicted in Table 6.24.

TABLE 6.24: MULTIPLE COMPARISONS TEST ON THE EXTENT TO WHICH HRIS IMPACTS ORGANISATIONAL EFFECTIVENESS

(I) Technical University	(J) Technical University	Mean Difference (I-J)	Sig.	95% Confidence Interval Bound	Upper Bound
TU1	TU3	0.27455*	0.000	0.1282	0.4209
	TU2	0.17273*	0.013	0.0263	0.3191
	TU4	0.18364*	0.007	0.0372	0.3300
TU2	TU3	0.10182	0.364	-0.0446	0.2482
	TU4	0.01091	1.000	-0.1355	0.1573
TU3	TU2	-0.10182	0.364	-0.2482	0.0446
	TU4	-0.09091	0.555	-0.2373	0.0555
TU4	TU2	-0.01091	1.000	-0.1573	0.1355

Source: Field Survey, 2024

The Bonferroni post hoc tests in Table 6.24 for multiple comparisons amongst the four technical universities evaluate the differences in how HRIS impacts organisational effectiveness. TU1 shows a significantly higher perceived organisational effectiveness of HRIS compared to TU3, TU2 and TU4, with mean differences of 0.27455, 0.17273 and 0.18364, respectively, all significant at the 0.05 level or better. TU3's comparisons show no significant differences in HRIS impact when compared to TU2 and TU4. Similarly, TU2's comparison with TU4 shows no significant difference. However, both TU2 and TU4 report significantly lower HRIS impact on organisational effectiveness compared to TU1. These results indicate that perceptions of HRIS impact on organisational effectiveness vary significantly across institutions, with TU1 consistently rated as experiencing more positive effects from HRIS implementation than the other universities involved in the study.

6.9 Theoretical contribution

Part of the enquiry of this study is to test and validate the conceptual framework, hereafter identified as MM, proposed in Chapter Three. To test the framework, exploratory factor analysis was first applied to all 45 items in the questionnaire.

6.9.1 Adequacy and dimensionality of the MM

As previously mentioned in this chapter, the Kaiser-Meyer-Olkin (KMO) measure was calculated to determine if the sample was adequate for factor analysis. According to Pallant (2020: 173), a KMO value of 0.6 or above, along with a significant Bartlett's Test of Sphericity, indicates sample adequacy for factor analysis. The KMO value was computed using SPSS, and the results are presented in Table 5.25. It is worth mentioning that during this processs, some items were dropped due to poor loading below 0.5 or having cross-loading.

TABLE 6.25: KMO AND BARTLETT'S TEST

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,918
Bartlett's Test of Sphericity	Approx. Chi-Square	4774,139
	Df	300
	Sig.	<,001

The results from the Kaiser-Meyer-Olkin (KMO) and Bartlett's tests in Table 6.25 are essential in assessing the suitability of data for factor analysis. The KMO measure of sampling adequacy is 0.918, which is above the acceptable threshold of 0.5. This suggests that the data set has adequate common variance amongst variables for a reliable factor analysis. A KMO value close to 1 indicates a higher proportion of variance amongst variables that might be common variance, suitable for structure detection. Here, the value of 0.918 indicates that the data is suitable for performing factor analysis. The Bartlett's Test of Sphericity has an approximate Chi-Square value of 4774.13 with 300 degrees of freedom and a significance level (Sig.) of 0.000. This test checks the hypothesis that the correlation matrix is an identity matrix, which indicates that variables are unrelated and unsuitable for structure detection. A significance level of 0.000 firmly rejects this hypothesis, demonstrating that the variables are indeed correlated, and that the data is suitable for factor analysis.

The results from Table 6.25 of the factor analysis using principal component analysis (PCA) provide insights into how much variance each component extracted from the data accounts for. The table reveals the initial eigenvalues, the percentage of variance each component explains, and the cumulative percentage of variance explained by the components. The PCA analysis reveals four distinct components, explaining 62.073% of the total variance.

TABLE 6.26: TOTAL VARIANCE EXPLAINED

Total Variance Explained			
Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	Rotation Sums of Squared Loadings

	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10,133	40,533	40,533	10,133	40,533	40,533	5,656	22,625	22,625
2	2,160	8,640	49,173	2,160	8,640	49,173	5,232	20,927	43,552
3	1,674	6,695	55,867	1,674	6,695	55,867	2,630	10,521	54,073
4	1,552	6,206	62,073	1,552	6,206	62,073	2,000	8,000	62,073
5	,956	3,823	65,896						
6	,905	3,620	69,516						
7	,852	3,408	72,924						
8	,773	3,092	76,016						
9	,737	2,946	78,962						
10	,582	2,327	81,289						
11	,559	2,234	83,524						
12	,532	2,129	85,653						
13	,474	1,897	87,550						
14	,434	1,735	89,285						
15	,386	1,546	90,831						
16	,366	1,466	92,297						
17	,299	1,197	93,494						
18	,273	1,093	94,587						

19	,261	1,044	95,631						
20	,245	,980	96,611						
21	,220	,881	97,492						
22	,196	,784	98,276						
23	,164	,658	98,934						
24	,146	,583	99,516						
25	,121	,484	100,000						
Extraction Method: Principal Component Analysis.									

Table 6.26 and Table 6.27 further show the component matrix of the extracted factor. In this analysis, a varimax rotation with Kaiser normalisation was applied to improve the interpretability of the factors.

TABLE 6.27: ROTATED COMPONENT MATRIX FOR MM

Rotated Component Matrix ^a				
	Component			
	1	2	3	4
HPP1			,690	
HPP2			,714	
HPP6			,659	
HPP9			,630	
HPP10			,643	
AHS1		,728		
AHS2		,750		

AHS3		,751		
AHS4		,761		
AHS5		,747		
AHS6		,693		
AHS7		,706		
AHS8		,517		
FIA2				
FIA3				,730
FIA4				,782
FIA11				,609
IOE3	,780			
IOE4	,719			
IOE5	,815			
IOE6	,807			
IOE7	,726			
IOE8	,798			
IOE9	,804			
IOE10	,643			
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.				
a. Rotation converged in 6 iterations.				

Component 1 measures the impact on organisational effectiveness, with 8 items (IOE3-IOE10) contributing to it. The high Cronbach's alpha (0.939) suggests excellent internal consistency, indicating that the items reliably measure the same underlying construct. This factor explains 22.625% of the total variance in the dataset.

Component 2 assesses the level of adoption and use of HR information systems in

HR functions and is measured with 8 items (AHS1-AHS8). Cronbach's alpha of 0.913 indicates strong internal consistency, meaning that the items are closely related and effectively measure the construct. This factor accounts for 20.927% of the variance.

Component 3 relates to HRM practices and processes, consisting of 5 items (HPP1, HPP2, HPP6, HPP9, and HPP10). The Cronbach's alpha of 0.749 suggests acceptable internal consistency. This factor explains 10.521% of the variance in the dataset.

Component 4 identifies the elements influencing the adoption and use of HRIS. With only 3 items (FIA3, FIA4, and FIA11) and a Cronbach's alpha of 0.658, it shows a lower but acceptable level of internal consistency. This factor accounts for 8% of the total variance.

TABLE 6.28: CONSTRUCTS

Construct	Label	Items included		Variance extracted	Cronbach's alpha
			Number of items		
Factor1	Impact on Organisational effectiveness	IOE3-IOE10	8	22,625	.939
Factor 2	LEVEL OF ADOPTION AND USE OF HR INFORMATION SYSTEM IN HUMAN RESOURCE FUNCTIONS	AHS1-AHS8	8	20,927	.913

Factor3	HRM PRACTICES AND PROCESSES	HPP1-HPP2, HPP6, HPP9- HPP10	5	10,521	.749
Factor 4	FACTORS THAT INFLUENCE THE ADOPTION AND USE OF HRIS	FIA3, FIA4 and FIA11	3	8,000	.658

6.9.2 Measurement Model: Scale Reliability and Construct Validity

Confirmatory factor analysis (CFA) was then applied to confirm the quality of the MM through an evaluation of convergent and discriminant validity. Table 6.28 reflects the composite reliability, convergent and discriminant validity of the MM. Metrics for the constructs measured in the study are R Impact on Organisational effectiveness (IOE); Level of adoption and use of HR information systems in HR functions (AHSI); HRM practices and processes (HPPS); and Factors influencing the adoption and use of HRIS (FIA). Convergent validity refers to “the extent to which a measure correlates positively with alternative measures of the same construct” (Al-Emran, Mezhujev and Kamaludin, 2019: 650). Criteria used to assess convergent validity include standardised loadings, construct (composite) reliability (CR) and the average variance extracted (AVE). CR is a measure of the internal consistency or reliability of the latent factors in the MM. A value greater than 0.7 indicates good reliability. All values of the CR range from 0.674 to 0.940, which suggests acceptable reliability. For example, excellent reliability was measured for AHS (0.907) and IOES (0.940) while good reliability was measured for HPP (0.764). The reliability measured for FIA was 0.674, implying moderate but still acceptable reliability.

The Average Variance Extracted (AVE) measures the level of variance captured by a construct relative to the amount of variance due to measurement error. A value above 0.5 is desirable. The AVE measured for HPP was 0.530, implying acceptable AVE. The AVE measured for AHS was 0.551, implying acceptable AVE and the AVE measured for IOES was 0.664, suggesting good AVE. However, the AVE measured for FIA was slightly below the recommended threshold, implying that the construct explains less than 50% of the variance.

Discriminant validity assesses the uniqueness of different constructs within a study, ensuring that measures intended to be unrelated are indeed distinct or show minimal correlation (Lim, 2024: 159). The Maximum Shared Variance (MSV) is a measure of the discriminant validity of a scale or a construct. It represents the maximum correlation between a construct and any other construct in the model. Ideally, AVE should be greater than MSV for discriminant validity. The value of the AVE for each construct is greater than the MSV values (except AHS), which suggests adequate discriminant validity (Fornell and Larcker, 1981).

The MaxR(H) (Maximum Reliability of the Construct) shows the upper boundary of the construct's reliability. It represents the maximum correlation between a construct and any other construct in the model that is different from the target construct. Values above 0.7 are considered acceptable. All constructs have MaxR(H) values above 0.7, thereby supporting discriminant validity.

TABLE 6.29: COMPOSITE RELIABILITY, AVERAGE VARIANCE EXTRACTED, AND MAXIMUM SHARED SQUARE VALUES

	CR	AVE	MSV	MaxR(H)	HPP	FIA	AHS	IOES
HPP	0,764	0,530	0,350	0,817	0,728			
FIA	0,674	0,415	0,105	0,700	0,095	0,644		
AHS	0,907	0,551	0,615	0,912	0,592	0,288	0,742	
IOES	0,940	0,663	0,615	0,951	0,509	0,324	0,784	0,814

Note: IOES= Impact on Organisational effectiveness; AHS= Level of adoption and use of HR Information Systems in Human Resource functions; HPP= HRM practices and processes; FIA= Factors that influence the adoption and use of HRIS.

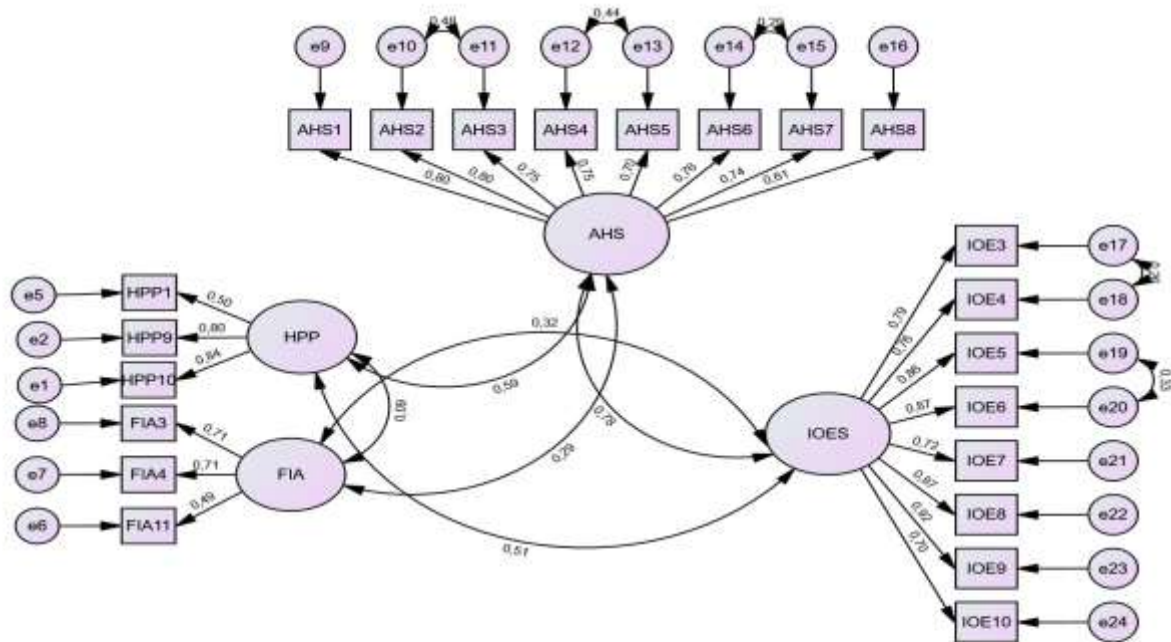
6.9.3 Fitness of the Model

The overall fit of the model was assessed by multiple fit criteria given in Table 6.33. The goodness-of-fit indices are as follows: chi-square = 505.563, df = 198, $p < .001$, $\chi^2 / df = 2.553$, CFI = 0.913, IFI = 0.914, GFI=0.909, RMSEA = 0.049. The fit indices indicate that the model fits the data well. The χ^2/df value is well below the threshold of 5 and both the IFI and CFI exceed 0.9, indicating good comparative and incremental fit, and the RMSEA is below 0.08, suggesting an acceptable level of error in the model's approximation. In line with Hu and Bentler (1999), these indices collectively suggest that the model is a good fit for the data. This is further shown in Table 6.30.

TABLE 6.30: MODEL FITNESS INDICES FOR MM

Fit Indices	Fit values	Criteria
χ^2 / df (p-value)	2.553(<.001)	<5
IFI	0.931	>.9
CFI	0.931	>.9
TLI	0.919	>.9
RMSEA	0.072	<.08

FIGURE 6.6: FITNESS INDICES OF MM

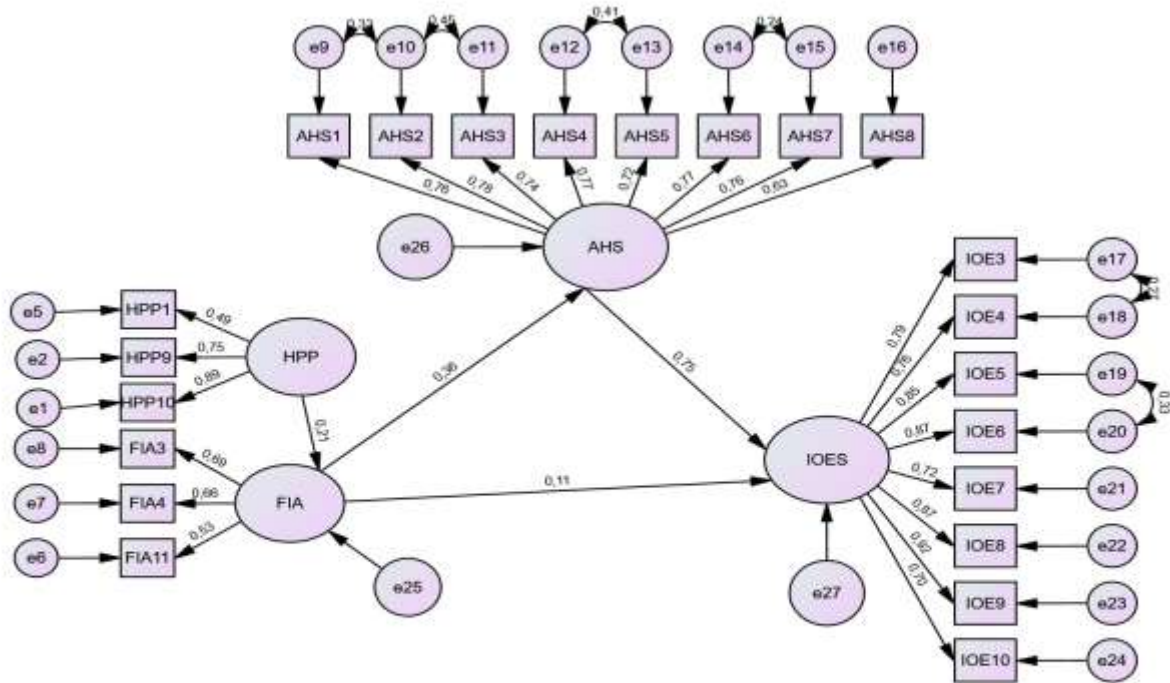


6.9.4 Structural Equation Model (Hypotheses Testing)

The MM model was then converted into a path model that shows the relationship between the latent variables. An SEM was applied to test all the hypothesised relationships that exist amongst the latent variables. From the structural model (SEM) illustrated in Figure 6.1, the rectangular shapes signify independent and dependent manifest or observed variables, as the circular shapes signify each observed variables' corresponding latent variable (Hair *et al.*, 2021: 6). The directional arrows draw on linkages between the latent variables in the SEM and analogue variables to create operational interplays between them. The numerical figures presented alongside latent variables to another in the SEM, are factor loadings known as standardised regression weights (SRW). The same criteria are used for assessing the goodness-of-fit for the MM are used in the structural model. The goodness-offitness indices are as follows: chi-square = $\chi^2 = 558.841$, $df = 199$, $p < .001$, $\chi^2 / df = 2.808$, CFI = 0.919, TLI=0.906, IFI = 0.919, RMSEA = 0.078, which suggests that the

measurement model is acceptable. It was thus concluded that the model was consistent with real data.

FIGURE 6.7: FINALISED SEM MODEL



Note: $\chi^2 = 558.841$, $df = 199$, $p < .001$, $\chi^2 / df = 2.808$, CFI = 0.919, TLI=0.906, IFI = 0.919, RMSEA = 0.078

The correlation index for all the factors considered in the SEM was assessed and results show that the squared multiple correlations were satisfactory for some, with the rule of thumb stating that the closer the value is to 0.850, the better the correlation (Gefen, Straub and Boudreau, 2000:44; Ranatunga, Priyanath and Megama, 2020: 105).

There is a weak positive relationship between the factors that influence the adoption and use of HRIS (FIA) and actual HRIS adoption. The low correlation estimate (0.095)

suggests that FIA and actual HRIS adoption are not strongly related, meaning that changes in factors influencing HRIS adoption do not significantly affect actual HRIS adoption.

There is a moderate positive relationship between HPP and the Level of Adoption and Use of HR Information Systems (AHS). The correlation estimate (0.594) suggests that improvements in HRM practices and processes are moderately associated with the higher adoption and use of HR information systems in HR functions.

There is a weak to moderate positive relationship between FIA and AHS. The correlation estimate (0.300) suggests that factors influencing HRIS adoption have a small to moderate association with the actual adoption and use of HR information systems in HR functions.

There is a strong positive relationship between AHS and Impact on Organisational Effectiveness (IOES). The high correlation estimate (0.788) indicates that a higher level of adoption and use of HR information systems is strongly associated with a greater impact on organisational effectiveness. This implies that the effective use of HRIS in HR functions significantly enhances organisational performance.

There is a weak to moderate positive relationship between FIA and IOES. The correlation estimate (0.324) suggests that factors influencing HRIS adoption and use are moderately associated with organisational effectiveness, but this relationship is not as strong as between AHS and IOES.

There is a moderate positive relationship between HPP and IOES. The correlation estimate (0.508) indicates that improvements in HRM practices and processes are moderately associated with a positive impact on organisational effectiveness.

TABLE 6.31: DISPLAYED SQUARE MULTIPLE CORRELATION ESTIMATES FOR THE MM

			Estimate
HPP	<-->	FIA	,095
HPP	<-->	AHS	,594
FIA	<-->	AHS	,300
AHS	<-->	IOES	,788
FIA	<-->	IOES	,324
HPP	<-->	IOES	,508

Table 6.31 illustrates the Standardised regression weights of selected outputs. As hypothesised in the conceptual framework, the path from actual HRIS adoption (HPP) and Factors that Influence the Adoption and Use of HRIS (FIA) was statistically significant ($\beta = 0.212$; CR = 2.668; $P = 0.008$), implying that as HPP increases, FIA also increases moderately. The decision rule thereby is to reject the null hypothesis (H_0) and accept the alternate (H_1) that states: the impact of HPP on FIA will be positive.

The path from FIA performance and AHS also showed statistical significance ($\beta = 0.365$; CR = 4.313; $p < 0.001$), indicating that as the factors influencing the adoption and use of HRIS increase, the level of adoption and use of HRIS in HR functions also increases. Therefore, the decision rule is to reject the null hypothesis (H_0) and accept the alternate (H_2) that states: the impact of FIA on AHS will be positive.

Likewise, the path from AHS and IOES was statistically significant ($\beta = 0.746$; CR = 10.776; $p < 0.001$), indicating that higher levels of HRIS adoption and use in HR functions have a substantial positive impact on organisational effectiveness. The decision rule thereby is to reject the null hypothesis (H_0) and accept the alternate (H_3) that states: the impact of AHS on IOES will be positive.

The path from FIA and IOES was statistically significant ($\beta = 0.114$; CR = 2.008; $P=0.045$), suggesting that factors influencing the adoption and use of HRIS have a small positive effect on organisational effectiveness. The decision rule thereby is to reject the null hypothesis (H_0) and accept the alternate (H_4) that states: the impact of FIA on IOES will be positive.

Overall, the path from AHS to IOES exhibits the strongest, most direct and most positive relationship between the two latent variables with a factor loading or correlation index of $\beta = .746$, rendering the path as the most prominent in the structural framework, while the weakest is between FIA and IOES (H_4). Nevertheless, all hypotheses (H_1 , H_2 , H_3 , H_4) are supported by the data, indicating significant relationships between the variables. Each independent variable has a meaningful impact on its respective dependent variable.

TABLE 6.32: HYPOTHESES CONCLUSIONS OF MM

Hypotheses	Dependent variable (DV)		Independent Variable (IV)	Standardized coefficient β	S.E.	Critical Ratio. (CR)	P	Decision
H1	FIA	<---	HPP	,212	,061	2,668	,008	Supported
H2	AHS	<---	FIA	,365	,117	4,313	***	Supported
H3	IOES	<---	AHS	,746	,075	10,776	***	Supported
	IOES	<---	FIA	,114	,085	2,008	,045	Supported

6.10 Qualitative data analysis

This chapter details the qualitative data collected from HR representatives from the selected universities. The collected data was aimed at gathering perspectives on the extent and challenges of digital adoption in HR practices in the selected universities.

Three interviews were conducted instead of four. The head of the HR unit for TU1 opted not to grant the researcher the interview. The information presented here is therefore based on the data from the three remaining universities.

The researcher conducted telephonically interviews. The interviews were recorded and thematically analysed. Thematic analysis was chosen for its structured yet flexible approach, allowing the researcher to organise data into clear themes and subthemes. Conducting interview via the telephone ensured the reliability of the data collected, while electronic recordings maintained the integrity of the information.

The transcribed interviews were then imported into QSR NVivo 12 to streamline the analysis process. NVivo assisted in organising the coded data into themes and subthemes based on the interview guide, promoting efficient data management and categorisation. The analysis involved objective comparisons of the data, which aligned with the research questions and adhered to Spencer and Ritchie (2012) qualitative research recommendations. The themes and sub-themes were generated inductively throughout the data collection and analysis process. The direct quotes from the participants were used verbatim to aid the interpretation of the study while anonymising their voice. Table 6.33 highlights the emerging themes and sub-themes as uncovered from the thematic analysis.

TABLE 6.33: THEMES AND SUB-THEMES

Theme	Subthemes
Responsibility for HR Functions	Subtheme 1.1: Broad Responsibility for HR Functions Subtheme 1.2: Specific HR Functions
Technology and Human Resource Information Systems (HRIS)	Subtheme 2.1: Lack of Fully Functional HRIS

	Subtheme 2.2: Use of General Technology in HR Functions
Integration of Technology in Specific HR Functions	Subtheme 3.1: Limited Integration of Technology
	Subtheme 3.2: Partial Use of Technology in Recruitment and Record-Keeping
Challenges to Technology Adoption	Subtheme 4.1: Budgetary and Connectivity Constraints
Impact of Technology on HR and University Operations	Subtheme 5.1: Financial Savings and Efficiency
	Subtheme 5.2: Enhanced Employee Performance and Internal Processes

Theme 1: Responsibility for HR Functions

Sub-theme 1.1: Broad Responsibility for HR Functions

The responses from the three universities (TU2, TU3 and TU4) suggest a broad consensus that HR departments are largely responsible for a wide range of HR functions. This indicates that HR units within these universities are well-established and manage most traditional HR activities, such as recruitment, employee relations, compensation and performance management. However, there are differences in the scope of responsibilities, with some HR departments extending beyond conventional roles. For example, TU2 acknowledges that while the HR department handles core functions, there may be exceptions where some responsibilities are not within their purview. This suggests a slight limitation or specialisation in HR roles within that institution, possibly indicating that certain administrative or strategic functions might be decentralised or shared with other departments.

*"I can't say all, but I think the known or core HR functions are done by my department."
(TU2)*

In contrast, TU3 provides a more definitive response, confirming that HR is responsible for "all HR-related activities". This reflects a comprehensive and centralised HR function at this university.

"Yes, the HR department is responsible for all HR related activities" (TU3)

TU4 introduces a further nuance, noting that their HR unit has evolved into a "Directorate" and taken on additional duties that are not traditionally considered HR-related. This expansion could imply a strategic shift, where HR plays a broader organisational role beyond just managing human capital, possibly integrating organisational development, governance or administrative duties.

"Our HR unit is now a Directorate and as a directorate it is responsible for all HR activities and even other duties that may not be considered as under HR". (TU4)

Sub-theme 1.2: Specific HR Functions

The data from TU2, TU3 and TU4 show a common understanding that the HR departments across the universities are largely responsible for traditional HR functions. TU2 mentions that while "core HR functions" are handled by the HR department, there may be certain functions outside their scope. This suggests that at TU2, there could be specific HR-related functions delegated to other units or shared with other departments, indicating a more traditional or segmented HR structure.

"Appraisals are done and we keep records of staff."(TU2)

TU3, on the other hand, affirms the HR department's comprehensive role in managing "all HR-related activities", highlighting a more centralised and possibly integrated HR

system within the university. This could lead to a streamlined approach where HR activities, from recruitment to employee relations and training, are managed entirely by the HR unit.

"All the relevant HR practices are done in the university including all the ones you have mentioned."(TU3)

TU4 stands out with its description of the HR unit becoming a "Directorate" that handles "all HR activities and even other duties that may not be considered as under HR". This demonstrates an expanded role for HR, where the department is taking on non-traditional functions and participating in broader organisational governance. This transition indicates a strategic shift where HR is not only handling employee management but also contributing to other administrative or strategic domains.

"All the activities you have mentioned are indeed carried out in my university."(TU4)

Theme 2: Technology and Human Resource Information Systems (HRIS)

Sub-theme 2.1: Lack of Fully Functional HRIS

The data from TU2, TU3 and TU4 highlight a shared challenge across all the universities: the absence of fully operational Human Resource Information Systems (HRIS). While TU4 has made some progress, having an incomplete HRIS with only certain modules functioning, TU2 and TU3 do not yet have functional HR software systems in place. The lack of fully functional HRIS across all three institutions points to a critical gap in HR management efficiency. TU2 and TU3 explicitly mention that they are not using any HR software, with TU2 awaiting management's procurement and TU3 in the process of building a system. This highlights the slow pace of HRIS adoption, which can significantly impact HR operations, such as payroll processing, employee record management, and recruitment tracking.

"Currently we are not using any software... management will procure one for us."(TU2)

"We don't have anything like that... but we are building on it."(TU3)

TU4, on the other hand, has made some headway, reporting the use of an incomplete system where only the leave portal is functional. However, this partial implementation suggests that despite intentions to improve HR systems, the institution faces ongoing challenges in achieving full operational capacity.

"We have but it is not functioning... we have now finished with the leave portal."(TU4)

Despite the absence of dedicated HR software, the universities utilise basic technology like computers, emails, and internet access for recruitment, performance management, and record-keeping tasks. The use of general technology in HR functions is a pragmatic response to the absence of fully integrated HRIS. TU2 acknowledges the use of "some form of technology," while TU3 expands this definition by listing everyday devices like phones and printers as technologies used in HR. This suggests that although these universities lack specialised HR software, they are not entirely deprived of technological tools. These basic technologies enable them to carry out crucial HR tasks, albeit in a more fragmented and manual way.

"We are using some form of technology in our department."(TU2)

"Phones, printers, and other electrical devices are all technologies."(TU3).

TU4 provides a specific example of technology use, mentioning the use of emails to send and receive staff appraisal forms. This practice demonstrates how institutions can adapt general technology to fulfill HR needs, such as performance management, in the absence of specialised systems. However, while this approach may suffice for routine tasks, it is less efficient and lacks the streamlined capabilities of an integrated HRIS, which would allow for better data management, automation, and analysis.

"We send the appraisal forms via emails to the staff, and they respond." (TU4)

Theme 3: Integration of Technology in Specific HR Functions

Sub-theme 3.1: Limited Integration of Technology

The extent to which technology is integrated into HR functions varies, with some functions such as performance management and recruitment being handled manually or with minimal technological assistance. The data from TU2, TU3 and TU4 indicate a limited integration of technology in the HR functions of these universities. Participants TU2 and TU3 explicitly state that performance appraisals are conducted manually, while TU4 highlights the limited technological use by noting that appraisal forms are sent via email. The use of basic technology, such as email, represents a step toward digitalisation, but it is far from an integrated HR solution that automates and streamlines HR tasks. The manual processes mentioned suggest inefficiencies in HR functions, as manual methods are typically more time-consuming, prone to human error, and difficult to scale.

"Performance appraisals are done manually."(TU2)

"For now, I think we go manual."(TU3)

"We send the appraisal forms via emails to the staff."(TU4)

Sub-theme 3.2: Partial Use of Technology in Recruitment, compensation management, performance management, training and Record-Keeping

The data from the universities show that the listed HRM functions are partially supported by technology, though they still largely depend on manual methods. The responses suggest that universities are adopting a hybrid model of manual and technological methods in recruitment and record-keeping. For example, TU2 mentions using social media and newspapers, reflecting a partial shift toward digital channels in recruitment.

"Recruitment is done through newspapers and social media."(TU2)

Participant TU4 also points out that some candidates submit applications and CVs online, indicating that certain aspects of the recruitment process are digital.

"Some send their applications and CVs online." (TU4)

However, the reliance on manual processes remains substantial, with TU3 explicitly stating that recruitment is "still manual".

"Recruitment is still manual." (TU3)

Theme 4: Challenges to Technology Adoption

Sub-theme 4.1: Budgetary and Connectivity Constraints

The responses from the participants reflect the significant role that budgetary constraints and internet connectivity play in shaping the adoption of HR technology. Budgetary constraints, such as limited funding or competing financial priorities, are common barriers to the implementation of HRIS in developing regions. This is especially true for public sector organisations such as universities, which often operate with tight budgets. Even when the need for HR technology is recognised, the lack of sufficient funds to invest in HRIS systems can delay its adoption, as reflected in TU3's statement about limited budget allocations.

"Budgetary constraints... every year in our budget we put in something but at the end of the day, the limitations slow down things."(TU3)

Moreover, TU2's comment on management's lack of realisation suggests that decision-makers may not yet see the value of fully integrating HR technology, further contributing to the slow adoption process.

"The challenge is our network... management has not come into realisation that we really need such a software."(TU2)

Similarly, poor internet connectivity is another critical issue that affects the performance of digital HR systems. TU4's emphasis on constant connectivity points to the importance of a stable internet connection for day-to-day HR functions. Inadequate or inconsistent internet access can disrupt communication, data storage, and digital processes, thus reducing the efficiency of any partially adopted HR systems.

"A constant flow of internet connectivity enhances our work."(TU4)

Theme 5: Impact of Technology on HR and University Operations

Sub-theme 5.1: Financial Savings and Efficiency

The use of technology in HR functions across the universities is viewed as a way to achieve financial savings and enhance operational efficiency. Participants identified areas such as recruitment, training and administrative processes (e.g., reducing paper use) where the adoption of technology has or could result in cost reductions and improved decision-making. TU2 believes that the introduction of HR technology will lead to cost savings once it is fully implemented, particularly in recruitment and administrative tasks.

"Once the technology is acquired, it will help in reducing other costs."(TU2)

TU3 highlights a real example of cost savings, where shifting training sessions to Zoom resulted in a 50% reduction in the training budget.

"We saved half of the money budgeted for training by doing it via Zoom."(TU3)

TU4 echoes this sentiment by pointing out that digital solutions can significantly reduce paper use and printing costs, contributing to operational efficiency and environmental sustainability.

"With proper technologies in place, the use of paper and other printing costs will be reduced."(TU4)

Sub-theme 5.2: Enhanced Employee Performance and Internal Processes

Participants in the study consistently noted that technology significantly enhances employee performance and improves internal processes within their respective institutions. TU2 emphasised how technology enables faster task completion and easier workflows, reflecting the potential for time-saving and operational efficiency gains.

"Employees will be able to work faster and complete tasks with ease." (TU2)

TU3 highlighted the accuracy benefits provided by technology, particularly when it comes to data management and reporting. Accurate information allows employees to make better decisions and reduces the likelihood of errors.

"Technology brings more accuracy... information generated from a system is more accurate."(TU3)

TU4 focused on how technology, especially communication platforms like WhatsApp, has streamlined internal communication, allowing for quick dissemination of information to all staff members.

"Information can spread quickly to all staff via WhatsApp platforms."(TU4)

The word cloud in Figure 5.1 highlights key terms and concepts frequently mentioned in the text or discussions related to HR functions, technology adoption, and university staff management. Briefly, one could observe that words like "Information", "Technology" and "Staff" are the largest and most central words, suggesting that discussions focused heavily on how information technology is used by staff in the

university setting. The integration of technology into HR and administrative functions appears to be a significant theme. Moreover, words such as "University" and "Internet" imply that the context involves educational institutions, and the use (or lack) of internet connectivity is likely a recurring topic, possibly tied to technological challenges faced by staff.

Furthermore, the emergence of words like "Performance", "Training" and "Management" suggests that performance management, employee training, and other HR functions are key areas where technology is being applied or discussed. The presence of technology in managing these processes may be part of broader efficiency and cost-saving efforts. The commonality of words like "Recruitment", "Record" and "Functions" implies that recruitment processes and record-keeping are likely key HR functions that are impacted by the level of technological adoption. Discussions around these areas might address partial or manual methods still in place despite the use of basic technologies like email.

Added to the above, the juxtaposition of "software" and "manual" implies that there is limited or incomplete integration of HR software solutions, with some processes still being handled manually. Budgetary constraints or system limitations may hinder the full implementation of dedicated HRIS (Human Resource Information Systems). The uncovering of words such as "Budgetary" and "Connectivity" indicate that these words point to challenges faced by universities, particularly in terms of budget and internet connectivity, which might be barriers to full technological adoption.

The word cloud underscores the ongoing transition towards technology-based HR management in universities, but with considerable limitations. Technology is already in use for some basic HR functions like recruitment and record-keeping, but full integration such as automated performance management and a dedicated HRIS remains constrained by budget and connectivity issues. These constraints prevent staff from fully leveraging technology to optimise internal processes, though there is

optimism about the future impact of more advanced systems, particularly in terms of cost savings and efficiency improvements. The visual emphasises how universities are at various stages of adopting technology, with a mixture of manual and digital practices, suggesting that targeted investments in infrastructure and software could further enhance staff performance and institutional efficiency.

FIGURE 6.8: WORD CLOUD OF THE COMMON WORDS UNCOVERED IN THE TEXTS



Source: Self-generated

From the analysis of the responses, several important conclusions emerge about the role of technology in HR processes at the universities. The three universities have acknowledged the importance of HR technology and its potential benefits but face challenges such as budget limitations and inadequate internet infrastructure. There is also a mix of manual and technological processes in HR operations, with a push toward greater adoption of HRIS in the future. The study reveals that while the universities have made some progress in adopting technology for HR functions, the lack of fully functional HRIS systems, combined with budgetary and infrastructural challenges limits their ability to achieve optimal efficiency. Basic technologies are currently in use but are inadequate to fully support modern HR needs. The potential

for cost savings, improved employee performance, and more efficient processes underscores the importance of greater investment in HR technology. Moving forward, it is crucial for these institutions to prioritise the implementation of integrated HRIS platforms; address financial and connectivity barriers; and enhance their technological capabilities to support the evolving demands of HR functions

6.11 Chapter Summary

In this chapter, the findings from both the quantitative and qualitative phases were presented, based on the analysis of data collected from 306 respondents involved in this study. The reliability of the scales used was assessed using Cronbach's alpha, while the validity of the data was evaluated through factor analysis and Bartlett's Test of Sphericity. This study aimed to develop a model for HRIS adoption and its impact on organisational effectiveness by adapting and combining existing models. The findings revealed that technological, organisational and environmental factors significantly influence HRIS adoption in universities. It was also found that HRIS adoption is primarily at the operational level, where it is mainly used for daily administrative tasks. Furthermore, the study demonstrated that HRIS adoption significantly impacts organisational effectiveness, particularly in terms of financial performance, internal operations, employee performance, and learning and growth within the universities. The next chapter will discuss the findings and data analysis results, addressing each hypothesis posed in the study.

CHAPTER SEVEN

DISCUSSION OF THE FINDINGS

7.1 INTRODUCTION

There is an increasing demand for integrating technology into the activities of higher education institutions, particularly technical universities in Ghana. This demand faces challenges and resistance to adopting new innovations such as Human Resource Information Systems (HRIS). This study aims to explore the extent to which HRIS has been adopted and utilised by Ghanaian technical universities. This chapter discusses the study's findings in relation to the existing body of knowledge. The narratives presented in the preceding chapter indicate that the conditions surrounding HRIS adoption and the actions of the management of these technical institutions significantly impact the success of HRIS in achieving organisational effectiveness.

7.2 DISCUSSION OF THE FINDINGS

This discussion is organised into four sections that align with the research questions of the study. The first section examines the current HRM practices in the universities. The second section assesses the extent of HRIS adoption in these technical institutions. The third section discusses the key factors influencing the adoption and use of HRIS by technical universities. The fourth section evaluates the impact of HRIS on organisational effectiveness from financial, employee, internal process, and learning and growth perspectives. As a preliminary section, the chapter correlates the findings with some demographic information provided by the respondents.

7.2. Respondents' demographic characteristics and HRIS adoption

Demographic characteristics of respondents were considered to ensure a comprehensive understanding of issues related to using HRIS. In the literature, several scholars have shown that the traits of research participants can impact their use of technology, influence their perceptions and the advantages they gain from technology usage.

In terms of gender distribution among the respondents, the results indicated that there are more males (59%) than females (41%). Accordingly, Muhammad, Siddiqui, Rasheed, Shabbir and Sher (2023:11) stated in the study that, generally, male

employees tend to have more computational skills than female. However, this finding contradicts the findings of the study conducted by Orser and Riding (2018:13), which revealed interesting insights regarding gender differences with regard to the adoption of information technology. According to their research, women are generally more inclined to adopt IT compared to men, particularly when it comes to social media and networking technologies. This suggests that women might be more proactive in integrating HRIS in the professional contexts. Other studies like Muhammad *et al.* (2023:9) have also found out that age and gender have no significant role in the adoption of HR information systems when they investigated into the role of age and gender in the adoption of HR Analytics.

It was also found that the participants were well-educated, middle-aged individuals who held diverse positions and had significant work experience. Some scholars have suggested that these characteristics contributed to a higher resistance towards the adoption of HRIS (Soja and Soja, 2020: 422; Lee *et al.*, 2019; Anderson and Perrin, 2017). These scholars are of the view that older and more experienced workers are often more resistant to change because they have become accustomed to traditional routines. For instance, the study by Soja and Soja (2020: 422) revealed that older individuals often have negative beliefs and attitudes towards ICT usage. Furthermore, Anderson and Perrin (2017) indicated that one challenge that older adults face with respect to technology adoption that of lack of confidence regarding their ability to learn to use the HRIS.

Nevertheless, other scholars have argued that participants with these identified traits still have positive attitudes towards the adoption and use of technology. Alnoor *et al.* (2020) supported this view by demonstrating that knowledgeable employees exhibited a higher degree of technology self-efficacy, meaning that they are more confident in their ability to use HRIS effectively. This confidence translates into a more favourable attitude towards HRIS adoption. Njau (2018: 49), for instance, asserted that employees who have received the necessary education are well prepared to

incorporate information systems considering technological progress. Their educational background equips them to adjust to systems and procedures guaranteeing effective transitions into emerging technologies.

Other studies have argued that demographic variables such as gender, qualification, rank and work experience do not have any impact on participants' attitudes towards HRIS adoption (Noutsu, Wamba and Kamdjoug, 2019: 293; Rajawat and Sharma, 2021: 976; Dimaranan, 2024). For instance, Rajawat and Sharma (2021: 976) sought to study the relationships between selected demographic variables such as gender, qualification, rank and work experience on HRIS users' attitudes and behaviour towards their jobs. The findings revealed that there is no significant level of impact from gender, qualification and rank on attitude and behaviour of HRIS users.

Overall, this study highlighted the complex interplay between demographic factors and employee's resistance/acceptance toward HRIS adoption. While some scholars argue that well-educated, middle-aged employees with significant work experience may exhibit resistance to HRIS due to established routines and a lack of confidence in learning new systems, other studies present a contrasting view. These studies suggested that educated and experienced individuals possessed a higher degree of technology self-efficacy, which fosters a more positive attitude toward HRIS adoption. Additionally, there is evidence to support that demographic variables such as gender, qualification, rank and work experience may not significantly impact employees' resistance or acceptance of HRIS.

7.2.2 HR processes and practices

Findings from the quantitative study revealed that most respondents across all the selected universities agreed that the HR departments in their universities are responsible for carrying out HR activities. Regarding the qualitative results, the responses from the HR heads interviewed (TU2, TU3 and TU4) suggested that there was broad consensus that HR departments are largely responsible for a wide range

of HR functions. This indicated that HR units within these universities are well established and manage most traditional HR activities, such as recruitment, compensation, performance management, training and record-keeping. However, there are differences in the scope of responsibilities, with some HR departments extending beyond conventional roles. For example, TU2 acknowledged that while the HR department handled core functions, there may be exceptions where some responsibilities are not within their purview. This suggests a slight limitation or specialisation in HR roles within that institution, possibly indicating that certain administrative or strategic functions might be decentralised or shared with other departments. Traditionally, HR's role was limited to administrative functions, but over the past few decades, HR has increasingly taken on a strategic role within organisations. Pandey and Risal's (2022:18) model of HR transformation emphasises the shift from administrative tasks to that of strategic partners, where HR helps to shape organisational strategies, improve performance, and manage change. The move toward HR directorates, as mentioned by TU4, reflects a growing trend where HR is not only involved in transactional activities but also in transformational roles that influence organisational culture and governance. This mirrors the argument of Mythily and Bella (2024: 9976) who highlight that HR departments are responsible for developing efficient recruitment strategies, evaluating candidates through assessments, and ensuring seamless onboarding experiences. Furthermore, HR professionals focus on enhancing the employee experience, introducing retention programmes, and cultivating a supportive work environment to retain top talent.

The study confirms that HR departments play a central role in managing all HR-related activities, from recruitment and onboarding to employee retention and workplace culture. Their broad responsibilities are essential in shaping the workforce, ensuring organisational growth and fostering a positive work environment that supports both employee satisfaction and overall business success. This highlights the critical role of HR in aligning people management strategies with the goals of the organisation.

The HRM functions evaluated in this study were performance management, recruitment and selection, compensation management, training and development and record keeping. It was revealed in the quantitative study that all these functions were carried out in the selected universities. Similarly, the qualitative data from TU2, TU3, and TU4 show a common understanding that the HR departments across the universities are largely responsible for traditional HR functions. TU2, for example, mentions that while “the core HR functions” are handled by the HR department, there may be certain functions outside their scope. This suggests that at TU2, there could be specific HR-related functions delegated to other units or shared with other departments, indicating a more traditional or segmented HR structure. TU3, on the other hand, affirms the HR department’s comprehensive role in managing “all HR-related activities,” highlighting a more centralised and possibly integrated HR system within the university. This could lead to a streamlined approach where HR activities, from recruitment to employee relations and training, are managed entirely by the HR unit. TU4 however stands out with its description of the HR unit becoming a “directoriate” that handles “all HR activities and even other duties that may not be considered as under HR”. This demonstrates an expanded role for HR, where the department is taking on non-traditional functions and participating in broader organisational governance. This transition indicates a strategic shift where HR is not only handling employee management but also contributing to other administrative or strategic domains.

The findings align with literature on the evolving role of HR in modern organisations (Potgieter and Mokomane, 2020: 5; Patrick and Mazhar, 2021:261; Ogunyomi and Bruning, 2016:66). Ogunyomi and Bruning (2016:66) identified core HRM functions as recruitment, selection, performance management, learning and development, and reward management. Similarly, Potgieter and Mokomane (2020:8) conducted a study on the implementation and perceived importance of HRM functions in small manufacturing companies (SMCs) in South Africa. The findings revealed that HRM functions such as talent management, organisational development, risk management,

and measuring HR success were neither implemented nor considered important in SMCs. While strategic HRM and selection were implemented, they were not perceived as critical. However, functions like recruitment, labor relations, performance management, orientation, and training and development were actively implemented and regarded as important by participants in the study.

The variation in HR responsibilities across the three universities may also reflect differing levels of institutional autonomy and organisational complexity. TU2's indication that not all HR functions are centralised suggests a more compartmentalised approach, possibly driven by decentralisation or organisational silos, a concept discussed in the work of Serrat and Serrat (2017:714). On the other hand, TU3's comprehensive approach aligns with the trend toward a more integrated and cohesive HR management system that supports both operational and strategic functions within an institution.

It is one thing carrying out your mandated functions and another thing doing it effectively. Respondents were therefore asked to indicate how effectively they consider their HR departments were regarding carrying out these activities. Across the four universities, the majority of respondents considered their HR department to be effective in carrying out their functions. According to Ghimire (2020: 5), employees can assess how much the HR department values, cares for, and effectively fulfills its role as an employee advocate by evaluating the department's demonstration of reliability, responsiveness, empathy and assurance.

Patrick and Mazhar (2019:9) argued that HRM functions within an organisation can only be effectively executed by the HR department if top management or business owners clearly communicate the benefits of HR practices within the business environment. As such, implementing HRM functions requires a collaborative effort between top management and employees. This involves engaging employees in the development of policies and procedures and effectively communicating the finalised

policies to staff members. In this context, most participants expressed satisfaction with the services provided by their HR departments.

The findings from the study offered significant insights into the current state of HRM functions in the selected universities, demonstrating a generally positive outlook on the effectiveness of HR departments in fulfilling their roles. The agreement among respondents that HR departments are responsible for key HR activities aligns with established literature, affirming the traditional role of HR in managing the employee lifecycle from recruitment to exit. The study also highlights the execution of various HRM functions, including performance management, recruitment and selection, compensation management, training and development, and record keeping. The consensus amongst respondents across the universities that these functions are being carried out reflected a robust HR infrastructure. While the execution of these functions is crucial, the effectiveness of their implementation is equally important. The respondents' positive evaluation of their HR departments' effectiveness in performing these functions is noteworthy, indicating general satisfaction with the HR services provided by the selected universities.

Notwithstanding, there is always room for improvement as some functions were noted to have more positive evaluations than others. For instance, at TU1, training and development (3.77) and compensation management (3.35) as HR functions, though positive, had slightly lower mean scores when compared to the mean scores of the other functions. According to Gardi *et al.* (2020), training is a basic HR function in which the existence and continuation of any organisation depends on. Burhan *et al.* (2021: 16), similarly explained that improvements in the overall effectiveness and profitability of an organisation can be achieved through staff training and development. In the same vein, Daniel (2019: 26) identified compensation management as an important element of HR management, influencing the decisions of potential employees on whether to join an organisation. Furthermore, it determines the employer-employee relationship once employees join an organisation. In relation to the established importance associated with training and compensation

management, it is important for organisations and institutions like TU1 to make all attempts to improve their training and compensation management activities.

It is therefore essential that all technical universities continuously strive to improve their HR functions, particularly in areas of recruitment and selection, training and development, performance management and record keeping, as well as compensation management. As highlighted, these functions play a critical role in the overall success and sustainability of an organisation. Training for instance is fundamental to ensuring that employees are equipped with the necessary skills and knowledge to perform effectively, while compensation management significantly influences employee motivation, retention and the organisation's ability to attract top talent. Given the established importance of these functions, it is imperative that these technical universities prioritise ongoing improvements in these areas to enhance their operational efficiency, employee satisfaction and institutional effectiveness.

7.2.3 The levels of HRIS adoption

For this study, HRIS was defined to include any form of technology that has been integrated in the HR practices of the universities but not limited to the installation of HRIS software. Furthermore, with regards to this study, HRIS is fully adopted when software has been installed and is already being used in almost all the functions of HRM. This was explained to the participants in the covering letter of the questionnaire sent to them. Against this backdrop, they were asked to indicate whether their university had integrated any form of technology in their HR activities. Across all four universities, respondents confirmed that their university has integrated some sort of technology in their HR activities but had not fully adopted an HRIS.

This quantitative finding was confirmed by the heads of the HR department when they all agreed that there is the absence of fully operational Human Resource Information Systems (HRIS) in their universities. While TU4 has made some progress, having an incomplete HRIS with only certain modules functioning, TU2 and TU3 do not yet have

functional HR software systems in place. The lack of fully functional HRIS across all three institutions points to a critical gap in HR management efficiency. TU2 and TU3 explicitly mentioned that they are not using any HR software, while TU2 is still awaiting management's procurement process to be finalised, while TU3 is in the process of building a system. This highlights the slow pace of HRIS adoption, which can significantly impact HR operations, such as payroll processing, employee record management, and recruitment tracking.

These findings concur with Schislyaeva and Plis (2021) who stated that many organisations in developing nations have been attracted to using IT systems such as e-advertisement and e-interviews in their HR practices and are now in the process of adopting HRIS. Priya and Preetha (2022: 402) also agreed that although the trend is taking effect gradually, organisations in Africa are now adopting information systems for their HR processes. Accordingly, Akpamah and Matko (2021:8) encouraged organisations to integrate technology into their HR management activities by arguing that organisations that did not do so, often failed to introduce database management systems that allowed for efficient management and data integration. Akpamah and Matko (2021:8) went further to suggest that such organisations are open to isolated data, inconsistencies and lack of access to available data.

According to Barišić, Poór, and Pejić (2019: 594), the intensity of HRIS usage is determined by the number of HR functions included into the HRIS software. Therefore, the greater the number of HR functions implemented within the software, the more extensively the HRIS is being utilised. However, findings from this study revealed that the full adoption of HRIS, where HRIS software should have been acquired to manage the HR functions in the universities, was nonexistent. This was confirmed by HR Heads who all stated that no HRIS software is being used for their HR activities. One university admitted that although the university had acquired the software, the system had still not been installed for implementation.

This finding is consistent with most studies examining the adoption of HRIS in African countries. Many of these studies have highlighted that the integration of technology into HR management is still a relatively recent development across the continent. As a result, the introduction and full adoption of HRIS in African organisations is often accompanied by significant challenges (Nguti and Mose, 2021: 557). These challenges hinder the effective implementation and utilisation of HRIS, making it more difficult for African organisations to fully capitalise on the benefits of technology in HRM.

Despite these challenges, there is a growing recognition of the potential of HRIS to improve HR processes, enhance operational efficiency and support organisational growth, making it crucial for African organisations to invest in overcoming these barriers. For this study, in as much as HRIS has not been fully adopted and used in the universities, it is significant to note that some levels of technology have been incorporated in the HR activities of the universities. This is a step in the right direction looking at the vigorous global technology advancement we find ourselves in.

With respect to HRIS usage in the specifically selected HRM functions in this study, (performance management, training and development, record keeping, compensation management and administrative tasks), the findings revealed that the majority of respondents agreed to the use of some level of technology in most of the HRM functions. It was observed that the extent of HRIS usage in these functions varies across the four technical universities. For example, while TU1 uses HRIS mostly in employee record-keeping and training, TU2 mainly uses it in administrative tasks. TU3 exhibited moderate HRIS in daily administrative tasks and training. TU4 also showed good use of HRIS in administrative tasks.

Despite the absence of dedicated HR software as indicated by the heads of the HR units of the universities, they all agreed that basic technologies such as computers, emails, and internet access for recruitment, performance management, and

recordkeeping tasks were utilised. The use of general technology in HR functions is a pragmatic response to the absence of fully integrated HRIS. TU2 acknowledged the use of "some form of technology," while TU3 expanded this definition by listing everyday devices like phones and printers as technologies used in HR. This suggests that although the universities lack specialised HR software, they are not entirely deprived of technological tools. These basic technologies enable them to carry out crucial HR tasks, albeit in a more fragmented and manual way.

These variations in the levels of HRIS adoption can be attributed to the influencing factors of each institution. Accordingly, Qaisar *et al.* (2018: 2) asserted that although HRIS as a concept has been adopted globally, when examining actual utilisation, its coverage remained partial in some functions of HR and to a greater extent on organisations. Consequently, Afriyie, Nyoni and Ahmat (2019: 4) highlighted the notion that sub-Saharan African countries are not meeting the strategic goals for HRIS effectiveness in monitoring workforce in the region.

However, comparisons from these findings indicated that a higher majority of the respondents across all the four universities agreed that HRIS is mostly used in administrative activities. These findings are also confirmed by the qualitative data from TU2, TU3, and TU4 which indicated a limited integration of technology in the HR functions of these universities. Participants TU2 and TU3 explicitly stated that performance appraisals are conducted manually, while TU4 highlighted the limited technological use by noting that appraisal forms are sent via email. The use of basic technology, such as email, represents a step toward digitalisation, but it is far from an integrated HR solution that automates and streamlines HR tasks. The manual processes mentioned suggest inefficiencies in HR functions, as manual methods are typically more time-consuming, prone to human error, and difficult to scale

These are significant findings under the level of HRIS adoption because it reveals that HRIS is being used at the operational level where technology is integrated into the

day-to-day activities of the HR department. This concurs with the findings of several studies which have reiterated that the adoption of HRIS in developing countries like Ghana is apparent at the operational level. For instance, the study of Muhammad, Shah and Azhar (2021: 24) was conducted to explore whether banks in the Pakistani banking sector have started to use HRIS beyond the routine administrative or operational aspects. Their study, however, confirmed that the banks have failed to exploit HRIS to its full potential but are still rather using HRIS at the routine operational level. Naveed *et al.* (2021: 20) also revealed that although the HR department of a public organisation in Pakistan put great efforts into the adopt HRIS, even after a decade of efforts and involvement of multiple vendors, the system could not be adopted successfully. The HRIS initiative which was undertaken in 2007 remains in the operational stage ten years since its implementation.

The adoption of HRIS has been grouped under three levels, depending on what the system is being used for. The identified levels or stages of HRIS adoption in the extant literature are operational, tactical and transformational. The adoption and utilisation of HRIS across the four Ghanaian technical universities revealed varying levels of integration and satisfaction within different HR functions. It was noted that HRIS is used at the administrative level in the four technical universities, however, the aim is to bring it to the strategic stage where it can be used in strategic decision making. Therefore, HR strategy must be aligned with the strategic goals of the organisation that allows HR department and top management to use it at a strategic level to make better decisions for the universities.

7.2.4. Factors influencing HRIS adoption and usage

Findings from TU1, TU3 and TU4 revealed varied challenges in the adoption of HRIS. Common across all universities were infrastructure issues like unreliable internet and inadequate ICT infrastructure, which significantly hindered HRIS adoption. The perceived complexity and integration difficulties of HRIS, along with data security concerns, were also notable barriers. Resistance from employees and a lack of

support from top management further complicated adoption, although there was moderate optimism regarding future investments in HRIS. Financial constraints and the high costs associated with setting up and maintaining HRIS systems were pervasive concerns. External factors such as weak national ICT infrastructure, limited government support, competitive pressures, and local vendor support also influenced adoption rates, with regards to providing some encouragement. Despite these challenges, there was an underlying acknowledgment of the necessity and potential benefits towards the adoption of HRIS within these institutions. A discussion of each factor follows.

7.2.4.1 Technological factors

In this study, items such as ICT infrastructure and internet, complexity, compatibility and data security were used to ascertain the technological factors that influence HRIS adoption in the universities. The findings from the quantitative study indicated that a significant number of respondents believed that the availability of ICT infrastructure influenced the adoption of HRIS. According to Jayadeva, Shikhare and Verma (2022: 5801), ICT Infrastructure is a primary factor and it includes several variables: a robust internet and networking system enhanced HRIS effectiveness, a reliable telecommunication system boosted HRIS efficiency, a dedicated department that addressed IT issues related to HRIS, infrastructure capable of collecting and analysing business data through technology, and an IT infrastructure designed to ensure the safety and privacy of the organisation when using HRIS. Specifically, respondents from the four universities (TU1: mean= 3.45; TU2: mean= 3.38; TU3: mean= 3.01; TU4: mean= 3.37) all agreed that the presence of ICT infrastructure deficiencies impacted the adoption of HRIS.

These findings are consistent with the assertions from several previous studies that have identified technological challenges as significant obstacles towards the implementation of new technologies such as HRIS. For example, Adebayo, Adegoroye and Alimi (2024: 71) noted that inadequate technological infrastructure are

among the technological challenges affecting the adoption of HRIS. Many public organisations suffer from weak internet connectivity and/or a lack of facilities like computer labs and modern computerised systems. Muriithi, Horner and Pemberton (2016) and Pan, Guo, Li and Song (2021: 2) argue that ICT infrastructure significantly influences the choice of technology. Accordingly, the lack of adequate IT systems and infrastructure has been identified as a significant barrier towards the adoption of HRIS in most public organisations in Ghana.

In terms of the complexity of HRIS usage, many respondents across the four universities disagreed with the assertion that HRIS is a complex system to use. This implies that the employees in the universities know their way around technology. This finding might be true, because most of the employees have attained higher educational levels which are associated with the use of information systems. Moreover, most of the academic staff who responded (58.9%) were found to already be using similar systems when uploading results into students' portals. This finding, however, contradicts several studies which found out that most employees find HRIS very complex to use. For instance, a study by Naveed *et al.* (2021:22) found that employees in a public organisation perceived HRIS software to be technical and complicated, requiring a high level of competency to use and maintain. The findings also indicated that only a few employees in the organisation were sufficiently competent to use HRIS software, and those who had the ability to use it efficiently demanded higher remuneration. This contradicted the findings of this study.

Compatibility as a technological factor for HRIS adoption was measured in terms of whether it was a challenge to integrate an HRIS into the current working processes of the universities. Except for TU1, most of the respondents from the other universities disagreed with this assertion. They believed that integrating HRIS into current working processes was not a challenge. Similar to the findings on HRIS complexity, this result may be attributed to the fact that most participants have prior experience with adopting other technologies, such as e-learning, in their universities.

Accordingly, Mairura, Ngugi and Kanali (2016: 504) opined that a positive previous experience of adoption of an innovation will also influence the adoption of new technology, whereas a negative previous experience can negatively impact the adoption of another innovation. Some studies have attributed the inability to adopt HRIS by some organisations to the fact that the technologies cannot be easily integrated into existing processes. Other studies have also sided with TU1 to agree with the assertion that integration of information systems in existing processes is a challenge (Matimbwa and Masue, 2019: 133; He, Zhang and Li, 2021:4).

Privacy and data security has been cited as an obstacle that hinders the adoption of innovations in various studies. Findings from this study, however, revealed a difference from the usual findings. Apart from TU4 whose respondents indicated that they were uncertain about whether data security hinders HRIS adoption, most of the respondents in the other TUs all disagreed with this claim. They were of the view that data security is not a factor that influences the adoption of HRIS in their universities. Studies by Li *et al.* (2016), Alkhater, Walters and Wills (2018) and Xu (2019) all confirm that security and privacy issues greatly influence the adoption of new innovations. These studies concluded that privacy and security are important because an HRIS stores sensitive data which should not be accessible to all the employees.

To maximise the positive impact of information technology on HR functions, universities need to identify and meet the technological resource needs that align with their goals and characteristics. This involves effective planning and the allocation of adequate resources. Thus, universities can harness the full potential of HRIS in managing their human resources

7.2.4.2 Organisational factors

Management support, employee assistance and cost of HRIS adoption were used to measure the organisational factors that influence HRIS adoption in this study. Thus, with reference to the statement “Lack of support from top management hinders

achieving full potential of HR Information System”, the findings revealed that most of the respondents across the universities agreed that the lack of management support negatively affected the adoption HRIS. Noutsu (2017) identified management support as a critical factor in the acceptance and effective use of HRIS. Managers played a key role in engaging users and ensuring their satisfaction with the system. By fostering an environment that encourages HRIS adoption, management can facilitate its successful implementation. Through effective communication, adequate training, and sufficient technical support, employees are more likely to feel supported and recognise the benefits of HRIS in their work.

Similarly, Wijethilaka (2016) found that top-level management support significantly impacted the adoption rate of HRIS in Sri Lanka's banking sector. Management support was evaluated based on factors such as commitment, resource allocation, and participation in HRIS implementation projects. The study revealed that higher levels of top-level management support correlated with higher HRIS adoption rates.

In another study, Ramírez and Tejada (2022:183) explored university stakeholders' perceptions of barriers to HRIS implementation in Spanish universities. The findings pointed to a lack of commitment from top managers, inadequate financial support, and resistance to organisational culture change as major obstacles to successful implementation.

These studies collectively highlight the critical role of management support in facilitating HRIS adoption. Strong commitment from top-level management, adequate resource allocation, and active engagement with employees create a supportive environment that increases the likelihood of successful HRIS implementation and ensures significant benefits for the organisation.

Another measure of organisational factors' influence on HRIS adoption is employee resistance to new innovations. In response to the statement “Adoption and use of new

Information technology/ system face resistance from employees in my institution”, most of the respondents disagreed that there is employee resistance to technology adoption in their universities. This finding might be due to the fact most of the respondents have high educational attainment and thus know the importance of embracing technologies that might be profitable to their universities. This finding contradicts most studies undertaken in this regard (Panjaitan, 2023:133; Srivastava and Bajaj, 2022:11). Findings from these studies indicated that the major setback in adopting new technologies was associated with resistance coming up from its end-users. The research of Srivastava and Bajaj (2022:11) for instance, revealed that small-to-medium organisations are still hesitant to adopt information and communication technologies like HRIS due to their financial constraints and employee resistance. Thus, to enhance the adoption and full utilisation of the HRIS technologies, institutions are encouraged to investigate the perceptions of their employees towards the innovation, before actual adoption is initiated.

In terms of their response to the statement “High cost of setting up and maintaining information technology hinders the adoption and use of HR Information System” with the exception of TU4, whose respondents indicated their uncertainty to this statement, most of the respondents from TU1, TU2 and TU3 agreed with the statement that the high costs involved in the adoption and maintenance of information technologies negatively affected the adoption of HRIS. The findings of several studies tended to confirm these outcomes. Ferdous, Chowdhury and Bhuiyan (2015: 36), for instance, found that organisational internal resistance towards the implementation of HRIS and the associated high conversion costs are the main challenges facing some companies in Bangladesh. Another study by Jayabalan *et al.* (2020:317) concurs that there are disparities between the expected and actual application of HRIS, citing high costs and the reluctance of management as reasons.

It can be deduced from the above discussion that the successful adoption of HRIS is significantly influenced by a range of organisational factors. These include

management support, employee assistance and the costs of HRIS adoption. Strong leadership and clear communication from top management are also crucial in driving the adoption process, ensuring that the necessary resources are allocated and that the initiative aligns with the organisation's overall strategic direction. Organisations that clearly define their goals for HRIS adoption, aligning them with broader business objectives, are more likely to achieve successful outcomes. By addressing these organisational factors, organisations can optimise the benefits of HRIS, leading to improved efficiency, better decision-making and enhanced human resource management capabilities.

7.2.4.3 Environmental factors

Competitive pressure, vendor support and government support were the factors used to evaluate the environmental influences on HRIS adoption. The findings of the study revealed various influencing factors in the adoption of HRIS across the universities. The responses to the statement "Competitive pressures from other institutions have influence the adoption/use of HR Information System in my university" showed that while TU1 and TU2 were neutral to this claim, TU3 and TU3 agreed that competitive pressures from other institutions influenced their universities adoption of HRIS. Past empirical evidence advocated that competitive pressure is an influential driver of IT adoption. Alam *et al.* (2016:16) identified competitive pressure as a fifth significant factor for HRIS adoption in the hospitals of Bangladesh.

Quality assistance from external IT experts, consultants and vendors is one of the most important aspects of the IT adoption process. Thus, regarding the statement "*Vendor supports in terms of quality of technical expertise encourages us to adopt HRIS*", except for TU1, respondents from the TU2, TU3 and TU4 indicated their uncertainty about these statement that vendor supports in terms of quality of technical expertise encourages the adoption of HRIS. However, findings from other studies confirmed that vendor supports play an important role in HRIS adoption.

Another environmental factor that has been identified in the literature is that of support from the government. This may be in terms of the provision of financial support to universities towards the adoption of technologies or providing quality internet connectivity. In respect of this study, the statement “There is adequate financial aid from government to support adoption of HR Information System applications” was provided to respondents to indicate their agreement or disagreement. The findings revealed that respondents from TU3 were unsure whether government gives financial support to institutions to aid in HRIS adoption. TU1, TU2 and TU4 however disagreed that there was support from the government for the adoption of HRIS. This finding is in line with the findings of Matimbwa and Masue (2019:132) who stated that a critical challenge in this regard is that the Government has not invested sufficient funds to procure the required quantity of computers and accessories for maximum utilisation of an HRIS.

The responses from the participants of the qualitative study however reflected the significant role that budgetary constraints and internet connectivity played in shaping the adoption of HR technology. Budgetary constraints, such as limited funding or competing financial priorities, are common barriers to the implementation of HRIS in developing regions. This is especially true for public sector organisations, such as universities, which often operate with tight budgets. Even when the need for HR technology is recognised, the lack of sufficient funds to invest in HRIS systems can delay its adoption, as reflected in TU3's statement about limited budget allocations. Similarly, poor internet connectivity is another critical issue that affects the performance of digital HR systems. TU4's emphasis on constant connectivity points to the importance of a stable internet connection for day-to-day HR functions. Inadequate or inconsistent internet access can disrupt communication, data storage, and digital processes, thus reducing the efficiency of any partially adopted HR systems. The challenges of budgetary limitations and poor connectivity reflect the broader issues faced by many organisations, particularly in developing regions, when implementing HR technology. Studies show that financial constraints are one of the

main reasons behind the slow adoption of HRIS in organisations, especially in public institutions, where the allocation of funds is often restricted and subject to competing demands (Marcel and Tefurukwa, 2020; Evelyne, George, Rwela, Noel and Mkwizu, 2023). These financial limitations can affect both the initial investment in technology and the ongoing maintenance of these systems. Budgetary constraints also mean that universities may struggle to afford comprehensive HRIS solutions that require significant upfront costs, such as software licenses, hardware infrastructure, and training for staff (Valcik, Sabharwal and Benavides, 2023). These issues can be compounded by a lack of strategic prioritisation from management, as indicated by TU2. The failure to recognise the value of HRIS, particularly in cost-sensitive environments, can slow the momentum toward digital transformation in HR functions.

The adoption of IT in universities is a complex process that is influenced by a multitude of factors. The TOE framework provides a comprehensive framework to analyse the technological, organisational and environmental factors that shape IT adoption in an educational institution. By considering technological factors such as compatibility, usability and security, universities can ensure a smooth integration of Information Technology into their existing systems. Organisational factors, including leadership support, effective communication, collaboration, and training programmes, are crucial in creating a positive environment for HRIS adoption. Lastly, environmental factors, such as funding availability and legal compliance, must be considered to ensure the successful implementation and sustainability of HRIS initiatives in universities. Adopting HRIS in universities not only enhances operational efficiency but also provides new opportunities for teaching, research, and collaboration. Universities that effectively navigate these organisational factors are better positioned to leverage the benefits of HRIS and prepare their students for the increasingly digital workplace of the future.

7.2.5 Impacts of HRIS on organisational effectiveness

The implementation of HRIS has been a topic of significant interest in the field of human resources, particularly regarding its impact on the performance of organisations. For this study, HRIS impact were analysed using the balance scorecard perspectives, namely: financial performance, internal processes, employee effectiveness and learning and growth.

7.2.5.1 Impact on Financial effectiveness

The finding from TU1 indicated that most of the respondents (55%) agreed that HRIS helps in reducing HR related costs. This finding aligns with the study of Sandeep and Hussain (2016:87), which revealed that HRIS helped in reducing various costs like labour costs and recruitment costs. Begum *et al.* (2020) sought to examine the association between HRIS and HR costs by focusing on the data of 40 Bangladeshi banks. The study found that the use of HRIS applications generated higher efficiency in terms of employee productivity and the reduction of HR costs. Similarly, a study by Anupa (2021: 25) examines the role of HRIS in accelerating organisational effectiveness in IT companies. The study reveals that HRIS plays a crucial role in reducing costs related to record-keeping and significantly benefits the firm's finances, with 86.7% of the respondents affirming its financial advantages and positive impact on overall cost savings. Another study by Bony and Fatema (2024:82) found that HRIS affects key financial metrics, including revenue per employee, ROA, ROE and ROI by optimising workforce management, elevating employee satisfaction and engagement, reducing costs, and facilitating data-driven decision-making. Bony and Fatema (2024:82) therefore argued that a well-implemented HRIS aligns HR strategies with organisational objectives, ultimately bolstering overall profitability and financial performance.

Interestingly however, a notable portion of respondents from the other universities, (TU2=36.5%, TU3=36.6%. TU4=49.5%) were uncertain about the financial benefits of HRIS in reducing overall HR costs. This uncertainty reflects a trend in literature where the direct financial benefits of HRIS are often debated. Sadiq *et al.* (2022: 80)

argued that it is very difficult to ascertain the value addition made by HRIS on the revenues and profits of an organisation since strategic HRIS is beneficial in facilitating only decision-making processes. Studies have indicated that while HRIS can lead to cost savings through automation and improved efficiency, the initial investment and maintenance costs can be substantial (Bamel, 2020). Therefore, it is crucial for universities to conduct thorough cost-benefit analyses to fully understand the financial implications of HRIS implementation. Accordingly, Kaygusuz (2016:47) note that the impact of HRIS on cost management can be enhanced by assigning a supervising user in each department and offering training for the use of the system to provide guidance to the employees with a view to achieving an effective use of the system.

7.2.5.2 Impact on Internal Processes effectiveness

Effectiveness in the internal processes was measured using two statements. The majority of respondents from across the four universities agreed that HRIS helps to improve the efficiency of internal operations in the university. These findings align with various studies identified in literature. For instance, Ramirez and Tejada (2022:183) attempted to understand stakeholders' perceptions of the impact of the effective implementation of HRIS on university efficiency in Spanish public universities. The findings revealed that HRIS implementation led to increased transparency and quick responses and easy access to information. Hosain *et al.* (2020:40) also tried to reveal the role of HRIS on the operational efficiency (OE) of selected multi-national corporations (MNCs) in Bangladesh. The findings indicated that HRIS had positive relationships with operational efficiency.

Similarly, several respondents also acknowledged that HRIS has improved the efficiency of internal operations by reducing the use of paperwork in the university, as task move on-line. Manivannan and Jayasakthivel (2016) confirmed that implementing HRIS reduces paperwork, enhances data control, decreases workforce requirements, and enables quick access to information. Similarly, Kumar (2018) evaluated the extent to which HRIS improves organisational efficiency in an

interconnected and holistic manner, focusing on its impact on HR processes, time management, employee relocation and managerial satisfaction. The findings revealed that HRIS significantly enhances overall organisational efficiency and its various dimensions, though the degree of improvement varies across areas.

The implementation of HRIS in a university setting leads to significant improvements in internal processes by enhancing data management, improving compliance, optimising recruitment and onboarding, facilitating performance management, enabling efficient resource allocation, improving employee self-service, and supporting strategic planning. HRIS can streamline various HR functions, reducing the time and effort required for administrative tasks (Kumar and Jagadeesan, 2024:5942). By automating routine processes, HRIS allows HR professionals to focus on more strategic activities, thus enhancing overall organisational efficiency. These enhancements result in more efficient and effective organisational internal operations (Rahman and Hosain, 2021: 12).

7.2.5.3 Impact on Employee Effectiveness

Findings from the quantitative study revealed that most respondents acknowledged that an HRIS helps to simplify and improve the quality and timeliness of employees, enhances employees' participation in HR activities and improves employees' performance. This is consistent with findings from contemporary studies that emphasise the role of HRIS in improving employee productivity by providing timely access to information and facilitating better decision-making (Parry and Battista, 2019). Moreover, the reduction in paperwork reported by 50.4% of respondents suggests that HRIS contributes to a more streamlined and less cumbersome administrative environment, which can further enhance employee effectiveness.

Kemei (2019) examined the influence of HRIS utilisation on employee performance in private universities in Kenya and concluded that optimising HRIS component functions significantly enhances employee performance. Specifically, employee

performance improves when the HRIS self-service portal is easily accessible. HRIS also facilitates better human resource records management and more efficient communication within organisations.

Similarly, Ololade, Paul, Morenike and Esitse (2023: 9) highlighted the impact of HRIS on employees' behavioral outcomes in selected manufacturing firms in Nigeria. The study emphasised the importance of HRIS in managing and monitoring employee data, particularly its capability to track employee movements and behaviors within organisations. Both the study findings and literature reviews underscored the role of HRIS in optimising HR functions, influencing employees' behavioral outcomes, and enhancing data management. Shahreki et al. (2019) demonstrated that implementing HRIS significantly improves employee satisfaction and reduces turnover intentions. Their findings suggested that by reducing workload and eliminating redundancies, HRIS contributes to greater employee satisfaction and lower turnover rates. Lukito (2016:533) investigated the relationship between HRIS and university performance. The study revealed that the use of technology in public universities in West Sumatra led to improved organisational performance.

An HRIS positively impacts on a university's employees' performances by automating administrative tasks, providing easy access to information, supporting targeted training, enabling continuous performance management, facilitating data-driven decision-making and enhancing communication and collaboration. These improvements lead to higher productivity, better employee engagement and more effective performance management.

7.2.5.4 Impact on Learning and Growth

Regarding learning and growth, the majority of respondents felt that HRIS facilitates learning and knowledge management and improved competitive advantage. This indicated that an HRIS is perceived as a valuable tool towards fostering a culture of continuous learning and development within the organisation. Additionally, most

respondents across the universities noted the role of HRIS to increase employee engagement in HR activities and in promoting a more participative and inclusive workplace environment. According to Kannipamula (2020: 29), organisational learning involves the generation of ideas, the acquisition, and integration of knowledge, all aimed at enhancing performance while also boosting employees' intellectual capabilities.

Barišić, Poór and Pejić Bach (2019:588) noted that HRIS can support education and training administration and monitoring, career-planning, employees and managers skill testing, assessment and development as well as management development. Similarly, Namwoonde (2019: 89) highlights that the implementation of HRIS has facilitated better information sharing, learning, and knowledge management. It has allowed staff and experts working overseas to collaborate on work challenges, provide coaching, and support each other in problem-solving, regardless of their physical locations. This collaborative approach eliminated the need for employees to travel to gain the knowledge required for their tasks, thereby saving both time and costs.

The implementation of HRIS has a profound impact on organisational learning and growth. HRIS enhances the organisation's ability to share information and manage knowledge effectively, facilitating continuous learning among employees. By enabling seamless communication and collaboration across geographical boundaries, an HRIS supports the development of a more knowledgeable and skilled workforce. This improved access to information and expertise not only accelerates problem-solving but also fosters innovation and adaptability within the organisation. Moreover, an HRIS contributes to organisational growth by reducing the time and costs associated with traditional learning and development methods. The system's ability to streamline processes and integrate learning into daily operations empowers employees to acquire new skills and knowledge more efficiently, driving overall performance improvements. As a result, organisations that effectively leverage HRIS are better

positioned to achieve sustainable growth, as they can more readily adapt to changing business environments and capitalise on new opportunities.

Regarding the finding from the qualitative study, it was identified by the heads of the HR units that the move from traditional, paper-based processes to digital platforms can reduce expenditures in areas such as printing, travel and administrative labour. For instance, the use of digital recruitment platforms allows organisations to reach a wider pool of candidates without the need for expensive advertisements in print media. Similarly, training programmes conducted via digital platforms, such as Zoom, as mentioned by TU3, can save costs related to venue hire, materials, and travel (Sikira and Mishael, 2024:6054).

The HR heads again observed that transition to HRIS also improves efficiency by automating repetitive tasks, thereby reducing human error and speeding up decisionmaking. For example, using an HRIS to manage employee data or conduct performance appraisals enables faster data retrieval, more accurate record-keeping, and timelier feedback (Savitri, Buchori and Supratikta, 2024). This for instance, aligns with TU4's observation that digital technologies reduce the need for paper-based documentation, contributing to both cost savings and environmental benefits.

Another perspective from the HR heads suggests that the use of technology in HR functions and internal processes facilitate smoother operations, greater accuracy in decision-making, and more effective communication channels. Although the universities may not yet have fully implemented advanced HR systems, the technology they use still contributes positively to their internal efficiency. This aligns with TU2's HR head's observation that technology helps employees' complete tasks more efficiently. Automating routine tasks such as data entry, payroll processing, and recruitment administration reduces the time spent on such activities, leading to improved overall performance (Bondarouk and Brewster, 2016).

In terms of accuracy, TU3's remark that technology leads to more accurate information generation is echoed in studies that emphasise how digital HR systems reduce human error and enhance data reliability. Electronic databases, for instance, ensure that information is stored and processed accurately, reducing mistakes associated with manual processes (Savitri, Buchori and Supratikta, 2024.). Accuracy is particularly critical in HR functions such as performance appraisals, payroll, and compliance management, where errors can have significant negative consequences.

The use of technology also improves internal communication, as TU4's statement about WhatsApp platforms demonstrates. Effective communication is a key aspect of organisational performance, and digital platforms enable quicker and more reliable information sharing across the organisation. Research highlights the role of digital communication tools like email, messaging apps, and intranets in fostering collaboration and ensuring that important information reaches all relevant parties promptly (Sharbaji, 2021:15). By facilitating instant communication, these tools help reduce delays and miscommunication, leading to smoother internal processes.

The implementation and effectiveness of HRIS have garnered considerable interest, particularly in the context of their impact on various organisational dimensions such as financial performance, internal processes, employee effectiveness, and learning and growth. The recent survey results provide a nuanced understanding of how HRIS is perceived within a university setting. The implication of these findings from the HR heads of the universities is that they should invest more to upgrade the HRIS system to enhance extensive adoption, which will ensure greater use of HRIS in the universities.

Moreover, technology supports not only communication but also knowledge sharing, which is critical for enhancing employee performance. Platforms such as learning management systems (LMS) or collaborative tools (e.g. Microsoft Teams and Slack) provide employees with access to training materials, performance feedback, and

updates, which help improve their knowledge and job performance (Gameil and AlAbdullatif, 2023: 4). The adoption of these systems fosters a learning culture within organisations, encouraging continuous development and performance improvements among employees.

7.3 Fitness of the conceptual framework to the study

After reviewing the concepts of HRIS and organisational effectiveness, along with the theories and approaches that typically support HRIS adoption and organisational performance, a conceptual blueprint for the current study was developed. The overall fit of the conceptual framework for the study was assessed using the multiple fit criteria and the fit indices statistical tests. These tests indicated that the conceptual framework fits the data well.

The conceptual framework for this study was developed through the integration of the factors that are assumed to influence the adoption of HRIS through to its impact on organisational effectiveness in terms of the balanced scorecard perspectives. Thus, two constructs/relationships were developed from the tests.

- Relationship between the factors influencing HRIS adoption and the level of HRIS adoption.
- Relationship between the level of HRIS adoption and the impact of HRIS on organisational effectiveness.

Furthermore, after the relationships have been established, there is the need to assess the path of the relationship. That is to show whether there is a positive (direct) or a negative relationship amongst the constructs. This was done using the standardised regression weights of selected output. The subsequent sections analyse these relationships and the paths amongst the constructs.

7.3.1 Relationship between the factors influencing HRIS adoption and the level of HRIS adoption

The fit indices indicated that there is a weak to moderate positive relationship between the factors influencing HRIS adoption (FIA) and the level of HRIS adoption (AHS). The correlation estimate (0.300) suggests that the FIA have a moderate association with the actual level of adoption and the use of HR information systems in HR functions. The decision to adopt and successfully implement HRIS is influenced by various factors, both internal and external to the organisation. Understanding the relationship between these influencing factors and HRIS adoption is critical for ensuring successful implementation. The adoption of HRIS is often a function of how these factors interact. These factors are interrelated, and their effective management is crucial for successful HRIS adoption.

Organisations that carefully assess these factors and implement strategies to mitigate challenges, such as user resistance or financial constraints, are more likely to realise the benefits of HRIS in improving HR operations and decision-making. For instance, technological factors such as internet connectivity and system compatibility must align with organisational factors such as top management commitment and resource allocation to facilitate HRIS adoption. Similarly, environmental factors, such as industry competition or regulatory demands, can drive organisational urgency to adopt HRIS. According to Bensaid (2023), good organisational culture, leadership, and communication strategies significantly impact HRIS adoption by shaping employee attitudes, fostering acceptance, and ensuring effective training and support throughout the implementation process. Marler and Boudreau, (2017) and Bamel *et al.* (2020), believed when HRIS has a user-friendly design, operational success is higher, and a simple and intuitive interface reduces resistance and improves the daily use of the system. Overall, these factors create a synergistic effect that can either facilitate or hinder the adoption process, emphasising the need for a holistic approach in implementation strategies (Quaosar *et al.*, 2024).

Conversely, while these factors are critical, challenges such as resistance to change and inadequate training can impede HRIS adoption, highlighting the complexity of the adoption landscape in various organisational contexts. The relationship between HRIS adoption factors and the level of HRIS adoption exhibits variability across different organisational contexts. Research indicates that while certain factors can affect one organisation, those factors can be a stepping-stone for other organisations in HRIS adoption (Kurnia, Parker, Ali and Karnali, 2019; Barišić, Tomić and Bach, 2022). This suggests that while some elements may be universally applicable, others are context dependent.

7.3.2 Relationship between the level of HRIS adoption and the impact of HRIS on organisational effectiveness

The study found out that there is a strong positive relationship between AHS and Impact on Organisational Effectiveness (IOES). The high correlation estimate (0.788) indicates that a higher level of adoption and use of HR information systems is strongly associated with a greater impact on organisational effectiveness. This implies that the effective use of HRIS in HR functions significantly enhances organisational performance.

Likewise, the path from AHS and IOES was statistically significant ($\beta = 0.746$; CR = 10.776; $p < 0.001$), indicating that higher levels of HRIS adoption and use in HR functions have a substantial positive impact on organisational effectiveness. The decision rule thereby is to reject the null hypothesis (H_0) and accept the alternate (H_3) that states: the impact of AHS on IOES will be positive.

The level of HRIS adoption significantly influences its impact on organisational performance metrics. High levels of HRIS adoption lead to improved efficiency, effectiveness and competitive advantage for organisations. HRIS facilitates structured performance appraisals, continuous feedback, and effective career development, enhancing employee performance and satisfaction (Savitri *et al.*, 2024). Thus,

organisations with comprehensive and strategic HRIS implementations report better alignment of HR functions with overall performance goals and improve decision-making processes. (Qaisar, 2018; AMARA *et al.*, 2022). Similarly, Barišić, Poór and Bach (2019: 586) explain that the toughest impact on organisational effectiveness is attained through the intensity of HRIS usage and this is measured by the number of different functionalities available in the HRIS software systems. Conversely, partial or ineffective HRIS adoption can hinder performance outcomes, suggesting that organisations must ensure comprehensive implementation to realise the full benefits of HRIS (Qaisar, 2018).

The study revealed a strong positive relationship between the level of HRIS adoption and its impact on organisational effectiveness. This finding suggests that as organisations increase their adoption and integration of HRIS, they experience greater improvements in operational efficiency, decision-making accuracy and overall workforce management. Higher levels of HRIS adoption enable organisations to streamline HR processes, reduce administrative burdens, and enhance data-driven strategies, ultimately leading to better organisational outcomes. The results emphasised the critical role that advanced HRIS adoption plays in driving organisational success by improving productivity, communication, and alignment between HR functions and broader business objectives. Therefore, to fully capitalise on the potential of HRIS, organisations should not only invest in technology but also foster a culture of continuous system utilisation and innovation.

The relationship between the level of HRIS adoption and its impact on organisational effectiveness demonstrates the strongest, most direct and positive connection between the two latent variables, with a factor loading or correlation index of $\beta = .746$, making it the most significant path within the structural framework. However, all identified relationships are supported by the data, confirming significant connections between the variables. Each independent variable exerts a meaningful influence on its corresponding dependent variable.

7.4 Theoretical implications of the study

The integration of the Technology-Organisation-Environment (TOE) model and the Balanced Scorecard (BSC) approach provides a comprehensive theoretical framework for examining the impact of HRIS adoption on organisational effectiveness. Each model offers unique insights, and when combined, they create a holistic perspective on the factors influencing HRIS adoption and its subsequent effects on an organisation's effectiveness.

The TOE model, which considers technological, organisational and environmental contexts, allows for an in-depth analysis of the multifaceted factors that influence the adoption of HRIS. Technological factors, such as system compatibility and innovation, assess the organisation's technological readiness and the potential for HRIS to enhance operations. Organisational factors, including culture, structure and resources, evaluate how well the internal environment can support the adoption and integration of HRIS. Environmental factors consider external pressures, such as market trends and regulatory requirements, which can drive or hinder HRIS implementation. By using the TOE model, researchers can systematically explore the complexities surrounding HRIS adoption and identify key drivers and barriers to successful implementation.

On the other hand, the Balanced Scorecard (BSC) offers a comprehensive effectiveness measurement tool that extends beyond traditional financial indicators by integrating four key perspectives: financial, customer, internal processes, and learning and growth. This approach allows for a more nuanced understanding of how HRIS adoption influences various aspects of the organisation. For instance, the financial perspective can assess cost savings and ROI from HRIS implementation. The customer perspective examines how HRIS improves service delivery and satisfaction. The internal processes perspective evaluates enhancements in operational efficiency and decision-making capabilities, while the learning and growth

perspective focuses on HRIS's role in fostering employee development and innovation.

The theoretical implications of using both the TOE model and the Balanced Scorecard are significant. By combining these frameworks, researchers and practitioners can achieve a more comprehensive understanding of the impact of HRIS adoption on organisational effectiveness. The TOE model helps identify the critical factors that affect HRIS adoption, while the Balanced Scorecard provides a structured approach to measuring the outcomes of that adoption. Together, they offer a robust framework for evaluating how well HRIS supports an organisation's strategic goals and contributes to its long-term success. This dual approach not only enhances the rigour of research but also provides practical insights for organisations seeking to optimise their HRIS investments to drive overall effectiveness and competitive advantage.

While many studies on technology adoption have predominantly utilised established theories such as UTAUT and TAM, very few have integrated these models with the Balanced Scorecard approach. The distinctiveness of this study lies in its unique combination of these frameworks. Unlike previous research, this study not only thoroughly examines the impact of HRIS adoption on organisational effectiveness but also provides a detailed analysis of how HRIS influences various dimensions of effectiveness.

Theoretically, this study makes a significant contribution by identifying the key factors that lead to a deeper and more comprehensive understanding of HRIS adoption, particularly within the context of universities in Ghana. By doing so, this research extends the current body of literature on information system adoption in several important ways. Firstly, it enriches the existing knowledge on HRIS implementation in university settings, offering new insights and a more nuanced perspective on the factors that drive successful adoption and its subsequent impact on organisational effectiveness. Additionally, the uniqueness of integrating TOE and the balance scorecard theoretical models validate that such a rich combination will draw more

attention among information technology scholars to use such combination of adoption-impact models in studying future emerging technologies.

7.5 Practical implication of the study

This study provides a robust, multi-dimensional approach that can guide organisations in both the implementation of HRIS and the assessment of its outcomes. The findings from this study present several practical implications for Ghanaian Technical Universities and the Ghanaian government to enhance the use of HRIS, thereby improving organisational effectiveness. These implications highlight actionable insights and strategies that can be implemented to maximise the benefits of HRIS adoption.

The integration of the TOE model and the BSC approach enables organisations to make informed strategic and practical decisions about HRIS adoption. The TOE model offers a structured way to evaluate whether the organisation is ready for HRIS implementation by assessing technological capabilities, organisational readiness, and environmental pressures. This helps the universities' management to identify potential barriers and opportunities, allowing for better planning and resource allocation. Meanwhile, the BSC provides a clear framework to measure the impact of HRIS on key performance areas, ensuring that the system aligns with the organisation's strategic goals.

This study found that the use of HRIS significantly enhances organisational effectiveness, as demonstrated by both the qualitative and quantitative findings. However, the research revealed that universities have not yet fully adopted HRIS. Therefore, university management should consider acquiring HRIS software to maximise its utilisation. Doing so would amplify the benefits associated with HRIS, ultimately improving institutional effectiveness across all dimensions.

This study highlights that ICT infrastructure and internet connectivity significantly influence the use of HRIS within university HR departments. Consequently, university stakeholders should implement appropriate measures to enhance system quality, including establishing and monitoring a dedicated maintenance team. A significant practical implication of HRIS adoption is the potential for cost reduction and better resource allocation. The study shows that HRIS can reduce costs associated with manual HR processes, such as paper-based record-keeping and manual payroll processing. Moreover, by optimising resource use, HRIS can help institutions allocate their HR budgets more effectively, ensuring that investments in employee development and other HR initiatives yield the highest returns.

In summary, the practical implications of the study on HRIS adoption for organisational effectiveness demonstrate the transformative potential of HRIS in enhancing HR operations, supporting strategic decision-making, improving employee satisfaction, and ensuring compliance. Organisations that effectively implement HRIS can expect to see significant improvements in their overall performance and a stronger alignment between their HR functions and strategic objectives.

By pursuing these avenues for future research, scholars and practitioners can gain a more holistic understanding of HRIS adoption and its implications for organisational effectiveness in the context of Ghanaian technical universities and beyond.

7.6 Chapter summary

This chapter presented an in-depth analysis of both the quantitative and qualitative findings from the study. The results are framed within the conceptual framework developed earlier in the research, linking key variables and relationships. Key metrics such as HRM practices, level of HRIS adoption, factors influencing HRIS adoption and impact of HRIS on organisational effectiveness were examined, showing empirical studies that support the findings revealed in the study. The qualitative insights gathered through interviews with HR heads of the universities were used to

either confirm or contrast the findings of the quantitative findings. The findings align with the proposed conceptual framework, which theorises that the level of HRIS adoption is influenced by technological, organisational and environmental factors. Depending on the success of the level of HRIS adopted, the four perspectives of organisational effectiveness can be achieved.

Theoretically, the study contributes to existing literature by providing empirical evidence that supports the effective adoption of HRIS and its impact on organisational effectiveness. Practically, the findings offer actionable recommendations for policymakers. Future research could expand the study to include other sectors, regions or countries to allow for comparative analysis, enriching the understanding of HRIS adoption.

CHAPTER EIGHT

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

8.1 INTRODUCTION

This chapter provides a comprehensive overview of the study exploring the extent of HRIS adoption for organisational effectiveness within selected Ghanaian technical universities. It presents a concise summary, conclusions and recommendations derived from the findings and their interpretations. Furthermore, the chapter explores potential avenues for future research in this domain and concludes by outlining the implications for policy and practice based on the study's insights. The descriptive

research with a mixed method approach of data collection was used for the study. Cluster and purposive sampling techniques were used in selecting respondents for the study. Questionnaire and interview guides were the data collection instruments used for the data collection.

8.2 CONCLUSIONS OF THE STUDY

The conclusions presented in this study are derived from a comprehensive analysis of the research objectives, which aimed to assess the extent of HRIS adoption in selected Ghanaian Technical Universities. These findings are grounded in the data collected, analysed and interpreted to address the research questions and objectives of the study.

8.2.1 Objective 1: Current HR processes and practices in the selected Ghanaian Technical Universities

The first objective sought to analyse the current HRM practices of the universities in terms of recruitment, performance appraisal, compensation management and employee record-keeping. The study revealed that all four universities demonstrated a strong acknowledgment of the HR department's responsibility for HRM practices, with consistently high mean scores. Employee record-keeping was another area of strength across the universities, receiving high satisfaction ratings. However, compensation management consistently emerged as a weaker area, with all universities indicating a need for improvement. Training and development, performance appraisal, and recruitment and selection were seen in a positive light, but with varying degrees of satisfaction and consistency in implementation. Notably, the effectiveness of HR departments and satisfaction with HR services showed moderate scores with room for enhancement, particularly in ensuring that policies were consistently applied. Overall, while there were areas of strong performance, each university showed specific aspects of HR practices that could benefit from focused improvements to boost overall employee satisfaction and policy consistency.

8.2.2 Objective 2: The extent of HRIS adoption in the Human Resource functions of the selected Ghanaian Technical Universities

The second objective sought to explore the level of adoption and use of HRIS in Human Resource functions in the selected Ghanaian Technical Universities. The study found out that the adoption and utilisation of HRIS across four Ghanaian technical universities revealed varied integration and satisfaction levels across different HR functions. TU1 showed a high appreciation of HRIS for strategic decision-making, with notable effectiveness also in employee record-keeping and training, although compensation management and recruitment revealed lower satisfaction levels. TU2 valued HRIS highly for strategic decisions and administrative tasks, yet faced challenges in compensation and recruitment. TU3 reflected moderate HRIS integration, particularly effective in daily administrative tasks and training, yet struggling in recruitment and performance management. Finally, TU4 demonstrated good use of HRIS in administrative and strategic areas but showed lower integration in general HRM, recruitment and compensation practices. Across all universities, there was a trend of high variability in responses, indicating diverse experiences and perceptions of HRIS effectiveness, with a common use of HRIS in the day-to-day administrative activities of the HR department and areas for improvement in recruitment, compensation management, and broader HRM integration.

8.2.3 Objective 3: Factors that influence the adoption of HRIS in the selected Ghanaian Technical Universities

The next objective was to explore the factors that influenced the adoption of HRIS in the selected Ghanaian Technical Universities through the eyes of the TOE model. It was found that all four universities (TU1, TU2, TU3 and TU4) revealed various challenges regarding the adoption of HRIS. Common across all universities were infrastructure issues like unreliable internet and inadequate ICT infrastructure, which significantly hindered HRIS adoption. Contrary to expectations, this research found that perceived complexity, integration difficulties, employee resistance and data

security concerns did not present significant barriers to HRIS adoption and use within the selected Ghanaian universities.

A lack of support from top management and financial constraints, along with the high costs associated with setting up and maintaining HRIS systems, were noted to complicate the adoption and use of HRIS, although there was moderate optimism regarding future investments in HRIS. External factors such as weak national ICT infrastructure and limited government support also influenced adoption rates. There was however mixed feeling among the respondents of the universities in relation to the influence of competitive pressures and local vendor support on HRIS adoption. Despite these challenges, there was an underlying acknowledgment of the necessity and potential benefits of adopting HRIS within these institutions.

8.2.4 Objective 4: Impact of HRIS applications on organisational effectiveness in the selected Ghanaian Technical Universities

The fourth objective sought to investigate the extent to which HRIS impacted institutional effectiveness. This was analysed using the perspectives of the balance scorecard measurement of effectiveness. The findings revealed that there were mixed feelings or uncertainties about the financial benefits of HRIS with regard to the reduction of overall HR costs. Thus, respondents were not convinced that HRIS had a significant effect on the financial effectiveness of the universities. With respect to the impact of HRIS on effectiveness of internal processes, most respondents from all four universities agreed that HRIS helped to improve the efficiency of internal operations in the university. This implied that the impact of HRIS on internal process effectiveness was confirmed by this study. For employee effectiveness, the study revealed that respondents acknowledged that HRIS helped to simplify and improve the quality and timeliness of employees, enhanced employees' participation in HR activities and improved employees' performances. This confirmed the impact of HRIS on employee effectiveness in the selected universities. Regarding learning and growth effectiveness, the study indicated that respondents perceived HRIS to be a

valuable tool for fostering a culture of continuous learning and development within the organisation. Furthermore, this finding affirmed the impact of HRIS adoption and use on the learning and growth effectiveness of the universities concerned.

8.2.5 Objective 5: A conceptual framework for effective HRIS adoption in the selected Ghanaian Technical Universities

The last objective of the study was to provide a framework to indicate how HRIS adoption impacted on effectiveness in the selected Ghanaian Technical Universities. The conceptual framework developed for the study was in response to this objective. This research chose to examine the impact of HRIS through the eyes of balanced scorecard perspectives. This aspect highlights the uniqueness of this study as virtually no studies have analysed the impact of HRIS in a holistic way like this study has done.

8.3 RECOMMENDATIONS OF THE STUDY

From the findings and conclusions, the following recommendations are proposed. By addressing these recommendations, universities can enhance the adoption and utilisation of HRIS, ultimately improving operational efficiency and supporting strategic human resource management. This holistic approach ensures that HRIS becomes an integral part of the university's administrative framework and drives meaningful outcomes.

8.3.1 Ensuring Continuous strive to improve human resource functions and practices

University management should be able to ensure that can ensure effective HRM practices that not only meet organisational needs but also support employee wellbeing and institutional success are employed. In order to do this, universities need to establish clear, inclusive, and well-documented HR policies that align with the institution's mission and goals. According to Sonar and Pandey (2023: 44), leaders of organisations need to explore the development, implementation, and perceptions of

HR policies and practices from various stakeholders, including employees. Thus, the implementation of HRM functions should be a collective teamwork from the top management to the employees. This can be done by involving employees in the process of developing the policy and procedure and communicating the approved policy and procedure to staff members. These policies should address all key HR practices such as recruitment, performance management, employee record keeping, compensation management and training and development.

8.3.2 Conducting Comprehensive Needs Assessment for Effective HRIS

Adoption

This study recommends that universities undertake a needs assessment before initiating the adoption of a HRIS. It is crucial that the universities conduct a comprehensive needs analysis, which involves key stakeholders, including university administration, HR staff, IT departments, and faculty representatives to identify specific needs and challenges. As purported by Panjaitan (2023: 133), implementing an HRIS begins with conducting a needs analysis to identify the specific requirements of the organisation for the system. This analysis should assess the current HR processes, identify inefficiencies, and determine how an HRIS can address these issues. According to Purwoko, Saksana and Soehaditama (2023: 3262), Key Performance Indicators (KPIs) are essential tools that enable organisations to measure progress, evaluate success in achieving strategic and operational objectives, and make informed decisions based on critical insights into their operations. Nasution and Sembiring (2019: 3) therefore suggest that organisations can evaluate their HR processes using KPIs such as reduced HR management costs, employee productivity, employee satisfaction, timely completion of tasks and turnover rates. These methods help identify gaps that HRIS could address to enhance HR management effectiveness. A comprehensive needs assessment with these methods will ensure that the decision to adopt an HRIS is data-driven and aligned with the university's strategic goals. As established in this study, the cost of setting and maintaining HRIS is very high. Therefore, in order to justify the investment for the

university, a proper needs assessment must be undertaken to ascertain the specific needs for the HRIS. The cost-benefit analysis of HRIS adoption must be positive.

8.3.3 Ensuring Resource Allocation and Top Management Support for HRIS Implementation

Following the confirmation of the need for an HRIS, it is essential to allocate adequate financial and technical resources to support both the adoption and ongoing maintenance of the system. This includes budgeting for the initial purchase, implementation costs, training, and continuous system upgrades. Adequate resource allocation ensures that the HRIS can function optimally without disruptions. This is where top management support comes in since the decision to adopt finally rests with them. Top management should visibly endorse the HRIS project to signal its importance to the entire university. Their commitment can foster a positive attitude towards the system among staff and encourage their co-operation. To secure top management support for adopting and implementing an HRIS, the HR department should present a well-structured proposal highlighting the Return on Investment (ROI) for HRIS. This proposal should include detailed cost-benefit analyses to effectively demonstrate the value of the HRIS and persuade management to provide their support. As reported by Naveed, Suhail and Rana (2021: 23), gaining this support is critical for the success and sustainability of an HRIS. They propose effective strategies such as engaging key stakeholders, employing rational persuasion and utilising exchange tactics.

8.3.4 Comprehensive HRIS solutions implementation

After confirming the decision to adopt an HRIS and securing resources for software, hardware, training and maintenance, the next step is to finalise the requirements specification. This involves listing the essential features of the HRIS based on insights gained during the needs assessment. At this stage, the institution must decide whether to adopt an Operational HRIS, Tactical HRIS or Strategic HRIS. This study emphasises the importance of acquiring an HRIS that supports strategic decision-

making, hence recommending the adoption of a strategic HRIS. Alam and Kashem (2022: 5) concur with this by stating that HRIS has the potential of transforming HR into a more efficient and strategic function, allowing them to move beyond simple administrative activities towards strategic applications.

To successfully implement an HRIS in a university, it is crucial to conduct thorough market research to identify vendors offering solutions tailored to academic institutions. This process should include issuing a Request for Proposal (RFP) to evaluate vendors based on functionality, scalability, support, and cost, as well as organising live demonstrations and trial periods to assess the user experience and system capabilities. During the implementation phase, a phased rollout approach should be adopted, beginning with foundational modules like payroll and employee data management and gradually expanding to more advanced functionalities, thus minimising disruptions and enabling incremental learning. According to Rahman (2022), suitable HRIS software is obtained when organisations tailor the preexisting modules to the requirements of their human resources department. Thus, a dedicated implementation team, comprising of HR, IT and faculty representatives, should oversee the process, ensuring that the system fits the specific requirement of the University. Finally, the team must ensure accurate data migration of employee records and historical data. The HRIS must be seamlessly integrated with existing systems, such as student information systems and financial management software, to enable efficient data sharing and enhanced functionality. This structured approach ensures that the HRIS not only improves operational efficiency but also supports strategic planning and decision-making.

8.3.5 Prioritising Training and Continuous Professional Development for HRIS Users

Investing in training for HR staff and end-users is crucial. Adequate training ensures that users are proficient in operating the HRIS, which maximises the system's effectiveness and minimises resistance to change. Regular training sessions should

be conducted for HR staff, faculties and administrators to familiarise them with the system and keep them updated on the latest HRIS features and best-practices. Continuous professional development opportunities should be provided to keep users updated on new features and best practices of HRIS usage. According to Varis, Kravchuk and Briks (2024), continuous learning equips employees with the skills necessary to adapt to technological changes and evolving market demands, ensuring that HRIS users remain proficient and effective in their roles.

Furthermore, Universities must address potential resistance by maintaining clear communication where stakeholders are engaged and informed throughout the process. Comprehensive support resources such as user guides, online tutorials, and helpdesks to assist users during and after the transition must also be provided. Additionally, thorough testing and quality assurance, including system and pilot testing, should be performed to identify and resolve issues, ensuring the system is user-friendly, functional, and aligned with organisational needs. Accordingly, Suryaningrat (2020: 199) reports that poorly tested software could result in failure to meet user requirements, leading to negative consumer experience and potential brand deterioration.

8.3.6 Safeguarding employee privacy and preventing the misuse of sensitive information

To support the advantages and address the obstacles of implementing HRIS in organisations, the study recommends that the management of universities prioritise safeguarding employee privacy and preventing the misuse of sensitive information. Accordingly, Shore (2020: 276) proposes that individuals with access to the HRIS must receive proper training to maintain the system's security. Furthermore, once HR data is uploaded to an internet-connected database, it becomes imperative to consider employing cybersecurity professionals to safeguard these systems. Management must implement robust data governance policies and cybersecurity measures to protect this data. Jamal, Algeelani and Al-Sammarraie (2024: 47)

therefore suggest that the implementation of firewalls, encryption and intrusion detection systems can be used to protect sensitive information from both internal and external threats. Sensitive data should be encrypted during storage and transmission, with secure login protocols like multi-factor authentication to restrict access. Compliance with privacy laws is essential to ensure the lawful handling of employee information. User access controls should define roles to limit exposure, granting broader access only to authorised personnel like HR staff. Employee awareness initiatives should inform staff about data collection purposes and obtain explicit consent to foster transparency and trust. Regular audits and access log monitoring can detect vulnerabilities and unauthorised activities, while contracts with third-party vendors should enforce data protection and liability standards. Finally, user training on ethical data management, coupled with strict policies and consequences for misuse, ensures accountability (Manoharan, 2024). These measures collectively will protect employee data while enabling universities to optimise HRIS for strategic benefits.

8.3.7 Continuous Evaluation and Improvement of HRIS Performance

After implementation, the HRIS should be continuously evaluated to ensure that it meets the university's needs. Evaluating the system's performance is essential to ensure that it meets organisational requirements, while measuring ROI using metrics such as cost savings, productivity improvements, compliance, recruitment efficiency and employee engagement helps demonstrate its value. Regular feedback from users should be collected and used to make necessary improvements. This iterative process helps in keeping the system relevant and effective over time. The system's performance should be reviewed regularly to identify areas needing updates or improvements. This can be achieved by assigning a dedicated team to oversee its functionality, implementing the latest updates to enhance features, ensuring data is consistently backed up and restored to prevent losses, and providing continuous training and education for users to maximise system effectiveness (Abuhantash, 2023: 244). Maintaining ongoing communication with the vendor is also essential to

access updates, enhancements and new features that can optimise the system's functionality and align it with emerging needs (Becker, 2022). Additionally, external support can be sought for complex issues.

Adopting an HRIS in a university in a developing country is a complex but achievable goal. By following these detailed recommendations, the university can ensure a smooth transition to a more efficient and effective HR management system, ultimately contributing to the institution's overall success and growth.

8.4 SUGGESTIONS FOR FUTURE RESEARCH

The study offers valuable insights into the current state of HRIS implementation and its impact on institutional effectiveness in technical universities in Ghana. However, several areas warrant further exploration to deepen understanding and guide future improvements. The following directions for future research are proposed:

- I. Firstly, this study was conducted in technical universities in Ghana. Thus, it is recommended that future research could expand the scope beyond technical universities to include a broader range of educational institutions, such as traditional and private universities/colleges. Comparative studies could help identify unique challenges and opportunities across different types of institutions and provide a more comprehensive understanding of HRIS adoption in the education sector.
- II. Secondly, long-term studies that track the adoption and impact of HRIS over an extended period would provide insights into the sustainability and long-term benefits of HRIS implementation. These studies could explore how HRIS adoption evolves over time, its impact on employee productivity, and its influence on institutional growth.
- III. Future research could investigate the integration of HRIS with other emerging technologies, such as artificial intelligence (AI), machine learning and data analytics, to enhance decision-making processes. Exploring how these integrations can further improve organisational effectiveness and streamline HR functions would be valuable.

- IV. Impact on Organisational Culture and Change Management: Future studies could examine how HRIS adoption affects organisational culture and the processes involved in change management. Research in this area could explore the role of HRIS in shaping organisational behaviour, employee engagement, and the management of change initiatives within technical universities.
- V. This study did not consider whether the universities have adopted or are using HRIS. Its focus was on knowing the status of HRIS in these universities. However, conducting case studies on institutions that are known to have successfully implemented HRIS could provide practical insights and lessons learned. These case studies could serve as benchmarks for other institutions and offer guidelines for effective HRIS adoption and usage.
- VI. Further research could explore the policy and governance implications of HRIS adoption in technical universities. This could involve an examination of the role of government policies, institutional governance structures, and leadership in facilitating or hindering HRIS adoption and effectiveness.

8.5 SUMMARY

The study on the adoption of Human HRIS for organisational effectiveness in selected universities has provided comprehensive insights into the extent and impact of HRIS implementation within these academic institutions. The findings underline the critical role that HRIS plays in enhancing various aspects of human resource management, ultimately contributing to the overall effectiveness of the universities.

Based on the findings of the first objective, which sought to analyse the current HRM practices of the universities in terms of recruitment, performance appraisal, compensation management and employee record-keeping, the study indicated that HR units within these universities are well established and are able to carry out most HR activities such as recruitment, compensation, and performance management, training and record keeping. Overall, while there were areas of strong performance,

each university showed specific aspects of HR practices that could benefit from focused improvements to boost overall employee satisfaction and policy consistency

The second objective concluded that the adoption and utilisation of HRIS across the four Ghanaian technical universities revealed varying levels of integration and satisfaction within different HR functions. It was noted that HRIS was used at the administrative level in the four technical universities. However, the aim is to bring it to the strategic stage, where it can be used in strategic decision-making. Therefore, the HR strategy must be aligned with the strategic goals of the organisation that allows HR department and top management to use it at a strategic level to make better decisions for the universities.

With respect to the third objective, findings indicated that the adoption of IT in universities is a complex process that is influenced by a multitude of factors. The TOE framework provided a comprehensive framework to analyse the technological, organisational and environmental factors that shaped IT adoption in an educational institution. Contrary to expectations, this research found that perceived complexity, integration difficulties, employee resistance and data security concerns did not present significant barriers to HRIS adoption and use within the selected Ghanaian universities. Other factors such as unreliable internet, inadequate ICT infrastructure, lack of support from top management and financial constraints were, however, negative influences on the adoption and use of HRIS.

Last but not the least, it was found that HRIS adoption and use impacted on the effectiveness of internal processes, employee learning and growth. It was, however, found that there are uncertainties about the impact of HRIS on the financial effectiveness of the universities. Finally, the conceptual framework developed for the study offers a platform through which the impact of HRIS can be holistically examined. The uniqueness of this study is seen in this aspect as virtually no studies have analysed the impact HRIS holistically like this study has done.

The successful implementation of HRIS is crucial for universities in Ghana to enhance organisational effectiveness in today's digital age. By automating HR processes, improving data-driven decision-making, and empowering employees, universities can optimise their HR management practices and achieve their strategic goals. However, successful HRIS adoption requires careful planning, stakeholder engagement, and ongoing evaluation to mitigate potential challenges and maximise its benefits. Future research can explore the long-term impact of HRIS on organisational performance in Ghanaian universities, considering factors such as cultural differences, user acceptance, and the evolving technological landscape. The adoption of HRIS has the potential to significantly enhance organisational effectiveness in universities. By addressing the challenges and leveraging the benefits of HRIS, universities can improve their HRM practices; achieve cost efficiencies; and ultimately create a more effective and responsive educational environment.

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ANNEXURE B



LETTER OF INFORMATION

Title of the Research Study:

HRIS Adoption for organisational effectiveness in Selected Ghanaian Technical Universities

Principal Investigator/s/researcher:

Esther Gyamfi

Co-Investigator/s/supervisor/s:

Main Supervisor: Dr. Pauline Ngo Eyono

Co-Supervisor: Prof Maame Afua Nkrumah

Brief Introduction and Purpose of the Study: Topic?

Dear respondents,

My name is Esther Gyamfi, a doctoral student of the Durban University of Technology, South Africa conducting research on the topic: 'HRIS Adoption for organisational effectiveness in Selected Ghanaian Technical Universities'. I would like to invite you to participate in the research.

Research is a systematic search or enquiry for generalized new knowledge. It involves the process of eliciting information from stakeholders to fully understand the phenomenon being studied in context. For this reason, I am inviting you to take part of this study which seeks to examine the extent to which Human Resource Information System (HRIS) is being adopted for organisational effectiveness in the Ghanaian Technical Universities (TUs).

HRIS is simply the incorporation of technology and information systems in Human Resource functions.

All information collected will be treated as confidential and participation is voluntary. No personal details will be made available to the public or any third party. You can ask as many questions as you wish because it is important that fully understand the study. You are also entitled to discuss the study with your family and friends and you are under no obligation to commit at this stage. For this purpose, this Letter of Information document is given to you to take home for further family/friend discussion.

Outline of the Procedures:

Current global technological trends necessitate the incorporation of technology in the operations of Human Resource (HR) departments to maximise effectiveness and minimise cost. As such, the Human Resource departments of organisations have been under a lot of pressure to incorporate technologies such as information systems in their functions. Universities' HR departments are no exception to these pressures as they are faced with the challenge of managing large employee sizes.

This study aims at examining the extent to which Human Resource Information System (HRIS) has been adopted and used for organisational effectiveness in some selected Ghanaian Technical Universities. The objectives of the study are to analyse the current HR processes and practices in the Ghanaian Universities; explore the level of adoption and use of HRIS in the Human Resource functions in the Universities; explore the factors that influence the adoption and use of HRIS in the Universities; assess the extent to which HRIS impacts organisational effectiveness; and develop a framework for improvement in the adoption and use of HRIS in the Ghanaian Technical Universities.

The mixed method approach will be used for the study. Five Ghanaian Technical Universities will be conveniently selected, and the target population will be all senior staff and senior members of the selected TUs. The stratified, simple random and purposive sampling techniques will be used to select 320 participants for the study. A survey questionnaire, an interview guide and documents will be used to elicit the information from

the participants. Regression analysis will be used to analyse the quantitative data while thematic content and document analyses will be used to analyse the qualitative data.

A gatekeeper's letter would be obtained from the five selected Ghanaian TUs, after which the sampled senior staff and senior members will be contacted in writing to seek their consent to participate in the study. Questionnaires will then be sent to the participants who are expected to take at most twenty minutes to complete the questionnaire. Interview dates will also be scheduled with the heads of the ICT and Human Resource Units.

Risks or Discomforts to the Participant:

You will not be asked to make statements or execute any acts that might lead to risks, discomfort, or cause you to experience embarrassment or regret. There are no envisioned adverse consequences.

Explain to the participant the reasons he/she may be withdraw from the Study: In the event of non-compliance, illness or adverse reactions, the research may be terminated. Participation is voluntary, and you may choose to withdraw from the study at any time. There will be no adverse consequences should you choose to withdraw.

Benefits:

The findings of the study have the potential to benefit the selected universities through judicious revelations about the status of their Human Resource Information System and how they can improve its adoption and usage. Better Human resource practices will therefore be established for individual universities to adopt. This will make your jobs easier. It is also envisaged that the research findings will be published in accredited journals to help in further research.

Remuneration:

You will not receive any monetary or any other types of remuneration.

Costs of the Study:

You will not be expected to cover any costs towards the study?

Confidentiality:

It is assured that all information will be purposely handled confidentially and used for research purposes only. To ensure this, all interview records will be kept in password protected computers and handwritten transcriptions. Your name will be presented anonymously throughout the research.

Results:

A soft copy of the thesis will be sent to anyone who will be interested in the results of the study. A written communication will be demanded from interested persons before a soft copy is sent to them. Moreover, the articles and written reports that will be generated from the results will be available to everyone.

Research-related Injury:

You will not perform any physical acts, hence there is no anticipated injury to you.

Storage of all electronic and hard copies including tape recordings:

Only the researcher will keep and have access to all electronic and hardcopies of the interview records and questionnaires. Both the questionnaire and interview records will be kept in password protected computers. These records will be kept for a period of five year (5) after which they will be disposed of by the researcher personally.

Persons to contact in the Event of Any Problems or Queries:

Please contact the researcher on +233207865959, my supervisor on +270836708065 or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the Director: Research and Postgraduate Support Dr L Langaniso on 031 373 2577 or researchdirector@dut.ac.za.

ANNEXURE C

QUESTIONNAIRE Topic: Human Resource Information System Adoption for Organisational Effectiveness in Ghanaian Technical Universities

Instructions to Respondents (All responses will be treated in the strictest confidence)

1. Place one tick (✓) for each question/statement.
2. Answer all questions/statements.
3. Please do not leave questions or statements blank.
4. The questions/ statements are rated in the Likert scale below, ranging from strongly agree **1** to strongly disagree **5**. Select and tick one response only.

1= Strongly Disagree (SD)

2= Disagree (D)

3= Neutral (N)

4= Agree (A)

5= Strongly Agree (SA)

SECTION ONE: Demographic Information.

Instruction: Please place a tick (✓) in the appropriate block

	Name of University	Tick
1.1	Takoradi Technical University	1 ☐
1.2	Cape Coast Technical University	2 ☐
1.3	Sunyani Technical University	3 ☐
1.4	Tamale Technical University	4 ☐

	Gender	Tick
2.1	Male	1 ☐
2.2	Female	2 ☐

	Age Category	Tick
3.1	Below 20	1 ☐
3.2	20 years to 29 years	2 ☐
3.3	30 years to 39 years	3 ☐
3.4	40 years to 49 years	4 ☐
3.5	50 years and above	5 ☐

	Length of Service	Tick
4.1	Less than 1 year	1 ☐
4.2	1-10 years	2 ☐
4.3	11-20 years	3 ☐

4.4	21-30 years	4 ☐
4.5	above 30 years	5 ☐

	Staff category	Tick
5.1	Teaching staff	1 ☐
5.2	Non- Teaching staff	2 ☐

	Rank	Tick
Teaching Staff		
6.1	Full Professor	1 ☐
6.2	Associate Professor	2 ☐
6.3	Senior Lecturer	3 ☐
6.4	Lecturer	4 ☐
6.5	Assistant Lecturer	5 ☐
Non-Teaching Staff		
6.6	Deputy Registrar	6 ☐

6.7	Senior Assistant Registrar	7
6.8	Assistant Registrar	8
6.9	Junior Assistant Registrar	9
6.10	Others	10

	Highest Qualification	Tick
7.1	PhD	1
7.2	Master's Degree	2
7.3	First Degree	3
7.4	Diploma	4
7.5	Other	5

SECTION TWO: HRM PRACTICES AND PROCESSES

This section examines your general view about the HR processes and practices in your university. The following statements highlight some HR practices that are carried out in your university by the Human Resource Unit. Please state how strongly you agree or disagree with the statements.

8.1	The HR Department/Unit is responsible for all HRM practices in my university.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

8.2	Performance Appraisal is an HRM practice in my university.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

8.3	Training and Development is an HRM practice in my university.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

8.4	Recruitment and Selection is an HRM	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

8.5	Compensation Management is an HRM practice in my university. practice in my university.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

8.6	Employee Record Keeping is an HRM practice in my university.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

8.7	I consider my HR Department to be effective in carrying out its practices.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

8.8	There is consistency between what the HR Department advocates and what it actually implements.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

8.9	I am happy about the services offered by the HR Unit in my institution.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

SECTION THREE

LEVEL OF ADOPTION AND USE OF HR INFORMATION SYSTEM IN HUMAN RESOURCE FUNCTIONS

The following statements assess the level of HRIS adoption and use in your university.

Please state how strongly you agree or disagree with the statements.

9.1	My institution has integrated information technology into their HRM practices.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

9.2	My university uses information technology in their recruitment and selection practices	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

9.3	My university uses information technology in their performance management practices	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

9.4	My university uses information technology in their training and development practices	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

9.5	My university uses information technology in their compensation management practices	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

9.6	My university uses information technology in their employee record keeping practices	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

9.7	The HR unit of my university uses information technology for their day to day administrative activities	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

9.8	Information generated from HR Information system helps in strategic decisions making	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

SECTION FOUR

FACTORS THAT INFLUENCE THE ADOPTION AND USE OF HRIS

The following statements assess factors that influence the adoption of and use of HRIS.

Please state how strongly you agree or disagree with the statements

10.1	My institution lacks a reliable internet connection to enhance the adoption of HR Information System.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

10.2	My institution lacks ICT infrastructures to facilitate the full adoption of HR Information System.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

10.3	I believe that HR Information System are very complex to use.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

10.4	I believe that integrating the HR Information System into current working process is a big challenge.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

10.5	Issues with data security hinders HR Information System adoption in my university.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

10.6	Lack of support from top management hinders achieving full potential of HR Information System.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

10.7	Adoption and use of new Information technology/ system face resistance from employees in my institution.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

10.8	High cost of setting up and maintaining information technology hinders the	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
	adoption and use of HR Information System.					

10.9	Top management is likely to invest funds in HR Information System applications.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

10.10	Our ICT unit lacks the technical expertise to adopt HR Information System.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

10.11	The country's fibre optic cable and ICT which enables us to access the internet for the adoption of the HRIS is weak.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

10.12	There is adequate financial aid from government to support adoption of HR Information System applications.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

10.13	Competitive pressures from other institutions have influence the adoption/use of HR Information System in my university	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

10.14	Local vendor supports in terms of quality of technical expertise encourages us to adopt HR Information System.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

SECTION FIVE IMPACTS OF HRIS ON ORGANISATIONAL EFFECTIVENESS

The following statements assess the impacts of HRIS on organisational effectiveness. Please state how strongly you agree or disagree with the statements

11.1	I believe the use of information systems in HR activities can reduce the overall HR expenses.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

11.2	HR Information System has helped my University improve the efficiency of internal operations	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

11.3	The HR Information System has simplified and improved the quality and timeliness of the HR department's services to employees.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

11.4	The HR information system has reduced paperwork in the HR department.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

11.5	Information generated from HR information system has helped improve my performance.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

11.6	I believe HR information systems can improve our institution's competitive advantage.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

11.7	HR Information System has enhanced information sharing, learning and knowledge management in my institution.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

11.8	HR Information System has enhanced my participation in HR activities.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

11.9	I believe the employees at HR unit appear to be satisfied with the information technology being used.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

ANNEXURE D

INTERVIEW GUIDE

Semi-structured interview questions for Heads of HR Topic:

HR information systems adoption for organizational effectiveness in selected Technical Universities

1. How long have you been the Head of HR/ICT
2. Do you have human resource information system software at your university?
3. If No, why?
4. If yes, what type of information technology do you use at your unit for human resource functions?
5. To what extent are you using the HRIS in terms of the following HR functions?
 - Performance Management
 - Training and Development
 - Compensation Management
 - Recruitment and Selection
6. Is there an HRM portal that serves as a Self-service for employees?
7. What is the state of your HR information systems in terms of system quality, information quality and service quality and user satisfaction?
8. Which factors have enhanced the implementation of HR information systems in your university?
9. Which factors have hindered your university in its adoption/use of HR information systems?
10. What is the state of the IT infrastructure in your university?
11. Are there enough IT experts in your institution
12. What has been the impact of HRIS usage on the performance of staff?
13. What has been the impact of HRIS usage on the finances of the institution?

14. What has been the impact of HRIS usage on the internal processes of your institution?
15. What has been the impact of HRIS usage on the learning and growth of your institution?
16. What are your recommendations for the use of HR information systems in this institution?
17. Are there any other issues concerning HRIS adoption that have not been covered in this interview that you wish to bring to our attention?

ANNEXURE E



CONSENT

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, _____ (name of researcher), about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: _____
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

Name (Optional/Not compulsory)

Date

Time

Signature

I, Esther herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Full Name of Researcher

Date

Signature

Full Name of Witness (If applicable)

Date

Signature

Full Name of Legal Guardian (If applicable)

Date

Signature



Institutional Research Ethics Committee
Research and Postgraduate Support Directorate
2nd Floor, Berwyn Court
Gate 1, Steve Biko Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4001

Tel: 031 373 2375
Email:

lavishad@dut.ac.za
http://www.dut.ac.za/research/institutional_research_ethics

www.dut.ac.za

2 June 2023

Ms E Gyamfi
P.O. Box 256
Takoradi

Dear Ms Gyamfi

HRIS Adoption for Organisational Effectiveness in Selected Ghanaian Technical Universities

Ethical Clearance number IREC 058/22

The Institutional Research Ethics Committee acknowledges receipt of your final data collection tool for review.

We are pleased to inform you that the data collection tools have been approved. Kindly ensure that participants used for the pilot study are not part of the main study.

In addition, the IREC acknowledges receipt of your gatekeeper permission letters.

Please note that **FULL APPROVAL** is granted to your research proposal. You may proceed with data collection.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the IREC according to the IREC Standard Operating Procedures (SOP's).

Please note that any deviations from the approved proposal require the approval of the IREC as outlined in the IREC SOP's.

Yours Sincerely

Dr K Padayachy
Deputy Chairperson: DUT-IREC



Our Ref: STU/CON-RES/V.1/003 Your Ref:

Date: FEB, 22, 2023

Ms. Esther Gyamfi
Durban University of Technology (DUT)
Faculty of Management Science
Department of Human Resource
Email: 22171521@dut4life.ac.za

South Africa

Dear Madam,

RE: REQUEST FOR AUTHORISATION TO CONDUCT RESEARCH AT SUNYANI TECHNICAL UNIVERSITY

Your letter dated 8th January, 2023 on the above subject matter refers.

I write to inform you that the Vice-Chancellor has given you permission to conduct your research at Sunyani Technical University (STU) as requested.

However, any data collected from the University should be treated as confidential and used for the intended purpose.

Thank you

Snr. Assistant Registrar
For: Registrar

Cc:

Planning Officer
Deputy Registrar (HRD)
Head, Department of Computer Science/ICT



ACCRA TECHNICAL UNIVERSITY

P. O. Box GP 561, Accra Ghana.

Tel: +233-266-685011

Website: www.atu.edu.gh Email: riptt@atu.edu.gh

DIRECTORATE OF RESEARCH, INNOVATION & TECHNOLOGY TRANSFER

Our Ref:

Your Ref

Date: 17th May, 2023

Esther Gyamfi,
Durban University of Technology,
Human Resource Management Department,
P.O. Box 1334,
Durban 4000, South Africa.
Dear Madam,

APPROVAL OF RESEARCH ETHICS APPLICATION (RE #18-2023-DRIPTT)

I write to inform you that following the review of your application relating to research ethics, approval has been granted for you to collect data from Accra Technical University (ATU) as part of your methodology in your Doctor of Philosophy (PhD) research project titled "**Human Resource Information System (HRIS) Adoption for Organizational Effectiveness in Selected Ghanaian Technical Universities**". Your research work has been designated with Ethics ID: **RE #18-2023-DRIPTT**. This approval is valid from 17th May, 2023 to 16th May, 2024.

Kindly note that if you will publish your research work, you should do so in accordance with reputable Journals/Conference Proceedings recognized by ATU. Counting on usual and kind cooperation.

Thank you.

Yours faithfully,

DR. NANA YAW ASABERE

Director – Directorate of Research, Innovation, Publication and Technology Transfer

Cc: Registrar

DRIPTT File

CAPE COAST TECHNICAL UNIVERSITY

(OFFICE OF THE REGISTRAR)

Tel: 0592774927/0209185158

Website: www.cctu.edu.gh

Email: registrar@cctu.edu.gh



P.O. BOX DL. 50

Cape Coast

Our Ref: CCTU/494/108

February 6, 2023

Dr. Pauline Ngo Henha Eyono
Faculty of Management Sciences
Department of Human Resource
Durban University of Technology
South Africa

Dear Dr. Eyono,

RE: REQUEST FOR AUTHORIZATION TO CONDUCT RESEARCH IN CAPE COAST TECHNICAL UNIVERSITY

Your letter dated January 27, 2023 on the above-mentioned subject refers.

We wish to inform you that approval has been granted for Ms. Esther Gyamfi, a doctoral student of the Department of Human Resource, Durban University of Technology, South Africa, to administer her questionnaires to the Senior Staff and Senior Members of Cape Coast Technical University (CCTU) on her research topic entitled "*Human Resource Information System Adoption for Organisational Effectiveness in Selected Ghanaian Technical Universities*". Approval has also been given for her to interview the Director of Human Resource and Head of Information and Communication Technology (ICT) Directorate, CCTU to aid her research.

By copies of this letter, the Director of Human Resource, Director of Public Affairs and Head of ICT Directorate are kindly informed to provide Ms. Esther Gyamfi the necessary assistance on her arrival on CCTU campus.

Thank you.

Yours sincerely,

Hannelore Asmah' (Mrs.)
Senior Assistant Registrar
For: Registrar

cc: Registrar
Director of Human Resource
Director of Public Affairs
Head, ICT Directorate



Ref. No. TTU/ERC/23/006

March 21, 2023

Madam Esther Gyamfi
International Programs and External Linkages Office
Takoradi Technical University
P. O. Box 256
Takoradi

Dear Madam Esther Gyamfi

LETTER OF APPROVAL

The Ethics Review Committee of the University has considered the ethical merit of your proposed research project titled **"HRIS Adoption for Organisational Effectiveness in Selected Ghanaian Technical Universities"** and has approved it.

The data collected should be used for the approved purpose only. Prior permission should be sought from the committee if there is the need to vary the research project or the primary purpose for which the data would be collected. You are expected not to release the data to any other person or researcher for the same or any other purpose without prior permission from the Committee.

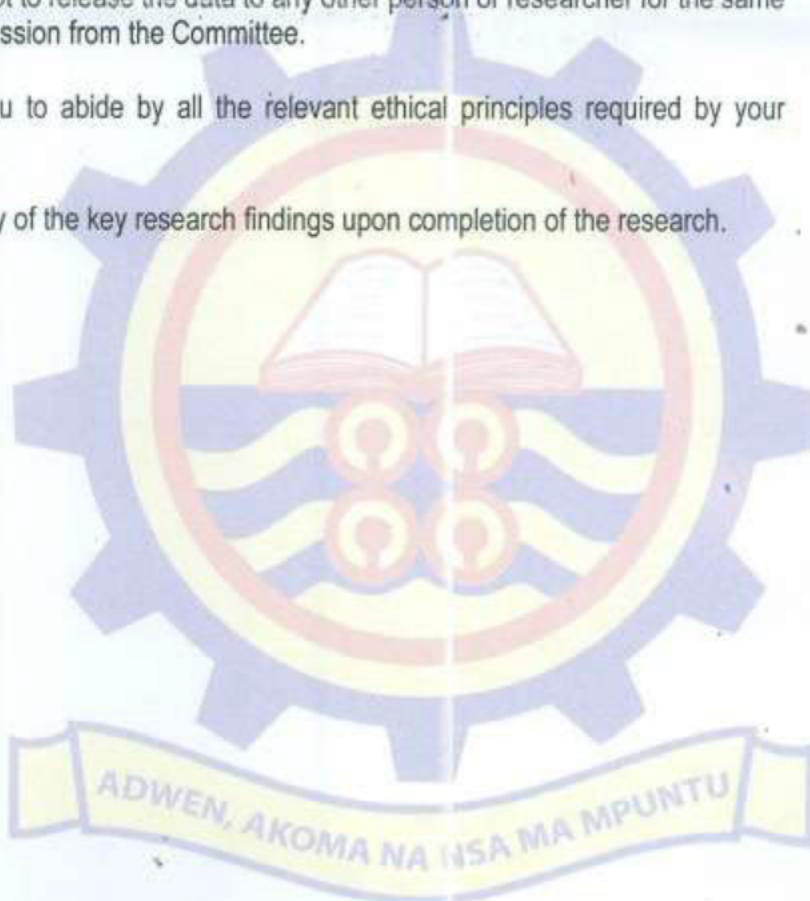
The committee respectfully request you to abide by all the relevant ethical principles required by your research.

Kindly furnish the Committee a summary of the key research findings upon completion of the research.

Thank you Madam, for your application.

Yours faithfully

Prof. Emmanuel M. Baah
Chairman
Ethics Review Committee
Takoradi Technical University



EDITOR'S LETTER

Researchers Beyond-Borders (PTY) LTD
Umhlanga, Durban
South Africa
10 November 2025

To whom it may concern

Editing of Doctoral thesis: Esther Gyamfi (Student number -22175121)

Title of dissertation: [REDACTED]
Technical Universities.

[REDACTED]
Any queries may be directed to the author of this letter.



Regards

Maleni Pillay
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Gyamfi

a complété avec succès - has successfully completed

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