Investigating the factors that influence digital transformation at a South African university

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ABSTRACT

This study aimed to investigate the factors influencing the success of digital transformation at a South African university. Most higher education institutions have initiated digital initiatives, integrating technology into their campuses to offer a modern educational experience. However, the digital transformation process remains inconsistent across universities due to a complex interplay of factors. This study aimed to answer the research question: *What the key factors contributing to the successful implementation of digital transformation in the context of a South African public university?* The study was grounded in the Technology-Organisation-Environment (TOE) framework, which considers technological, organisational, and environmental contexts when assessing the adoption of new technologies.

A quantitative research design was employed, using an online survey to collect data from staff members across various departments at the university. The final convenience sample consisted of 138 respondents. Data analysis involved descriptive statistics and Structural Equation Modelling (SEM) to test the hypothesised relationships. The results revealed that, within the technological environment, only the factor of technology infrastructure had a significant impact on digital transformation. Among organisational factors, both management support and technology orientation were found to significantly influence the success of digital transformation. In terms of environmental factors, government support emerged as a significant determinant, while competitive pressure and relative advantage were not statistically significant.

Based on the findings, the study recommends that universities invest in upgrading and maintaining robust IT infrastructure, provide targeted training to enhance digital competencies among staff, and institutionalise digital strategies through dedicated leadership structures. Furthermore, collaboration with government should be strengthened by aligning institutional digital goals with national policy frameworks and advocating for more streamlined funding channels to support technology adoption. The study contributes to the limited body of knowledge on digital transformation in South African universities, providing implementable strategies for university administrators, policymakers, and stakeholders. The

study highlighted the weight of a comprehensive, integrated method to digital change, considering equal internal and external factors to drive successful change in higher education institutions.

Keywords: *Digital transformation, digitalisation, digitisation, technological factors, organisational factors, environmental factors, higher education*

DECLARATION

I, Mpendulo Desiree Ngubeni, state that this study information is my work excluding as directed in the references and acknowledgements. It is presented in preferential completion of the requirements for the degree of Master of Management in the field of Digital Business at the University of the Witwatersrand, Johannesburg. It has not been presented before for any degree or examination in this or some other university.

Name: Mpendulo Ngubeni Signature: MD NGUBENI

Signed at …Wits University……

On the ……12……. day of …August…… 2024

DEDICATION

This research report is devoted to my family for their unwavering support, perseverance, and encouragement, which have been my greatest source of strength.

To my mentors and my supervisor, Dr. Jenika Gobind, whose guidance and insights have shaped my academic journey and deepened my understanding of digital transformation in higher education.

To my colleagues and peers, whose valuable discussions, motivation, and inspiration have been instrumental throughout this process.

Finally, I dedicate this work to everyone striving to drive meaningful digital transformation in South African universities, ensuring that education remains accessible, innovative, and impactful for future generations.

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Finally, I extend my appreciation to the broader academic and professional community for their dedication to advancing digital transformation in South African universities. Their commitment to innovation and progress continues to drive meaningful change in higher education.

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AI	Artificial Intelligence
AMOS	Analysis of Moment Structures
AVE	Average Variance Extracted
CFA	Confirmatory Factor Analysis
EFA	Exploratory Factor Analysis
SEM	Structural Equation Modelling
SME	Small and Medium Enterprise
SPSS	Statistical Package for Social Sciences
TOE	Technology-Organisation-Environment
TVET	Technical Vocational Education and Training

CHAPTER 1. INTRODUCTION

1.1 Statement of purpose

This quantitative study investigated the factors that influence digital transformation at a South African University.

1.2 Background of the study

The concept of digital transformation in literature is very often mentioned alongside digitisation and digitalisation (Pani & Pramanik, 2020). Digitisation can be implemented by transforming a physical resource into a digital resource (digitalisation) (Morakanyane et al., 2017). Digital transformation is a complex process involving the integration of digital technologies into various aspects of an organisation to change its operations and deliver value to stakeholders (Mapingire et al., 2021).

Digital transformation in South African universities represents a pivotal shift towards integrating technology into education to enhance learning experiences and operational efficiencies (Chomunorwa, 2023). Over the past decade, institutions like Wits University have led the way in adopting digital initiatives, such as digital campuses, online courses, and high-tech classrooms, reflecting a broader trend of technological adoption across the higher education sector (Cajee, 2021). However, this transformation is neither uniform nor universally advanced. While some universities boast sophisticated digital infrastructures, others lag, highlighting a significant disparity in digital capabilities (Mlanga, 2020). The COVID-19 pandemic has accelerated the need for digitalisation in education, presenting unique challenges to South African universities (Chomunorwa, 2023).

South African universities are working to adapt to the digital age while ensuring inclusivity and accessibility for all students and staff (Chomunorwa, 2023). Challenges faced include infrastructure limitations, connectivity issues, and digital literacy among students and faculty (Chomunorwa, 2023). The retention of lecturers is a critical factor influencing the success of digital transformation in

South African universities (Mahoko, 2023). Lecturers drive innovation and change, and factors affecting their retention must be carefully considered for continuity and stability in the educational environment (Mahoko, 2023). Challenges faced by academics with disabilities in South African higher education institutions underscore the importance of inclusive digital transformation strategies catering to diverse stakeholder needs (Ndlovu, 2023).

Experiences of African women doctoral students in STEM disciplines in South African universities contribute to the debate on transformation and reform in academia (Mkhize, 2022). Understanding factors influencing underrepresented groups is crucial for designing effective digital transformation initiatives promoting diversity and inclusivity in higher education (Mkhize, 2022). The legacy of apartheid-era education policies continues to cast a long shadow, creating a landscape marked by inequality (Mlanga, 2020). Many universities still struggle with inadequate digital resources, which impedes their ability to provide an inclusive and equitable education environment (Kanyane, 2023). This inequality in digital transformation efforts is a significant barrier to achieving a seamless integration of technology in education across the country.

Moreover, the expectations of the new generation of students are evolving rapidly (Cajee, 2021). Modern students demand a more integrated digital learning experience, compelling universities to innovate continuously to meet these expectations and stay competitive (Mlanga, 2020). The rise of online learning platforms and short courses that offer flexibility and immediate skill acquisition further intensifies the pressure on traditional universities to transform digitally (Alenezi, 2023). These market trends not only challenge the conventional education model but also offer opportunities for universities to expand their reach and impact.

Institutions like Wits University have demonstrated the potential of strategic initiatives and leadership in driving digital transformation (Cajee, 2021). Investments in digital infrastructure and the establishment of specialized roles, such as the Chair in Digital Business, are critical steps towards fostering an environment conducive to digital innovation. Such strategic planning and

leadership are essential to navigate the complexities of digital transformation and to leverage its full potential.

However, despite ongoing efforts, digital transformation in South African universities remains an uneven and complex process. Disparities in digital capabilities, high student expectations, and the persistent impact of historical inequalities all contribute to this challenge. These issues reflect the need for an understanding of the factors that either facilitate or hinder successful digital transformation in higher education. While some institutions have made significant progress through strategic investments and leadership initiatives, many others struggle with infrastructure gaps, staff retention issues, and inclusive digital access. These diverse experiences suggest that digital transformation is shaped by a wide range of technological, organisational, and environmental factors. Therefore, this study focuses on identifying and examining these key influencing factors using the TOE framework to better understand what drives or obstructs digital transformation in South African universities.

1.3 Research problem

Digital transformation is increasingly recognised as a crucial factor for enhancing the operational efficiency, competitiveness, and educational quality of universities worldwide (Trisninawati & Helmi, 2024). South African universities are no exception to this trend. Most higher education institutions have begun significant digital initiatives, integrating technology into their campuses to provide a modern educational experience. Despite these efforts, the digital transformation process remains uneven across different universities in South Africa, revealing a complex interplay of factors that influence its success.

The disparities in digital transformation efforts can be traced to several underlying issues, including leadership and management challenges, resource allocation, technological infrastructure, and historical inequalities stemming from apartheid-era policies (Caje, 2021; Mlanga, 2020; Kanyane, 2023). Davenport et al. (2007) on the importance of analytics and leadership in driving digital transformation, provide a foundational understanding of the critical role that effective

management plays in this process. Westerman et al. (2014) emphasise that digital transformation is not merely about technology adoption but also about strategic leadership and cultural change within institutions.

Currently, South African universities face significant barriers to achieving seamless digital transformation. These include inadequate digital infrastructure, limited financial resources, and a lack of strategic leadership dedicated to overseeing and driving digital initiatives (Caje, 2021; Mlanga, 2020; Kanyane, 2023). Additionally, there is a growing demand from students for more integrated digital learning experiences, which traditional universities must meet to remain competitive (Alenezi, 2023). The rise of online learning platforms and the need for flexible, skills-based education further complicate the landscape.

Given this context, there is a need for an investigation into the factors that influence the success of digital transformation in South African universities. This research aims to examine the role of organisational factors, environmental factors, and technological infrastructure, in shaping the digital transformation journey of selected universities. Thus, the study is based on the Technology-Organisation and Environment (TOE) framework.

Despite growing interest in digital transformation, there remains a limited understanding of the multidimensional factors influencing its success in South African universities. Existing studies tend to focus on isolated challenges such as infrastructure or funding, without employing an integrated theoretical lens (Kanyane, 2023; Caje, 2021; Mlanga, 2020). Moreover, few have utilised the TOE framework to examine the interplay of technology, organisation, and environment in this context (Nguyen et al., 2022; Qi et al., 2023). This study addresses this gap by applying the TOE framework to explore the critical success factors in digital transformation at a South African university. This study addresses the following research question: "What are the key factors influencing the success of digital transformation at a South African university?" The study aims to contribute to the existing body of literature and provide South African universities with the tools and strategies needed to thrive in an increasingly digital world.

1.4 Research objectives

RO1: To investigate the factors that influence digital transformation at a South African university.

1.4.1 *Secondary research objectives*

i. To determine the influence of technological factors on digital transformation at a South African university
ii. To examine organisational factors that influence digital transformation at a South African university
iii. To explore the influence of environmental factors on digital transformation at a South African university

1.5 Rationale

This study could contribute to the body of knowledge on digital transformation. The study is grounded in the TOE framework (Tornatzky & Fleischer, 1990). This framework feeds a complete model, interpretation, adoption, and execution of technological innovations by considering technological, organisational, and environmental contexts. While the TOE framework has been widely applied in various sectors, its utilisation in the context of digital transformation in educational institutions remains limited (Nguyen et al., 2022; Qi et al., 2023). This study aims to apply the TOE framework in educational institutions by identifying the factors that influence successful digital transformation. The findings could help bridge the gap between theoretical knowledge and practical application, ensuring that the insights derived from this research are not only academically rigorous but also practically relevant and actionable.

The increasing digitalisation of global education systems and the pressing need for South African universities to remain competitive in a rapidly evolving technological landscape informed the interest in this topic. The disparity in digital transformation efforts among South African universities highlights the necessity to understand the underlying factors that contribute to or hinder this process. Existing studies on digital transformation within educational institutions are

scarce, particularly those that comprehensively explore the intersection of technology, organisational culture, and the external environment (Nguyen et al., 2022; Qi et al., 2023).

Universities, policymakers, and educational leaders could also benefit from the findings of this study. For universities, the research could identify best practices and strategic approaches to digital transformation that can be implemented to overcome existing challenges. Policymakers could use the insights to develop supportive policies and frameworks that facilitate digital adoption across the higher education sector. Educational leaders could gain an understanding of the critical role of leadership and management in driving a successful digital transformation, enabling them to foster an environment conducive to innovation and continuous improvement.

1.6 Delimitations of the study

- The study was limited to only one South African university. While there are numerous higher education institutions across the country, this research excluded other types of institutions, such as technical and vocational education and training (TVET) colleges and private higher education providers.
- The study was guided by the TOE framework and specifically focused on key factors within this framework:
    - Technology: The availability and implementation of digital technologies and infrastructure within the universities.
    - Organisation: The internal organisational factors, including leadership, culture, and resource allocation, that affect digital transformation.
    - Environment: The external factors, such as regulatory policies, market competition, and socio-economic conditions, that influence digital transformation efforts.
- This study did focus on individual-level factors, such as personal attitudes towards technology adoption, instead of concentrating on organisational and environmental levels.

- The study was cross-sectional and did not extend to longitudinal analysis over multiple years or include experimental methods. The chosen methodologies aim to capture a comprehensive snapshot of the current state of digital transformation and its influencing factors within the specified universities.

1.7 Definition of terms

i. Digital transformation: Digital transformation refers to a strategic process that leverages digital technologies to drive significant changes in an organisation's business model, operations, and value delivery mechanisms (Rojas-Segura, 2023). Digital transformation involves the integration of advanced digital tools such as artificial intelligence, big data, cloud computing, and the Internet of Things to enhance business processes, customer experiences, and create innovative business models (Wang, 2024).

ii. Digitisation: Digitisation involves the conversion of similarity information or processes into digital formats, enabling data to be stored, processed, and transmitted electronically (Iyamu et al., 2021). Digitisation is a foundational step in the digital transformation journey, facilitating the transition to digital operations and services (Iyamu et al., 2021).

iii. Digitalisation: Digitalisation encompasses the broader adoption and integration of digital technologies into organisational processes, systems, and culture (Aubry et al., 2022). Digitalisation involves the strategic deployment of digital technologies to drive organisational change, enhance performance, and foster innovation (Aubry et al., 2022).

1.8 Assumptions

i. The study assumed that respondents from selected South African universities provided honest, accurate, and comprehensive reflections of their perspectives and experiences regarding digital transformation. If respondents provide inaccurate or incomplete information, the findings may not accurately reflect the true state of digital transformation, potentially leading to misguided conclusions and recommendations.

ii. The study assumed that the key technological, organisational, and environmental factors influencing digital transformation remained relatively stable during the research period. Significant changes in these factors during the study could impact the findings, potentially altering the identified success factors for digital transformation.

1.9 Summary

This chapter provided the introduction to the study on the factors that influence digital transformation in universities. The study focused on the context of a South African university, identifying the main drivers of digital transformation at the institution. It was revealed that there is limited literature on digital transformation within the context of higher education institutions in South Africa. This study will therefore aim to contribute to literature, by applying the TOE framework. The following chapter presents a literature review.

CHAPTER 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

This chapter focuses on a literature review and presentation of the theoretical framework that underpins the study. Firstly, the chapter presents the definition of the topic where key concepts of the study are discussed and debated. The next sections then focus on literature that pertains to research objectives, which then lead to the development of a hypothesis. After the development of the hypothesis, the analytical framework of the study is presented, focusing on the theoretical and conceptual frameworks.

2.2 Digital transformation

Digital transformation has emerged as a critical topic in both academia and industry, gaining considerable attention due to its profound impact on organisational processes and strategies. Despite its widespread use, there remains a lack of consensus on a single, universally accepted definition (Pani & Pramanik, 2020). Various scholars have approached the concept from different perspectives, reflecting the complexity and multifaceted nature of digital transformation.

Rojas-Segura (2023) offers a formal conceptual definition of digital transformation as a process aimed at improving society by triggering significant changes to enterprise business models using digital technologies. Pani and Pramanik (2020) define digital transformation as a complex process, consciously undertaken by institutions in response to their ecosystem imperatives, which involves the application and exploitation of digital technologies, to capitalize on differential benefits for the institutions as well as key stakeholders. This definition emphasises the process-oriented nature of digital transformation, highlighting that it is a strategic and deliberate effort by institutions to leverage digital technologies to achieve specific benefits. Pani and Pramanik (2020) view

underscores the importance of both external and internal factors driving this transformation, framing it as a response to various ecosystem imperatives.

Furthermore, Morakanyane et al. (2017) describe digital transformation as characterized by using new digital technologies to enable significant business improvements. Their definition focuses on the tangible improvements and innovations that digital technologies bring to organisations, emphasising the transformative impact on business processes and models. This perspective aligns closely with the views of Bharadwaj et al. (2013), who see digital transformation as an organisational methodology expressed and performed by leveraging digital resources to create distinction value. Bharadwaj et al. (2013) frame digital transformation as a strategic initiative aimed at creating unique value through the use of digital technologies, highlighting the importance of strategic planning and execution.

Another important contribution comes from Verina and Titko (2016), who define digital transformation as the use of digital technologies to enable major business improvements. This definition, like that of Morakanyane et al. (2017) emphasises the role of digital technologies in driving substantial improvements in business operations. Westerman et al. (2014) expand on this idea by describing digital transformation as the use of technology to radically improve the performance or reach of an enterprise, highlighting the potential for radical and transformative changes brought about by digital technologies.

Henriette et al. (2016) offer a broader perspective by defining digital transformation as a business model driven by changes associated with the application of digital technology in all aspects of society. This definition acknowledges the extensive impact of digital technologies, extending beyond mere business improvements to encompass societal changes. This view reflects the expansive reach of digital transformation, influencing various facets of societal and organisational life.

Synthesizing these perspectives, several common themes emerge. Digital transformation is consistently described as a strategic and deliberate process undertaken by organisations to leverage digital technologies for specific goals.

The integration and application of digital technologies are central to this transformation, driving substantial improvements in business processes, models, and overall performance. Additionally, external and internal factors, including ecosystem imperatives, play a critical role in modelling the direction and outcomes of digital transformation efforts.

2.2.1 *Operationalisation of digital transformation*

Operationalizing digital transformation involves systematically integrating advanced technologies, processes, and strategies into an organisation's structure to achieve enhanced efficiency, innovation, and value creation (Elias et al., 2024). This transformation is not merely about adopting technology but represents a fundamental shift in how organisations function and deliver value (Carvalho et al., 2021).

Digital transformation encompasses the reconfiguration of organisational processes, technological infrastructures, and human capital to leverage digital advancements effectively. It goes beyond the digitisation of artifacts or the automation of workflows to include a broader reinvention of business models and strategies. Verhoef et al. (2021) noted that the interplay of technology, organisational adaptability, and strategic direction creates a dynamic environment where digital transformation flourishes. This transformation thrives on adaptability, which likens digital evolution to Darwinian principles (Carvalho et al., 2021). Organisations must embrace change, integrating dynamic capabilities and innovative technologies to align with market demands and technological trends.

A cohesive framework for digital transformation involves strategic alignment, effective governance, and stakeholder engagement. Elia et al. (2024) proposed the Digital Transformation Canvas, which identifies key operational pillars: processes, people, platforms, and partners. Processes are re-engineered to enhance efficiency, while people are upskilled and engaged to foster a culture of innovation. Platforms form the technological backbone, enabling real-time data analysis and automation, while partnerships with external stakeholders bring expertise and resources. This framework emphasises the interconnectedness of

these elements. For instance, technology adoption without workforce readiness may lead to resistance, while neglecting strategic alignment risks and misdirected investments (Mergel et al., 2019).

Digital transformation operates across various tiers, as conceptualized by (Subramaniam, 2021). The first tier focuses on operational efficiencies, using technologies like IoT and analytics to streamline processes. The second tier, advanced operational efficiencies, integrates customer interaction data to refine products and services. The third tier shifts the business model toward data-driven services within value chains, while the fourth tier involves ecosystem-oriented platforms, fostering interactions among users, partners, and digital customers. These tiers illustrate a progressive deepening of technological integration, with higher tiers demanding more sophisticated strategies and investments. Carvalho et al. (2021) stressed the strategic importance of aligning organisational goals with the appropriate tier to maximise value creation.

Nevertheless, operationalising digital transformation is fraught with challenges, including technological complexity, cultural resistance, and cybersecurity concerns. Effective leadership emerges as a critical enabler, providing vision, fostering innovation, and ensuring alignment between transformation efforts and strategic objectives (Heubeck, 2023). Leadership must not only champion change but also build organisational resilience. Elia et al. (2024) noted that distributed leadership models involve empowering teams to take initiative and collaborate across functional boundaries. This approach mitigates resistance and promotes collective ownership of transformation goals.

2.2.2 *Digital transformation in institutions of higher learning*

In the context of higher education, digital transformation involves the strategic adoption and integration of digital technologies to enhance educational delivery, administrative processes, and stakeholder engagement (Kanyane, 2023; Timotheou et al., 2023). Digital transformation requires continuous adaptation to technological advancements and external pressures, ensuring that universities remain responsive and relevant in a rapid progression to the digital landscape (Tungpantong et al., 2022). This definition captures the strategic nature of digital

transformation, its reliance on digital technologies, and the specific context of higher education institutions.

Digital transformation has emerged as a cornerstone for the modernization of higher learning institutions worldwide. This evolution is driven by technological advancements, the need for improved accessibility, and the changing expectations of students, educators, and stakeholders (Kanyane, 2023). Institutions that effectively implement digital strategies gain the ability to enhance learning experiences, streamline operations, and ensure competitiveness in an increasingly digital world (Abad-Segura et al., 2020).

The extent of digital transformation in higher learning institutions varies significantly across regions presenting unique challenges and opportunities. Globally, universities have made significant strides in integrating digital technologies into teaching, research, and administrative functions. In regions like Europe, North America, and parts of Asia, digital transformation has been catalysed by substantial investment in infrastructure and policy frameworks supporting technological innovation in education (Sepúlveda, 2020). However, the pace of transformation has been slower in Africa due to systemic challenges, including funding constraints, digital infrastructure deficits, and socio-economic inequalities (Chomunorwa & Mashonganyika, 2023).

The South African higher education landscape illustrates this global unevenness. While digital transformation is gaining traction, it remains fragmented and highly dependent on institutional capacity and geographical location. South Africa's historical inequalities and the urban-rural divide further complicate this transformation. For example, while urban-based universities have adopted Learning Management Systems (LMS) like Moodle and Blackboard to support online and blended learning, rural and historically disadvantaged institutions often lack the infrastructure, connectivity, and resources needed to implement similar technologies effectively (Chomunorwa, 2023; Mhlanga et al., 2022).

The COVID-19 pandemic accelerated the shift to digital platforms, highlighting both the opportunities and limitations of digital transformation in the South African context. Although digital tools enabled continued learning, they also exposed

deep inequalities in access to internet, devices, and digital literacy. In response to these challenges, South African universities are increasingly exploring inclusive strategies such as Open Educational Resources (OERs) and Massive Open Online Courses (MOOCs) to broaden access to quality education (Adeyemo, 2023). These tools, if properly supported, can help bridge learning gaps, especially in under-resourced communities. However, sustained efforts are required to overcome persistent barriers, including affordability, connectivity, and the need for coordinated investment from government and the private sector (Mabidi, 2024).

2.3 Factors influencing digital transformation

This section focuses on the discussion of the factors that influence digital transformation in a higher education institution setting. Factors driving digital transformation are the elements that influence and facilitate this process. Although limited, the existing literature identifies attributes such as digital capabilities, maturity, technologies, strategies, and business models as key drivers of digital transformation within organisations (Morakanyane et al., 2017).

Ezeokoli et al. (2016) noted that numerous studies have highlighted drivers such as profitability and new revenue growth, customer satisfaction, improved operational efficiency, convenience and consistent high-quality technical standards, increased business agility, enhanced employee productivity, and competitive advantage. However, there is an ongoing debate about which attribute has the most significant influence. Kane (2015) argued that merely using digital technologies to drive transformation is insufficient and emphasises the importance of digital capabilities, strategies, culture, and talent development. Therefore, this study will examine factors within the TOE framework to discuss their impact on digital transformation.

2.3.1 *Technological context-related factors*

- **Technology infrastructure**

Technology infrastructure plays a key role in enabling and shaping digital transformation across sectors. This includes components like network infrastructure, IT hardware, and software systems. These elements create the foundation for digital innovation, allowing organisations to modernize operations, improve efficiency, and foster resilience (Bryan & Zuva, 2021). In stressing the key role of technology infrastructure, Manny et al. (2021) found that inadequate technology infrastructure is a barrier to digital transformation, particularly in infrastructure-intensive sectors. In contrast, robust digital infrastructure fosters agility and responsiveness.

The role of digital infrastructure in facilitating enterprise transformations was also discussed by Guo et al. (2024) who found that investments in digital infrastructure not only support operational improvements but also enhance environmental sustainability. Similarly, Li et al. (2025) analysed China's “Broadband China" strategy, revealing that broadband infrastructure drives enterprise digital transformation, particularly for small- and medium-sized enterprises. From a strategic perspective, digital transformation is strongly correlated with IT capabilities (Nwankpa & Roumani, 2016). Nwankpa and Roumani (2016) argued that IT infrastructure and human IT capabilities collectively boost organisational performance during digital transformation.

Moreso, Xiao, and Qi (2019) found that employing digital technology endows enterprises with comprehensive capabilities, facilitating internal changes and expediting digital transformation. Qi et al. (2023) maintained that enterprise digital transformation relies on the innovative use of data technology to empower organisations to undergo a complete transformation, evolving into new digital enterprises that create value through new models, structures, and behaviors. Wang et al. (2014) identified key motivators for enterprises to pursue digital transformation, including advanced technology and equipment, as well as investments in digital innovation.

However, not all technology investments yield positive outcomes. Inadequate planning or misalignment with organisational goals can hinder transformation (Schwertner, 2017). To address these challenges, Lafioune et al. (2023)

emphasised the importance of aligning technology investments with effective change management.

Therefore, based on the literature, the following hypothesis was proposed:

Hypothesis 1 (H1): Technological infrastructure positively influences digital transformation in universities.

- **The relative advantage of the technology**

Relative advantage relates to the extent to which an innovation is anticipated to offer benefits to firms (Rogers et al., 2014). When businesses perceive a particular innovation as beneficial and practical, they are more inclined to adopt it (Chatterjee et al., 2020). Therefore, recognising these benefits is crucial for digital transformation in a competitive market to enhance competitive advantage. Relative advantage is a critical factor in the adoption of innovations, influencing the speed and extent of digital transformation. Zhang et al. (2022) highlighted that organisations perceive relative advantage as the ability of new technologies to align with digital strategies and support managerial decision-making processes effectively.

Bughin et al. (2019) emphasised that organisations focusing on the relative benefits of technology such as operational efficiency and customer engagement are more likely to achieve successful digital transformations. For example, in Jordanian SMEs, Lutfi et al. (2022) showed that the perceived advantage of big data analytics directly influences its adoption, driving broader digital efforts. Educational institutions are uniquely positioned to benefit from technologies with high relative advantage. As digital tools enhance learning outcomes, resource optimization, and administrative efficiency, their perceived benefits encourage adoption.

Chen et al. (2016) explored how industry-specific digital tools improved organisational performance in the education-adjacent textile sector, offering lessons for higher education. Florek-Paszkowska et al. (2021) emphasised how technologies like learning management systems and smart apps redefine educational practices, contributing to digital transformation. They highlighted that

when educators perceive these tools as offering clear benefits, adoption rates improve significantly, leading to systemic changes.

The implementation of technologies with a clear relative advantage often involves strategic alignment with organisational goals. According to Sundaram and Sharma (2020), organisations must leverage the unique benefits of technologies such as speed, scalability, and real-time insights to achieve digital transformation maturity. However, N'Dri and Su (2024) cautioned that realising these advantages requires strong organisational capabilities and external environmental support.

Therefore, in line with previous research, it is inferred that the relative advantage of digital technologies promotes an organisation's readiness to adopt them. As such, this study proposed the following hypothesis:

Hypothesis 2 (H2): The relative advantage of technology positively influences digital transformation in universities.

2.3.2 *Organisational context-related factors*

- **Top management support**

Top management support refers to the extent to which managers understand and embrace the technological potential of an innovation (Maroufkhani et al., 2023). It identifies the decision-makers who influence the utilisation of innovation, aiming to create a conducive environment, ensure resource mobilization, and provide active support to facilitate the adoption process (Ali Abbasi et al., 2022). This support is a critical consideration for managers when deciding to adopt an innovation, particularly when the innovation aligns well with the existing system and culture (Maroufkhani et al., 2023). The backing of top managers is essential during the innovation adoption process, and thus, they are likely to support digital transformation initiatives (Qi et al., 2023). Top managers play a crucial role in establishing an appropriate environment and ensuring the availability of sufficient resources for implementing digital transformation (Nguyen et al., 2022).

The influence of top management is multifaceted. Leaders provide vision and direction, which are crucial for aligning digital transformation with organisational goals (Zhang et al., 2022). They also act as change agents, cultivating buy-in from stakeholders. According to Heavin and Power (2018), strategic support from top management mitigates resistance to change by communicating the value of digital initiatives and fostering employee engagement. This is supported by Kamdjoug (2023) who also emphasised that leadership support is indispensable for managing resistance and ensuring project success, particularly in SMEs. Kamdjoug (2023) argued that leaders must not only endorse but actively participate in transformation efforts.

Similarly, Vogelsang and Liere-Netheler (2019) found that top management support facilitates the integration of digital tools and technologies, enabling firms to maintain a competitive advantage. Leaders' active involvement ensures that digital transformation aligns with long-term strategic priorities. Gurbaxani and Dunkle (2018) emphasised the importance of senior administrators advocating for and investing in digital tools that enhance learning and administration. Such commitment not only facilitates adoption but also ensures sustainability by embedding digital transformation into institutional strategies.

However, despite its critical role, top management support can face challenges such as limited digital literacy among leaders or conflicting priorities (Wang et al., 2024). Addressing these issues requires targeted efforts to enhance leaders' understanding of digital transformation. Wang et al. (2024) highlighted the interplay between leadership, change management, and the success of digital initiatives.

Consequently, the following hypothesis was proposed:

Hypothesis 3 (H3): Top management support has a positive influence on the digital transformation of universities.

- **Organisational technology orientation**

Organisational technology orientation refers to a firm’s inclination toward adopting and integrating advanced technologies into its operational and strategic

frameworks (Ngyuyen et al., 2022). This orientation is a critical determinant of digital transformation success (Mamduh & Pratikto, 2021). Technology orientation can boost firm acceptance of experiments with technological innovations (Rupeika-Apoga et al., 2022). Technology is especially vital in developing new products and addressing issues that are not addressable without technology (Costa et al., 2015). Additionally, technological orientation is important in developing new ideas and upgrading processes and systems (Costa et al., 2015).

Technology-oriented organisations actively integrate digital tools into their processes, enhancing adaptability and competitiveness. Kindermann et al. (2021) described digital orientation as a strategic posture that aligns IT capabilities with organisational goals, ensuring that technological investments deliver maximum impact. This alignment minimises the risks of technological failure. In addition, Cvijić Ćović et al. (2023) highlighted the importance of Internet of Things (IoT) technologies in driving transformation, particularly in sectors like manufacturing. They argued that technology-oriented organisations are more agile and better equipped to leverage emerging technologies, ensuring resilience against disruptions.

In the context of universities, technology orientation plays a significant role in modernising education and administration. Yu and Moon (2021) found that digital strategic orientation enhances institutional performance by fostering digital competence among faculty and staff. For higher education institutions, this involves investing in learning management systems, digital classrooms, and AI-driven analytics to improve outcomes and operational efficiency. Moreover, Barba-Sánchez and Meseguer-Martínez (2024) emphasised that universities with a strong digital orientation are more likely to achieve organisational excellence. They attributed this to the ability of these institutions to create an ecosystem that supports innovation and adaptability.

However, despite its advantages, technology orientation requires careful implementation. Organisations should cultivate a culture that values innovation and continuous learning. Zhang et al. (2022) argued that the effectiveness of technology orientation is amplified when combined with supportive leadership

and robust change management practices. Challenges, such as resistance to change and inadequate technological infrastructure, can hinder the realisation of digital transformation goals. Nguyen et al. (2022) suggested that a comprehensive strategy integrating organisational, technological, and environmental factors is essential for overcoming these barriers.

Hence, the following hypothesis was proposed:

Hypothesis 4 (H4): Technology orientation has a positive influence on digital transformation in universities.

2.3.3 *Environmental contextual factors*

- **Competitive pressure**

Competitive pressure refers to the force exerted by competitors within the same industry (Oliveira et al., 2014). As market competition intensifies, firms increasingly seek new approaches, solutions, and resources to gain competitive advantages through innovation (Nguyen et al., 2022). When firms perceive increased competition, they tend to invest in innovation to respond effectively. Embracing innovation can alter the industry structure and improve a firm's competitive position (Hiran & Henten, 2020). At the environmental level, Qi et al. (2023) found that market competition mechanisms serve as crucial external governance mechanisms for enterprises, playing an irreplaceable role in their change and development.

Organisations operating in highly competitive environments often feel compelled to enhance their digital capabilities to differentiate themselves. Zhang et al. (2022) indicated that competitive pressure creates urgency, fostering a culture of innovation and adaptability in response to rivals' technological advancements. In the education sector, competitive pressure manifests in various ways, such as the need to attract and retain students, improve operational efficiency, and deliver superior learning experiences (Benavides et al., 2020).

Universities often face pressure from both domestic and international peers to adopt cutting-edge technologies like virtual learning environments, AI-driven

student support systems, and blockchain-based credentialing (Benavides et al., 2020). Competitive pressure has also driven institutions to partner with technology providers to implement transformative projects. For instance, initiatives aimed at creating hybrid learning models or digitising administrative systems often stem from the need to match or surpass the capabilities of peer institutions (Abad-Segura et al., 2020).

Therefore, the following hypothesis was formulated:

Hypothesis 5 (H5): Competitive pressure is positively associated with digital transformation.

- **Government support**

Government provision refers to the support and regulation provided by the government to help firms develop innovations (Hsu et al., 2014). This encouragement often includes technical support, training, and funding for innovation efforts (El-Haddadeh et al., 2021), which in turn facilitates the innovation adoption process within firms. Researchers have confirmed that government support is crucial in triggering the use of new technologies. Financial and non-financial support from the government notably increases the likelihood of firms accepting and implementing innovations (Nguyen et al., 2022). Moreover, Chen et al. (2021) suggested that government subsidies can drive enterprise digital transformation by alleviating financing constraints and encouraging investment in innovation.

In the education sector, government initiatives are instrumental in advancing digital transformation. Vachkova et al. (2021) highlighted how national education projects have facilitated the adoption of digital tools in schools, particularly through funding and policy incentives. These initiatives ensure that educational institutions keep pace with technological advancements, creating a conducive environment for digital learning and innovation.

Furthermore, Sepúlveda (2021) emphasised the importance of government policies in bridging the digital divide. By connecting schools and empowering learners with digital resources, governments enhance the inclusivity and

effectiveness of education systems. Yang et al. (2024) argued that digital transformation in public administration, supported by clear regulatory frameworks, has led to improved efficiency and service delivery. This aligns with the findings by Brunetti et al. (2020), who highlighted the role of multi-stakeholder policies in overcoming digital transformation challenges.

However, despite the benefits, government support and regulation can sometimes act as a double-edged sword. Overregulation or poorly designed policies may stifle innovation and discourage investment in digital transformation initiatives. Zhu et al. (2023) explored this tension in small and medium-sized enterprises, emphasising the need for balanced policies that support innovation without imposing excessive constraints. In higher education, García-Peñalvo (2023) stressed the importance of institutional frameworks that align with government policies. Effective implementation requires collaboration between policymakers and institutional leaders to ensure that regulations facilitate, rather than hinder, digital transformation.

Therefore, the following hypothesis was proposed:

Hypothesis 6 (H6): Government support has a positive influence on digital transformation in universities.

2.4 ANALYTICAL FRAMEWORK

This section presents a discussion of the theoretical and conceptual frameworks of the study.

2.4.1 *Theoretical Framework: The TOE framework*

The TOE framework was proposed by Tornatzky and Fleischer in 1990, providing a structured approach to understanding the factors that influence the adoption and implementation of technological innovations (Le, 2024). This framework comprises three key dimensions: technology, organisation, and environment, each playing a crucial role in shaping the outcomes of digital transformation initiatives.

The technology dimension of the TOE framework focuses on the characteristics of the technology itself, including its complexity, compatibility with existing systems, and relative advantage over current practices (Katsamakas, 2022). In the context of higher education institutions, this dimension would encompass the digital tools, platforms, and systems being introduced to enhance teaching, learning, research, and administrative processes (Timotheou et al., 2023). Understanding the technological aspects is essential for assessing the feasibility and effectiveness of digital transformation initiatives within universities.

The organisational dimension of the TOE framework focuses on the internal structures, processes, and capabilities of an organisation that influences its ability to adopt and leverage new technologies (Khurniawan, 2024). Within higher education institutions, this dimension would encompass factors such as leadership support, organisational culture, change management practices, and the availability of resources for digital initiatives (Timotheou, 2023). Organisational readiness and alignment are critical components that can either facilitate or impede the success of digital transformation efforts in universities (Trisninawati & Helmi, 2024).

The environmental dimension of the TOE framework considers the external factors that impact an organisation's digital transformation journey, including regulatory frameworks, market dynamics, competitive pressures, and societal trends (Zhang et al., 2021). In the context of higher education, environmental factors may include government policies supporting digital innovation in education, industry trends shaping pedagogical approaches, and student expectations regarding technology-enhanced learning experiences. Understanding the external environment is crucial for universities to adapt their digital strategies to meet evolving demands and remain competitive.

The TOE framework's relevance to the study of factors influencing digital transformation in organisations, particularly within higher education institutions, lies in its comprehensive and integrative approach to analysing the interplay between technology, organisation, and environment (Firmansyah, 2024).

2.4.2 *Conceptual Framework*

This study was guided by the TOE framework. As identified in the literature, the factors that may influence digital transformation include technological (technology infrastructure, relative advantage of the technology), organisational (top management support, organisational technology orientation), and environmental (competitive pressure and government support). This study sought to test the perceived influence of these factors in the context of South African universities. The following figure presents the conceptual framework of the study:

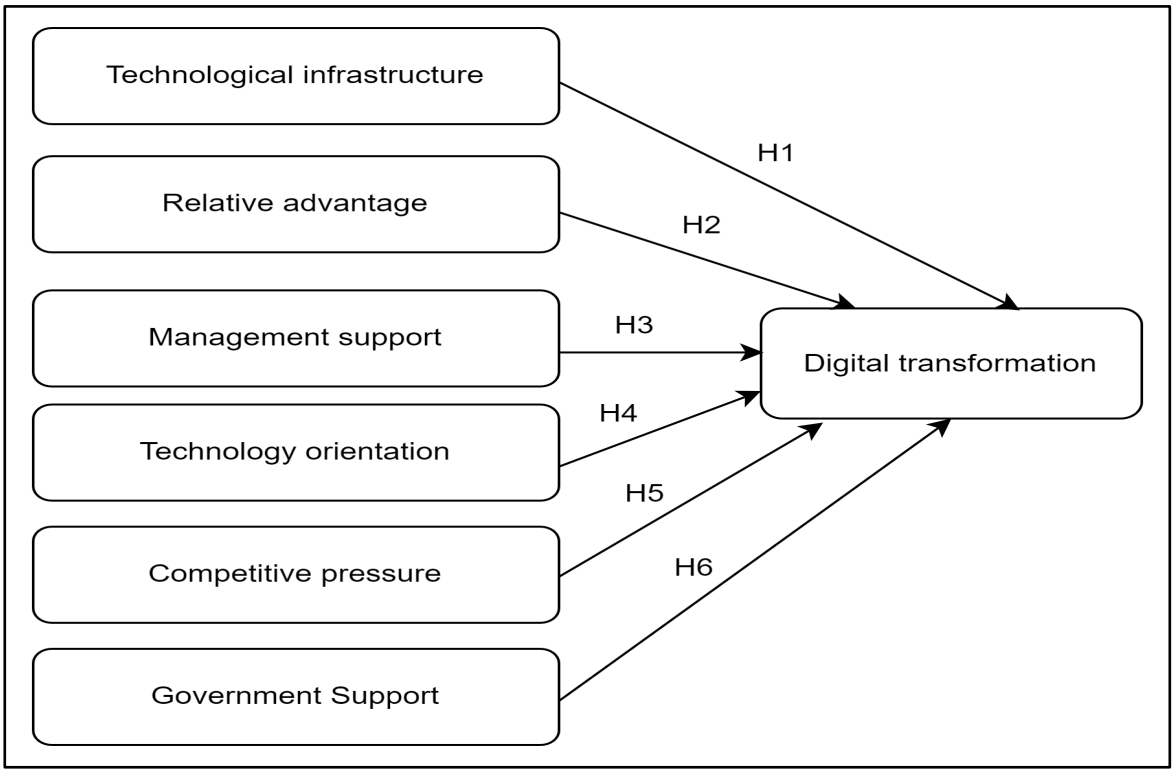

Figure 2.1: Conceptual Framework

2.5 Research gap

Although numerous studies have identified factors influencing digital transformation such as technological infrastructure (Bryan & Zuva, 2021; Manny et al., 2021), top management support (Maroufkhani et al., 2023; Qi et al., 2023), and environmental enablers like competitive pressure and government provision (Nguyen et al., 2022; Chen et al., 2021), the current body of literature remains fragmented, with a disproportionate focus on private enterprises or institutions in

developed economies. Limited empirical work has been conducted within the context of higher education in developing countries, particularly South Africa. While researchers such as Morakanyane et al. (2017) and Kane (2015) have acknowledged the role of digital capabilities, strategies, and organisational culture in digital transformation, few studies have offered a holistic, context-sensitive analysis grounded in a comprehensive framework such as the TOE model. Moreover, although recent studies (Guo et al., 2024; Zhang et al., 2022; Qi et al., 2023) stress the multifaceted drivers of transformation, they often do so in sectoral contexts (for example, manufacturing, SMEs) that differ substantially from the higher education landscape.

Notably, the digital transformation experiences of South African universities remain underexplored in empirical literature. Furthermore, while studies like Florek-Paszkowska et al. (2021) and Barba-Sánchez and Meseguer-Martínez (2024) explore the educational benefits of technology, they do not systematically evaluate how internal and external organisational conditions interact to shape transformation outcomes. This study therefore addresses this gap by applying the TOE framework to investigate the interplay of technological, organisational, and environmental factors influencing digital transformation within South African higher education institutions. In doing so, it responds to calls for more contextually grounded, integrative research (N'Dri & Su, 2024; Wang et al., 2024) that can inform both institutional strategy and national policy.

2.6 Conclusion of Literature Review

The literature review explored the concept of digital transformation and its antecedents within the TOE framework. The study hypothesised that digital transformation is influenced by factors such as technology infrastructure, relative advantage, top management support, organisational technology orientation, competitive pressure, and government support. The hypotheses are summarised below:

Hypothesis 1 (H1): Technological infrastructure positively influences digital transformation in universities.

Hypothesis 2 (H2): The relative advantage of technology positively influences digital transformation in universities.

Hypothesis 3 (H3): Top management support has a positive influence on the digital transformation of universities.

Hypothesis 4 (H4): Technology orientation has a positive influence on digital transformation in universities.

Hypothesis 5 (H5): Competitive pressure is positively associated with digital transformation.

Hypothesis 6 (H6): Government support has a positive influence on digital transformation in universities.

Despite these insights, there is limited literature addressing the success factors for digital transformation specifically in the context of higher education institutions. This study seeks to contribute to existing literature on digital transformation and its drivers.

CHAPTER 3. RESEARCH METHODOLOGY

3.1 Introduction

The previous chapter focused on reviewing the literature and developing hypotheses that this study aims to test. This chapter describes the methodology that was followed to address the hypotheses that arose from the literature review. The chapter begins by discussing the research paradigm, followed by a discussion on the research approach and research design. Further, the chapter discusses data collection methods, the study population and sample, the research instrument, data analysis, quality assurance, limitations of the study, and lastly, ethical considerations.

3.2 Research paradigm

For this study on the factors influencing digital transformation in selected South African universities, the chosen research paradigm was positivism. This paradigm aligns with a quantitative research approach and emphasises the objective measurement and statistical analysis of data (Saunders et al., 2019). The objective nature of positivism ensures that the findings are based on empirical evidence rather than subjective interpretations, enhancing the credibility and generalisability of the results (Creswell & Creswell, 2017).

Ontology concerns the nature of reality and what can be known about it (Saunders et al., 2019). In the context of positivism, the ontological stance is that reality is objective and external to the researcher (Kivunja & Kuyini, 2017). Positivists believe that the social world exists independently of individual perceptions and can be observed and measured directly (Creswell & Creswell, 2017). In this study, the factors influencing digital transformation are treated as objective phenomena that can be quantitatively assessed through empirical data.

Epistemology involves the nature and scope of knowledge and how it can be acquired (Kivunja & Kuyini, 2017). Under positivism, the epistemological stance is that knowledge is derived from sensory experience and can be obtained

through observation and experimentation (Saunders et al., 2019). This study adopted a positivist epistemology by using structured instruments such as surveys or questionnaires to collect data. The goal was to uncover patterns, relationships, and causal links between variables that influence digital transformation in universities.

Axiology pertains to the role of values in research (Saunders et al., 2019). In positivist research, there is an emphasis on objectivity and value neutrality (Rehman & Alharthi, 2016). Researchers strive to minimise biases and ensure that their values do not influence the data collection or analysis process (Creswell & Creswell, 2017). In this study, the researcher maintained an objective stance, using standardised methods and statistical techniques to analyse the data, thereby reducing the influence of personal biases and ensuring the reliability and validity of the findings

3.3 Research approach

For this research, a quantitative approach was adopted. According to Abutabenjeh and Jaradat (2018), quantitative methods emphasise objective measurements and the statistical, mathematical, or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques. Quantitative research focuses on gathering numerical data and generalising it across groups of people to explain a particular phenomenon. Leonard (2011) added that quantitative data is more efficient and able to test hypotheses but may miss contextual detail. The development of standard questions by researchers can lead to "structural bias" and false representation, where the data reflects the view of the researcher instead of the participating subject (Creswell & Creswell, 2017).

However, the quantitative approach assumes that reality is objective and can be observed and measured independently of the researcher’s beliefs or biases (Walliman, 2021). This assumption is appropriate for this study because it allows for the objective assessment of factors influencing digital transformation, free from subjective interpretations. It is assumed that the factors influencing digital

transformation can be quantified and analysed statistically. The approach assumes that findings from a representative sample can be generalised to the broader population (Creswell & Creswell, 2017). This is particularly relevant for this study, as it aimed to provide insights that could apply to South African universities.

3.4 Research design

This study adopted a case study strategy, focusing on the digital transformation of Wits University in South Africa. A case study is an in-depth, contextual analysis of a specific entity, phenomenon, or event within its real-life context (Walliman, 2021). By focusing on Wits University, the study aimed to gain detailed insights into the specific factors influencing digital transformation within a leading South African university, enabling a comprehensive understanding that can inform broader generalizations or further research.

This case study utilised a survey design to collect data. A survey design was appropriate for this research because it allowed for the collection of data from a large number of respondents efficiently and effectively. This design helped in answering the research questions by providing quantitative data that was analysed statistically to identify patterns, relationships, and causal links between variables (Nardi, 2018). Surveys provided a standardized method of data collection, where all respondents answered the same set of questions. This standardization ensures consistency in responses, making it easier to compare and analyse data across different groups (Story & Tait, 2018).

Surveys, particularly online surveys, are cost-effective compared to other data collection methods (Nardi, 2018). They require fewer resources in terms of time, personnel, and materials. In addition, surveys can be designed to ensure respondents' anonymity and confidentiality, which can encourage honest and accurate responses, especially when dealing with sensitive topics (Story & Tait, 2018).

However, while surveys are effective for collecting broad quantitative data, they may lack the depth and context provided by qualitative methods (Creswell &

Creswell, 2017). Respondents' answers are limited to the predefined questions, which may not capture the full complexity of their experiences and perspectives. In addition, surveys are subject to response biases, such as social desirability bias, where respondents may answer questions in a manner, they believe is socially acceptable rather than truthfully (Nardi, 2018). This can affect the accuracy of the data collected.

The survey design was justified for this study because it aligns with the research objectives of quantitatively measuring and analysing the factors influencing digital transformation in universities. The standardised nature of surveys ensures consistency and comparability of data, while the broad reach allows for a comprehensive understanding of the phenomenon across multiple institutions (Story & Tait, 2018). Despite its limitations, the survey design provided an efficient and effective means to gather the necessary data to answer the research questions and achieve the study's objectives.

3.5 Data collection methods

In this study, data was collected using questionnaires. This method was chosen due to its efficiency in gathering quantitative data from a large number of respondents (Saunders et al., 2019). This efficiency was crucial for the study, as it aimed to obtain a large volume of responses to ensure the findings were statistically significant and representative of the target population.

Questionnaires provide a standardised format where all respondents answer the same set of questions. This uniformity ensures that the data collected is consistent across different respondents, facilitating reliable comparison and analysis (Walliman, 2021). Questionnaires are well-suited for collecting numerical data that can be analysed statistically to identify patterns and relationships.

Questionnaires, particularly when administered online, are widely recognised as a cost-effective and efficient data collection method, especially in large institutional settings such as universities (Story & Tait, 2019). Compared to methods like face-to-face interviews or focus groups, online surveys reduce logistical burdens, minimise travel and transcription costs, and enable rapid data

collection and analysis. In this study, an online questionnaire was distributed to university staff across various departments at the University. Online distribution offered broad reach and ease of access, potentially enhancing response rates. Follow-up reminders were sent periodically to encourage participation and reduce non-response.

However, the online mode of data collection is not without limitations. It can introduce sampling and response biases, particularly if certain groups such as less digitally literate staff or those with limited internet access, are underrepresented (Story & Tait, 2019). This may affect the representativeness of the sample and the validity of the findings. To mitigate these potential biases, the questionnaire was designed to be mobile-friendly and accessible on multiple devices like desktops, smartphones, and tablets, thus accommodating varying levels of digital access. Additionally, the invitation to participate was distributed across multiple communication channels to reach a broader cross-section of the university community. Further efforts to reduce participation bias included the use of clear, inclusive language and assurances of confidentiality and anonymity, which aimed to make all staff members regardless of position or background, feel comfortable participating.

3.6 Population and sample

3.6.1 *Population*

The population for this study consisted of university staff across all departments at the University of Witwatersrand, South Africa. This population included faculty members, administrative staff, IT personnel, and other stakeholders involved in or affected by digital transformation initiatives within the institution. Including university staff from all departments ensured that the study captured a comprehensive range of perspectives on digital transformation. Faculty members provided insights into how digital tools impact teaching and research, while administrative staff provided insights into changes in workflows and processes. IT personnel offered technical insights.

3.6.2 *Sample*

A total of 200 university staff members were targeted for this study. This sample size was guided by both practical and methodological considerations. According to Field (2018), for regression-based analyses or factor analysis, a sample of at least 150–200 participants is typically considered sufficient to detect medium effect sizes with a power level of 0.80 and an alpha of 0.05. This threshold helps ensure adequate statistical power and robustness of results. Additionally, the sample size was chosen to enable the capture of diverse perspectives across various departments and staff categories, thereby improving the representativeness of the findings within the study's scope. While the study was constrained by time and resource limitations, efforts were made to secure participation from individuals across different job categories and faculties to strengthen the inclusivity of the sample.

3.6.3 *Sampling method*

The study employed convenience sampling, a non-probability sampling method that involves selecting participants who are readily accessible and willing to take part (Flick, 2018). This method was deemed appropriate given the constraints of time, logistics, and limited access to institutional databases. Convenience sampling enabled efficient data collection, especially as the survey was distributed via digital platforms such as email and internal staff networks.

However, it is acknowledged that convenience sampling can introduce selection bias, as it does not involve random selection and may over-represent individuals who are more motivated, digitally literate, or more available during the survey period (Creswell & Creswell, 2017; Walliman, 2021). These limitations can affect the external validity and generalizability of the findings to the broader Wits staff population.

To mitigate these limitations and strengthen the internal validity of the study, deliberate steps were taken to ensure maximum variation within the sample. This included outreach to staff across different faculties, campuses, and roles (academic and support staff), and an emphasis on demographic diversity (age,

years of service, and digital proficiency levels). Furthermore, the survey design and communication clearly explained the voluntary nature of participation and the relevance of the study to encourage participation from less represented or typically under-engaged groups.

Despite its limitations, convenience sampling has been shown to yield valuable and valid insights, particularly in exploratory or context-specific research where the objective is to uncover perceptions, experiences, or barriers related to organisational change (Etikan et al., 2016). Accordingly, the methodological choice was appropriate for the exploratory nature of this research, which aims to generate grounded understanding rather than statistically generalisable findings.

3.7 The research instrument

This study used a questionnaire to collect data. The questionnaire consisted of a section with demographic information of respondents which includes gender, age, university, and department of the respondent. The preceding sections consisted of measurement scales for the constructs that were used in this study. The items were all assessed on a 5-point Likert scale (1= strongly disagree, to 5= strongly agree). The following table provides a summary of the research instrument, highlighting the number of items and the sources from where the construct was adapted.

Table 3.1: Research instrument

Items	Construct	Source
1-4	Demographic information	
5-9	Technological infrastructure	Nguyen et al. (2022); Qi et al. (2023); Zhang et al. (2023).
10-14	Relative advantage	Nguyen et al. (2022); Qi et al. (2023); Zhang et al. (2023).

15-19	Management support	Nguyen et al. (2022); Qi et al. (2023); Zhang et al. (2023).
20-24	Technology orientation	Nguyen et al. (2022); Qi et al. (2023); Zhang et al. (2023).
25-29	Competitive pressure	Nguyen et al. (2022); Qi et al. (2023); Zhang et al. (2023).
30-34	Government support	Nguyen et al. (2022); Qi et al. (2023); Zhang et al. (2023).
35-40	Digital transformation	Zhang et al. (2023); Carvalho et al. (2021).

3.8 Procedure for data collection

The first step involved obtaining formal permission from Wits University. A formal request letter was sent to the university administration. The letter detailed the study's objectives, its significance, and the data collection process. The request emphasised how the study aligned with the university's goals of enhancing digital transformation, thus seeking to obtain the necessary authorizations and address any potential concerns or requirements from the university.

Upon receiving permission, the next step was to coordinate with the university administration to facilitate the survey distribution. A point of contact within the university was identified. This individual received a briefing about the survey, including its purpose, the target respondents, and the expected time commitment for completing the questionnaire. This collaboration aimed to develop a distribution plan that leverages the university's existing communication channels to reach all staff members effectively.

The survey, designed using a reliable online platform Qualtrics, was then distributed. The university administration sent an email invitation to all staff members, containing the survey link and detailed instructions for participation.

To boost response rates, follow-up reminders were scheduled and sent periodically until the desired sample number of responses was achieved. These reminders helped to maintain engagement and prompt participation from those who might have initially overlooked the invitation.

3.9 Data analysis strategies and interpretation

The data analysis process for this study was conducted using software tools SPSS 27 and AMOS 29. The process involved several critical steps, starting with data cleaning and culminating in structural equation modelling to test the hypotheses.

3.9.1 *Data cleaning and preparation*

The initial step in the data analysis process was data cleaning. This involved examining the raw data to identify and address any issues that could compromise the integrity of the analysis. First, the data was checked for completeness, ensuring that only responses that were fully completed and valid were included in the analysis. Missing values were analysed to determine their pattern and extent. If missing data is minimal, cases with missing values are excluded. However, if there are significant missing values, appropriate imputation techniques are applied to handle them, ensuring that the dataset remains robust and reliable.

3.9.2 *Descriptive statistics*

Once the data is cleaned, descriptive statistics were computed to provide an overview of the sample characteristics and the key variables of interest. Descriptive statistics were presented to summarise the demographic profile of the respondents and the main variables under study. This step provided a clear understanding of the data distribution and highlighted any initial patterns or trends that would warrant further investigation.

3.9.3 *Exploratory Factor Analysis (EFA)*

After presenting the descriptive statistics, EFA was conducted to explore the factor structure of the research measurement scales. EFA helps in identifying the underlying factor structure of the measurement items, ensuring that they accurately represent the constructs being studied (Hair et al., 2010). The process involves extracting factors, determining the number of factors to retain, and rotating the factor matrix to achieve a simpler and more interpretable structure (Field, 2018). The reliability of the scales was assessed using Cronbach's alpha, with values above 0.7 indicating acceptable reliability (Hair et al., 2018).

3.9.4 *Confirmatory Factor Analysis (CFA)*

Following EFA, CFA was performed using AMOS 29 to confirm the factor structures identified during EFA. CFA allows for the testing of a predefined factor structure and provides a more rigorous assessment of construct validity (Hair et al., 2010). The model fit was evaluated using several fit indices, such as the Chi-square statistic, Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA). Good model fit is indicated by a non-significant Chi-square, CFI, and TLI values close to or above 0.95, and RMSEA values below 0.06 (Hair et al., 2010).

3.9.5 *Structural Equation Modelling (SEM)*

The final step in the data analysis process was Structural Equation Modelling (SEM), which was used to test the hypotheses. SEM combines both the measurement model and the structural model, allowing for the simultaneous assessment of relationships between observed and latent variables (Hair et al., 2010). The structural model was specified based on the conceptual framework and the hypotheses that were formulated. Path analysis was conducted to examine the relationships between the variables. The model fit was assessed using the same fit indices as in CFA. Significant path coefficients indicate support for the hypothesized relationships, while non-significant coefficients suggest that the hypothesized relationships do not hold in the sample data (Hair et al., 2010.

3.10 Possible limitations and challenges of the study

- As a quantitative study, this research may lack the depth of understanding that a mixed methods approach could provide. While quantitative methods are effective for identifying patterns and relationships, they may not fully capture the nuanced experiences and perceptions of university staff regarding digital transformation.
- The study's cross-sectional design captures data at a single point in time, limiting the ability to examine changes or trends over time. This design may not account for the dynamic nature of digital transformation and its evolving impact on university staff.
- The use of a convenience sample, where participants are selected based on their availability and willingness, may introduce sampling bias and limit the generalisability of the findings. To overcome this limitation, the study made efforts to reach a diverse range of respondents within the university, including various departments and roles. Additionally, the study maximised response rates through follow-up reminders and incentives to ensure a more representative sample.

3.11 Quality Assurance

3.11.1 *External validity*

External validity refers to the extent to which the findings of a study can be generalized or have relevance for settings beyond the specific context of the study (Creswell & Creswell, 2017). This study ensured generalisability by employing a comprehensive approach to data collection and analysis. Although the study utilised convenience sampling, efforts were made to include a diverse range of university staff across various departments and roles to capture a wide array of perspectives on digital transformation. The study enhanced generalisability by documenting the methodology in detail, allowing for replication and comparison with similar research in different contexts.

3.11.2 *Internal validity*

Internal validity refers to the extent to which the study accurately measures the constructs it intends to and whether the observed relationships can be confidently attributed to the variables under investigation rather than to external factors (Field, 2018). To ensure internal validity, this study utilised EFA and CFA to assess and confirm the validity of the measurement scales. EFA helped identify the underlying factor structure and ensure that the scales accurately represent the constructs of interest, while CFA validated the factor structure against theoretical models (Hair et al., 2010). Additionally, measures such as Average Variance Extracted (AVE) were employed to confirm the convergent validity and discriminant validity of the scales, ensuring that the measurements effectively capture the intended constructs and support robust, credible findings (Hair et al., 2010).

3.11.3 *Reliability*

Reliability in this study was assessed using Cronbach's alpha, a statistical measure that evaluates the internal consistency of the scales used in the survey. Cronbach's alpha measures how closely related a set of items are as a group, with values above 0.7 indicating acceptable reliability (Hair et al., 2010; Field et al., 2019).

3.12 Ethical considerations

To ensure that this research was conducted ethically, several key measures were implemented. First, informed consent was obtained from all participants. Before completing the survey, staff members were provided with a detailed information sheet explaining the study's purpose, procedures, and their rights, including the charitable nature of the contribution and their ability to retract at any time without penalty. Next, the study guaranteed anonymity and confidentiality by ensuring that all responses were aggregated, and no individual identifiers were collected or reported. Data is securely stored and only accessible to the research team. Additionally, permission to conduct the study was sought from the selected

university, with formal approval obtained to ensure institutional support and adherence to ethical standards. The completed WBS ethics form, which outlines these procedures, was submitted and approved by the Post-Graduate Committee (PGC) before data collection began. These measures collectively ensured that the research upheld the highest ethical standards throughout the study.

CHAPTER 4. RESULTS

4.1 Introduction

This study investigated the success factors for digital transformation at a South African university. The methodology followed was outlined in the preceding chapter. Data was collected from the university's staff members, aiming to get their perceptions on digital transformation and driving forces at the organisation. This chapter focuses on results presentation and interpretation of results. Section 4.2 of this chapter discusses the data cleaning processes followed. Section 4.3 presents an overview of respondents' demographic information. Section 4.4 focuses on descriptive statistical analysis, focusing on the distributions of responses on different questions asked in the survey. Further, Section 4.5 presents normality tests, which will inform the type of statistical tests to be employed for further analysis. Section 4.6 presents a reliability analysis. Thereafter, exploratory factor analysis (EFA) is conducted to explore the factor structure of the dataset, before conducting confirmatory factor analysis (CFA) to confirm the validity of the measurement model. Structural equation modelling (SEM) is conducted at the end of the chapter to test the hypothesized relationships.

4.2 Data screening

An online survey was distributed to staff members across various departments at Wits University. Using a convenience sampling approach, 149 responses were collected. These responses were screened to identify and remove missing or incomplete data. Of the 149 responses, 11 were incomplete, as respondents only completed the demographic section and left the rest unanswered. After eliminating these incomplete responses, the final usable sample size comprised 138 respondents.

4.3 Sample demographic characteristics

The survey collected data on gender, age group and department of the respondent. This section presents statistical distributions of the sample according to these demographic details.

4.3.1 *Gender*

Figure 4.1 presents a summary of gender distribution of the sample.

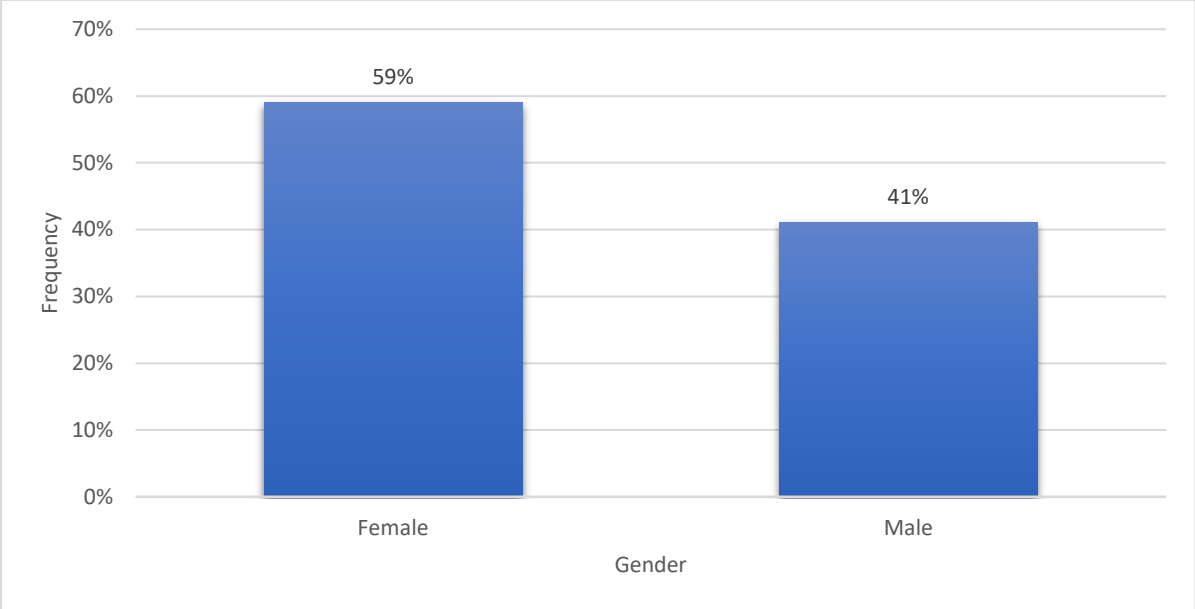

Figure 4.1: Gender

The gender distribution of the sample indicates that the majority of respondents were female, accounting for 82 participants (59.4% of the sample). Male respondents comprised 56 respondents, representing 40.6% of the sample. The results show that though there were more female respondents, a significant number of male respondents were also included, thus, perspectives across genders were incorporated in the study.

4.3.2 *Age group*

Figure 4.2 shows how the sample was distributed according to respondents' age groups.

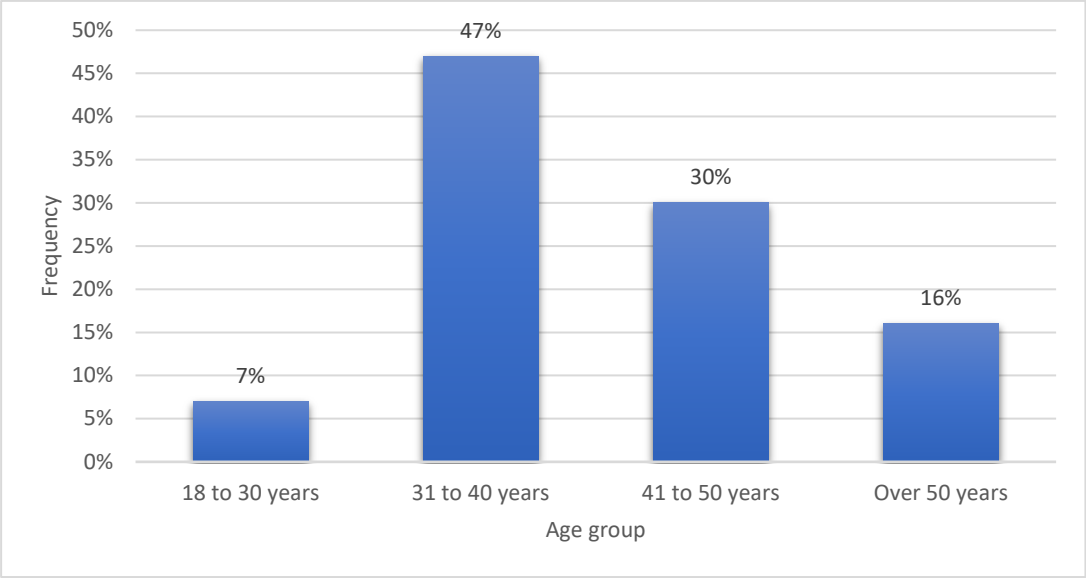

Figure 4.2: Age group of respondents

The age distribution of the sample reveals that the largest proportion of respondents, 47% (65 participants), fell within the 31 to 40 years age group. This was followed by the 41 to 50 years age group, which comprised 30% (42 participants). Respondents aged over 50 years accounted for 16% (22 participants), while the youngest age group, 18 to 30 years, represented only 7% (9 participants). This distribution suggests that data was collected from diverse age groups, thus accommodating perspective of different age groups in the study.

4.3.3 *Department*

Respondents were asked to indicate the respective departments they work in. Results are summarised in Figure 4.3.

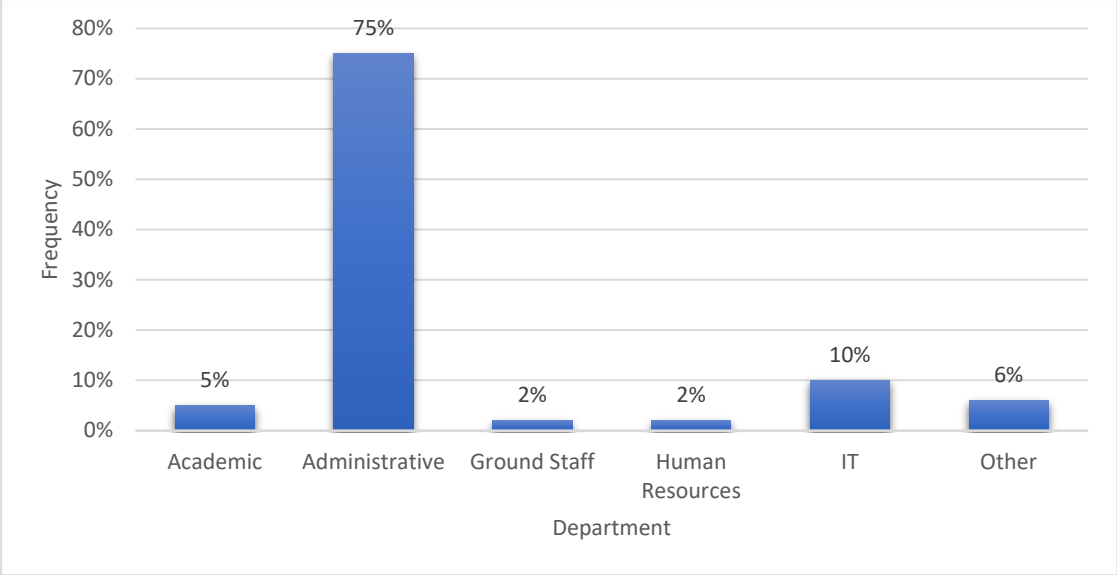

Figure 4.3: Department

The distribution of respondents by department indicates that the majority were from administrative roles, comprising 75% (104 participants) of the sample. This was followed by the IT department, which accounted for 10% (13 participants). Academic staff made up 5% (7 participants), while participants from other departments represented 6% (8 participants). Ground staff, human resources, and an unspecified department each contributed 2% (2 participants) to the sample.

4.4 Descriptive statistics

Descriptive statistics summarises the important characteristics of the data set. This study used the mean and standard deviation to analyse respondents' perceptions of the digital transformation success factors, focusing on the extent to which they agreed or disagreed with the statements. All statements were measured on a 5-point Likert scale (1= strongly disagree, 5= strongly agree). This suggests that mean score indicates the average response per item, with a mean score above 3.5 indicating that most respondents agreed. A mean score of 3 to 3.4 indicate that most respondents answered "neutral" and a mean score of below 3 indicates that most respondents answered, "disagree or strongly disagree". The lower the standard deviation (below 1.00), the more consistent are the responses, indicating a consensus among respondents (Hair et al., 2010). This section

presents descriptive statistics per item for the constructs of this study, which are: technological infrastructure (TI), relative advantage of the technology (RA), top management support (MS), organisational technology orientation (TO), competitive pressure (CP), government support (GS) and digital transformation (DT).

4.4.1 *Technological infrastructure (TI)*

Technology infrastructure was constructed in this study to measure the extent to which the university has sufficient technology infrastructure that can support digital transformation efforts of the organisation. The construct consisted of 5 items, and per item descriptive statistics are shown in Table 4.1.

Table 4.1: Technology infrastructure

Item	Mean	Std. Deviation
The university has sufficient high-speed internet access for all staff	3.92	1.033
The university's hardware and software are regularly updated to support digital initiatives	3.75	1.010
There are adequate digital tools available for staff to perform their duties effectively	3.51	1.076
The university's IT infrastructure is reliable and experiences minimal downtime	3.62	1.090
The university provides effective technical support for the use of digital technologies	3.62	1.056

The descriptive statistics for the technology infrastructure construct reveal that respondents generally agreed the university has sufficient technological resources to support digital transformation, as indicated by mean scores above 3.5 for all five items. However, the relatively high standard deviations, all exceeding 1.00, suggest variability in responses, indicating differing perceptions among staff. Among the items, the highest-rated aspect was the availability of high-speed internet access for all staff, with a mean of 3.92 (SD = 1.033),

reflecting strong agreement that this foundational resource is adequately provided. Conversely, the adequacy of digital tools for staff to perform their duties effectively received the lowest mean score of 3.51 (SD = 1.076), suggesting a slightly less favourable perception in this area. These results highlight that while respondents recognise the university's progress in providing essential technological infrastructure, some areas, particularly the availability of digital tools, may require further attention to ensure alignment with digital transformation goals.

4.4.2 *Relative advantage of the technology (RA)*

Relative advantage was constructed to measure respondents' perceptions on the extent to which adoption of digital technologies brings benefits to the organisation as a whole. Table 4.2 summarise item descriptive statistics for this construct.

Table 4.2: Relative advantage

Item	Mean	Std. Deviation
Digital technologies make operations more efficient	4.39	.796
Integration of digital technologies lowers operational costs	4.09	.919
Digital technologies enhance the quality of teaching and learning	4.33	.831
Digital tools provide a competitive advantage for the university	4.49	.717
Adopting digital systems increases the university's ability to meet student needs	4.46	.716

The descriptive statistics for the relative advantage construct indicate strong agreement among respondents regarding the benefits of adopting digital technologies, as evidenced by consistently high mean scores above 4.0 across all five items. Additionally, the standard deviations, all below 1.00, suggest a high degree of consensus, indicating that respondents shared similar positive perceptions. The highest-rated item was the belief that digital tools provide a competitive advantage for the university (M = 4.49, SD = 0.717), closely followed by the view that adopting digital systems enhances the university's ability to meet

student needs (M = 4.46, SD = 0.716). These findings highlight a strong perception among staff that digital transformation significantly benefits the organisation, enhancing efficiency, reducing costs, improving teaching and learning quality, and strengthening the university's competitive position. This highlights a shared understanding of the value digital technologies bring to the institution.

4.4.3 *Top management support (MS)*

This construct measured the extent to which respondents perceive the management of the university to be supportive of the digital transformation initiatives of the organisation. Results are summarised in Table 4.3.

Table 4.3: Management support

Items	Mean	Std. Deviation
University management actively encourages the adoption of digital technologies	3.64	.928
There is clear communication from management about the importance of digital transformation	3.34	1.057
Management provides sufficient resources for implementing digital initiatives	3.22	1.121
University leadership is committed to the continuous improvement of digital systems	3.59	1.023
Management supports staff training on new digital tools and technologies	3.41	1.037

The descriptive statistics for the management support construct indicate moderate agreement among respondents regarding the university management's role in supporting digital transformation initiatives. While some items show relatively favourable perceptions, the standard deviations (all above 0.90) suggest notable variability in responses, indicating differing views among staff. The highest-rated item was the active encouragement from university management for adopting digital technologies (M = 3.64, SD = 0.928), followed closely by the leadership's commitment to continuous improvement of digital

systems (M = 3.59, SD = 1.023). However, aspects such as providing sufficient resources for implementing digital initiatives (M = 3.22, SD = 1.121) and supporting staff training on new digital tools (M = 3.41, SD = 1.037) were rated slightly lower. Clear communication from management about the importance of digital transformation also received a lower mean score (M = 3.34, SD = 1.057). These findings suggest that while management demonstrates some support for digital transformation, greater efforts in resource allocation, communication, and staff development could enhance perceptions of management's commitment to these initiatives.

4.4.4 *Organisational technology orientation (TO)*

This construct measured respondents' perceptions of the extent to which the university is inclined towards adopting and integrating advanced technologies in its operations. Table 4.4 summarise per item descriptive statistics for the construct.

Table 4.4: Technology orientation

Items	Mean	Std. Deviation
The university is quick to adopt new digital technologies	3.12	1.130
There is a strong culture of innovation within the university	3.41	.994
The university frequently explores new technological solutions to enhance operations	3.33	1.006
Staff are encouraged to experiment with and implement innovative digital tools	3.22	1.009
The university actively invests in the latest technological advancements	3.30	1.111

The descriptive statistics for the technology orientation construct reveal moderate perceptions among respondents regarding the university's inclination toward adopting and integrating advanced technologies. Mean scores for all items fall within the range of 3.12 to 3.41, indicating a mix of neutral to slightly positive

views. The standard deviations, ranging from 0.994 to 1.130, suggest some variability in responses, reflecting differing opinions among staff.

The highest-rated item was the presence of a strong culture of innovation within the university (M = 3.41, SD = 0.994), followed by the university's exploration of new technological solutions to enhance operations (M = 3.33, SD = 1.006). However, perceptions of the university's active investment in the latest technological advancements (M = 3.30, SD = 1.111) and encouragement of staff to experiment with innovative tools (M = 3.22, SD = 1.009) were slightly lower. The lowest-rated item was the university's speed in adopting new digital technologies (M = 3.12, SD = 1.130), suggesting room for improvement in this area. Overall, while respondents recognise some level of technology orientation, these findings indicate opportunities for the university to strengthen its commitment to adopting advanced technologies and fostering innovation.

4.4.5 *Competitive pressure (CP)*

Competitive pressure was constructed to measure respondents' perceptions of the extent to which their organisation responds to competition by adopting new digital technologies. Table 4.5 summarises descriptive statistics for this construct.

Table 4.5: Competitive pressure

Item	Mean	Std. Deviation
The university feels pressure from other institutions to adopt advanced digital technologies	3.54	.937
Competitive forces drive the university to continuously enhance its digital offerings	3.70	.883
The university is aware of the digital advancements made by its competitors	3.94	.826
There is a need to match or exceed the digital capabilities of other universities	4.12	.850
Competitive pressures influence the university's decisions on digital transformation initiatives	3.89	.885

Table 4.5 shows respondents generally agree the university is influenced by competition in its approach to digital transformation, as reflected by mean scores above 3.5 for all items. The standard deviations, ranging from 0.826 to 0.937, indicate relatively low variability, suggesting a reasonable level of consensus among respondents.

The highest-rated item was the perceived need to match or exceed the digital capabilities of other universities (M = 4.12, SD = 0.850), highlighting a strong recognition of competitive benchmarking as a driver for digital transformation. Awareness of competitors' digital advancements (M = 3.94, SD = 0.826) and the influence of competitive pressures on decision-making (M = 3.89, SD = 0.885) were also rated highly, emphasising the university's responsiveness to its competitive environment. Slightly lower, but still indicative of agreement, were perceptions that competitive forces drive continuous enhancement of digital offerings (M = 3.70, SD = 0.883) and that the university feels pressure from other institutions to adopt advanced technologies (M = 3.54, SD = 0.937). These results suggest that competition is a significant motivator for the university's digital transformation efforts, with a strong focus on maintaining or surpassing its peers in digital capabilities.

4.4.6 *Government support (GS)*

This construct measured how respondents perceive government as being supportive or less supportive of the university's digital transformation efforts. Table 4.6 summarises descriptive statistics for this construct.

Table 4.6: Government support

Item	Mean	Std. Deviation
The university receives adequate funding from the government for digital initiatives	3.09	.916
Government policies support the university's digital transformation efforts	3.31	.800
There is strong government encouragement for universities to adopt digital technologies	3.28	1.009
The university benefits from government-provided resources for digital innovation	3.22	.910
Government regulations facilitate the university's adoption of new digital systems	3.24	.851

Results indicate that respondents perceive government support for the university's digital transformation efforts as moderate. Mean scores for all items range between 3.09 and 3.31, reflecting neutral to slightly positive perceptions. Standard deviations, ranging from 0.800 to 1.009, suggest some variability in responses, indicating mixed views among staff.

The highest-rated item was the perception that government policies support the university's digital transformation efforts (M = 3.31, SD = 0.800), followed closely by the belief that government regulations facilitate the adoption of new digital systems (M = 3.24, SD = 0.851) and that the university benefits from government-provided resources for digital innovation (M = 3.22, SD = 0.910). However, the adequacy of government funding for digital initiatives received the lowest rating (M = 3.09, SD = 0.916), suggesting a potential area of concern. Strong government encouragement for universities to adopt digital technologies also received a moderate rating (M = 3.28, SD = 1.009), reflecting variability in perceived support. Overall, while respondents acknowledge some level of government support for digital transformation, these results suggest that increased funding and more proactive encouragement could enhance the effectiveness of these initiatives.

4.4.7 *Digital transformation (DT)*

This construct measured respondents' perceptions of the extent to which the university has spearheaded digital transformation. Results are summarised in Table 4.7.

Table 4.7: Digital transformation

Item	Mean	Std. Deviation
The university has successfully integrated digital technologies into its core operations	3.43	.981
Digital tools have significantly improved the teaching and learning experience at the university	3.80	.838
There is a noticeable shift towards online and digital platforms for university services	3.98	.749
The university's digital transformation has enhanced its ability to respond to student needs	3.73	.884
Staff and students are well-equipped to use digital technologies in their daily activities	3.44	.996
The university has established a clear strategy for ongoing digital transformation efforts	3.45	.936

Results in Table 4.7 reveal a positive outlook, with mean scores ranging from 3.43 to 3.98. These results suggest that respondents see progress in digital transformation, though some areas could be strengthened. The standard deviations, ranging from 0.749 to 0.996, indicate relatively low variability, suggesting a reasonable level of consensus among respondents.

The highest-rated item was the noticeable shift toward online and digital platforms for university services (M = 3.98, SD = 0.749), reflecting strong agreement that the university is adopting digital approaches in service delivery. This was followed by the perception that digital tools have significantly improved the teaching and learning experience (M = 3.80, SD = 0.838) and that digital transformation has enhanced the university's ability to respond to student needs (M = 3.73, SD = 0.884). Lower-rated items included the university's integration of digital technologies into core operations (M = 3.43, SD = 0.981), the perception that staff and students are well-equipped to use digital technologies (M = 3.44, SD =

0.996), and the establishment of a clear strategy for ongoing digital transformation (M = 3.45, SD = 0.936).

These findings suggest that while the university has made notable strides in its digital transformation journey, further efforts are needed to strengthen the integration of digital technologies, equip stakeholders, and develop a comprehensive strategy to sustain progress.

4.5 Normality tests

Normality tests were conducted in this study to determine whether the data followed a normal distribution, ensuring the selection of appropriate statistical tests for further analysis. Composite scales were calculated for each construct, and skewness and kurtosis statistics were used to evaluate the data's normality. According to Hair et al. (2010), skewness and kurtosis values between -2 and +2 are acceptable for establishing a normal univariate distribution. Table 4.8 provides a summary of the descriptive statistics for the composite variables.

Table 4.8: Descriptive statistics of composite variables

	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
TI	1.00	5.00	3.68	.885	-.862	.206	.576	.410
RA	1.00	5.00	4.35	.668	-1.023	.206	1.815	.410
MS	1.00	5.00	3.44	.906	-.377	.206	-.092	.410
OTO	1.00	5.00	3.28	.934	-.271	.206	-.462	.410
CP	1.00	5.00	3.84	.658	-.829	.206	1.300	.410
GP	1.00	5.00	3.23	.757	-.030	.206	.474	.410
DT	1.00	5.00	3.64	.741	-.591	.206	.880	.410

The skewness and kurtosis values indicate that the data are approximately normally distributed, as all values fall within the -2 to +2 range (Hair et al., 2010).

The skewness values are generally negative, reflecting a left skew, where responses cluster towards higher values. Overall, the results suggest that the data meet the normality assumption, supporting the use of parametric statistical tests for further analysis.

4.6 Exploratory Factor Analysis (EFA)

Exploratory Factor Analysis (EFA) is a statistical technique used to identify the underlying structure of a set of observed variables by grouping them into latent factors based on their correlations (Watkins, 2021). In this study, EFA was conducted to uncover the factor structure of the constructs and ensure that the items measured the intended dimensions of digital transformation success factors. The first step in EFA is to assess the adequacy of the sample for factor analysis using the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity. As shown in Table 4.9, the KMO value for this study was 0.893, which is above the recommended threshold of 0.6, indicating that the sample is adequate for factor analysis (Hair et al., 2010). Bartlett's Test of Sphericity statistics is significant (Chi-square= 4022.415, $p < 0.001$), confirming that the correlation matrix is not an identity matrix, and that factor analysis is appropriate (Watkins, 2021). These results justify proceeding with EFA.

Table 4.9: Sample adequacy

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.893
Bartlett's Test of Sphericity	Approx. Chi-Square	4022.415
	Df	630
	Sig.	.000

The next step in the EFA process was to determine the extraction method and the number of factors to retain. Principal Component Analysis (PCA) was employed as the extraction method to identify components that explain the maximum variance in the dataset. The eigenvalue criterion was applied, where only components with an eigenvalue greater than 1 were retained for further

analysis (Watkins, 2021). This approach ensures that each extracted factor accounts for a meaningful amount of variance (Hair et al., 2010).

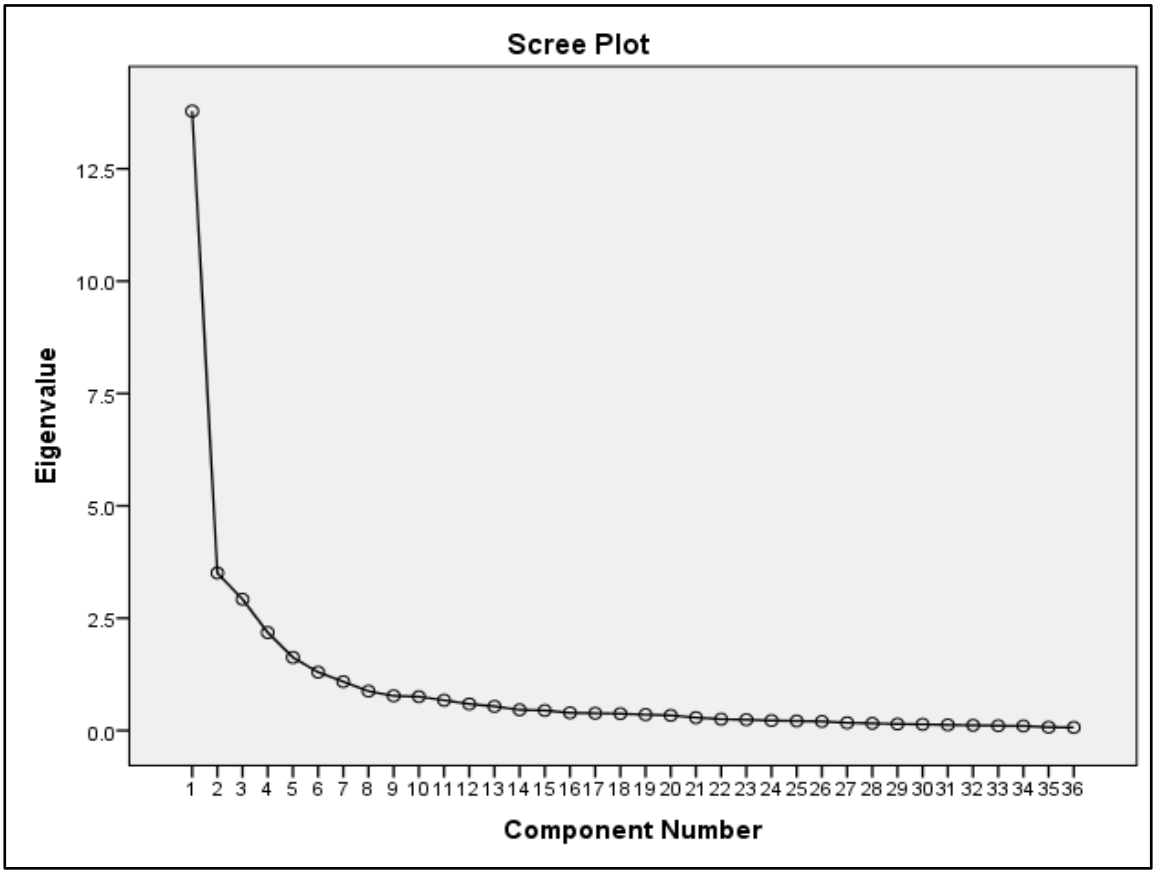

Figure 4.4: Scree plot

A scree plot was generated to visually illustrate the eigenvalues (see Figure 4.4), revealing a clear point of inflection after the seventh component. Based on this criterion, seven components were extracted, representing the key dimensions underlying the constructs of digital transformation success factors.

Table 4.10: Total Variance Explained

Component	Rotation Sums of Squared Loadings		
	Total	**% of Variance**	**Cumulative %**
1	5.218	14.494	14.494
2	4.387	12.185	26.680
3	3.911	10.863	37.543
4	3.794	10.539	48.082
5	3.361	9.336	57.418
6	2.876	7.988	65.407
7	2.858	7.938	**73.345**
Extraction Method: Principal Component Analysis.			

As shown in Table 4.10, the seven extracted factors collectively explain a total of 73.35% of the variance in the dataset, which is above the commonly accepted threshold of 60%, indicating a strong factor solution (Watkins, 2021). This cumulative variance suggests that the extracted factors adequately capture the underlying structure of the data, making them suitable for further analysis and interpretation (Hair et al., 2010).

To enhance the interpretability of the extracted factors, factor rotation was conducted as the next step in the EFA process. Varimax rotation, an orthogonal rotation method, was employed to achieve a simpler and more interpretable factor structure by maximizing the variance of loadings within each factor (Watkins, 2021). This approach helps to clarify the relationship between items and factors by ensuring that each item strongly loads onto one factor while minimizing cross-loadings on others (Watkins, 2021). The rotated solution, shown in Table 4.11, provided a clearer grouping of items under distinct factors, facilitating a better understanding of the constructs underlying digital transformation success factors.

Table 4.11: Rotated component matrix

Rotated Component Matrix							
	Component						
	1	2	3	4	5	6	7
TI1							.752
TI4							.700
TI5							.621
RA1				.859			
RA2				.746			
RA3				.787			
RA4				.879			
RA5				.862			
MS1	.735						
MS2	.749						
MS3	.805						
MS4	.778						
MS5	.798						
TO1					.727		
TO2					.625		
TO3					.721		
TO4					.638		
TO5					.665		
CP1						.608	
CP2						.635	
CP3						.625	
CP4						.723	
CP5						.782	
GS1			.784				
GS2			.838				
GS3			.798				
GS4			.846				
GS5			.792				
DT1		.682					
DT2		.766					
DT3		.655					
DT4		.772					
DT5		.701					
DT6		.609					
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.							
a. Rotation converged in 8 iterations.							

The rotated factor matrix provided a clearer and more interpretable structure of the data, allowing the identification of underlying factors based on the items that loaded highly (> 0.5) onto each component. Factor 7, representing technology infrastructure, initially had five items, but two items (TI1 and TI2) were eliminated, one due to low loading and the other due to cross-loading. The remaining three items (TI3, TI4, TI5) loaded strongly onto this factor. For the other factors, no items were eliminated as they all loaded highly and cleanly on their respective factors without any cross-loadings.

The factors were named based on the items that loaded most strongly: Factor 1 was named management support, with high loadings on items MS1 to MS5. Factor 2 was named digital transformation, as it contained items DT1 to DT6 with strong loadings. Factor 3 was government support, with items GS1 to GS5 loading highly. Factor 4 was technology orientation, represented by items TO1 to TO5. Factor 5 corresponded to relative advantage, with items RA1 to RA5 loading strongly. Factor 6 represented competitive pressure, with items CP1 to CP5 strongly loading. Overall, the factor rotation ensured that each item aligned with its intended construct. CFA will be conducted to confirm and validate this factor structure.

4.7 Confirmatory Factor Analysis (CFA)

CFA was conducted using AMOS 29 to confirm the factor structure of the dataset. The resulting CFA model is illustrated in the following figure, which depicts the relationships between latent variables (represented by large circles) and their corresponding observed variables (represented by small rectangles). Error terms are represented by small scales next to each observed variable, while the double-headed arrows indicate covariances between the latent variables.

The model presented in Figure 4.5 shows the factor loadings and covariances for each variable. Notably, all factor loadings are above 0.5, indicating that the observed variables adequately explain their respective latent constructs (Hair et al., 2010). This suggests that the measurement model is valid and that the relationships between the latent and observed variables are strong and reliable.

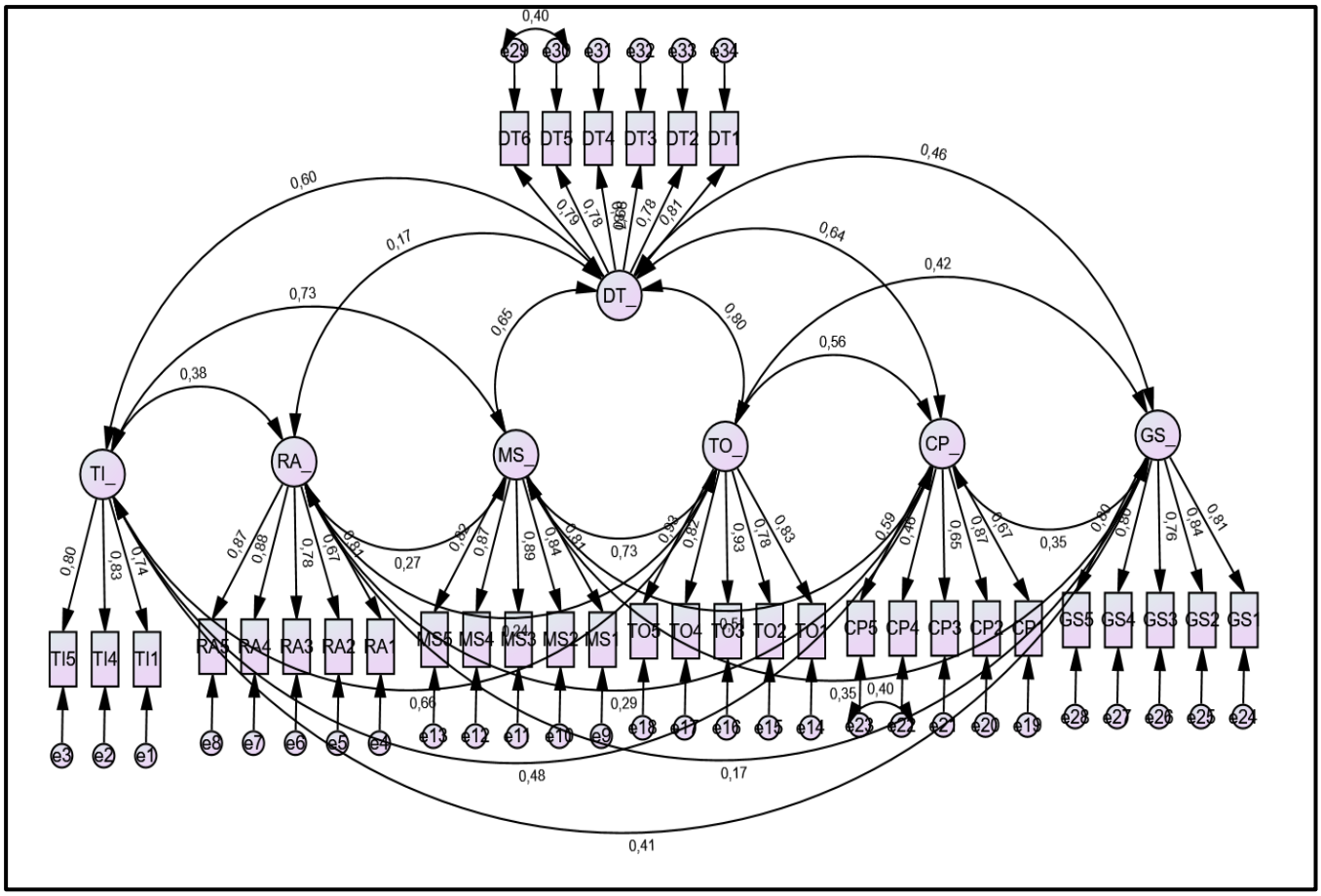

Figure 4.5: CFA model

When evaluating the goodness-of-fit of the model, various model fit indices were considered. The first step involved assessing the Chi-square value of the tested model. The calculated was 1.743, which falls within the acceptable range, indicating that the data fit the model well.

In addition to the Chi-square value, several other fit indices were examined to ensure a comprehensive evaluation of the model fit. These include the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Incremental Fit Index (IFI), and the Root Mean Square Error of Approximation (RMSEA). Each of these indices provides insight into different aspects of model fit. A summary of the fit indices, along with their values and the recommended thresholds, is presented in Table 4.12. These results collectively demonstrate the adequacy of the model in capturing the data structure.

Table 4.12: CFA Model Fit

Fit Index	Recommended value	Actual value
Normed fit index (NFI)	Less than .80 (poor) Between [0.80-0.90] (acceptable) Above 0.90 (good)	0.883
Comparative fit index (CFI)	Less than 0.90 (poor) Above 0.90 (good)	.0.903
Incremental fit index (IFI)	Less than 0.90 (poor) Above 0.90 (good)	0.895
Root mean square error of approximation (RMSEA)	Less than 0.05 (good) Between [0.06-1] (acceptable) Above 1 (poor)	0.074
Chi-square (χ2 /DF)	Less than 3 (good) Between [3-5] (acceptable) Above 5 (poor)	1.741
Tucker-Lewis Index (TLI)	Less than 0.80 (poor) Between [0.80-0.90] (acceptable) Above 0.90 (good)	0.881

The model fit indices indicate that the tested model fits the data reasonably well. The NFI at 0.883 and TLI at 0.881 falls within the acceptable range, suggesting a moderate fit. The CFI at 0.903 surpasses the 0.90 threshold, indicating good fit quality. The IFI is close to the good fit threshold at 0.895, reflecting an acceptable fit. The RMSEA is 0.074, which falls within the acceptable range (between 0.06 and 0.10). Finally, the Chi-square statistic (χ2 /DF) is 1.741, below the threshold of 3, confirming a good fit. Overall, these indices collectively show that the model adequately represents the data.

4.7.1 *Reliability and validity analysis*

Reliability and validity were assessed to ensure the quality and consistency of the measurement model. Reliability was evaluated using Cronbach's alpha and composite reliability (CR). As shown in Table 4.13, Cronbach's alpha values for all constructs exceeded the commonly accepted threshold of 0.7, indicating good

internal consistency (Watkins, 2021). Composite reliability, calculated using factor loadings and error variances, also exceeded the recommended value of 0.7 for all constructs, confirming that the measures reliably captured the intended constructs.

Convergent validity was assessed using the Average Variance Extracted (AVE), which is computed as the average of the squared standardized factor loadings for each construct (Watkins, 2021). An AVE value above 0.5 indicates that the constructs explain more than half of the variance in their observed variables (Hair et al., 2010)

Table 4.13: Reliability and validity

Scale	Original number items	Final number of items	Cronbach Alpha after adjustment	Average variance extracted (AVE)	Composite reliability (CR)
Technological infrastructure	5	3	0.832	0.63	0.83
Relative advantage	5	5	0.892	0.65	0.90
Management support	5	5	0.924	0.71	0.92
Technological orientation	5	5	0.933	0.74	0.93
Competitive pressure	5	5	0.807	0.55	0.79
Government support	5	5	0.897	0.64	0.90
Digital transformation	6	5	0.904	0.61	0.90

In this study, all constructs had AVE values above 0.5, confirming adequate convergent validity.

Discriminant validity was assessed by comparing the square root of the AVE for each construct to the correlations between that construct and others. For discriminant validity to hold, the square root of the AVE should exceed the inter-construct correlations (Hair et al., 2010). As shown in Table 4.14, this criterion was met for all constructs, demonstrating that the constructs were distinct from one another.

Table 4.14: Discriminant validity

		TI	RA	MS	TO	CP	GP	DT
TI		**0.79**						
RA	Pearson Correlation	.333**	**0.80**					
MS	Pearson Correlation	.631**	.236**	**0.84**				
TO	Pearson Correlation	.595**	.210*	.689**	**0.86**			
CP	Pearson Correlation	.370**	.293**	.435**	.484**	**0.78**		
GP	Pearson Correlation	.346**	.152	.317**	.391**	.313**	**0.80**	
DT	Pearson Correlation	.525**	.163	.590**	.747**	.506**	.440**	**0.74**
**. Correlation is significant at the 0.01 level (2-tailed).								
*. Correlation is significant at the 0.05 level (2-tailed).								

As Table 4.14 shows, discriminant validity was assessed by replacing the diagonal of the correlation matrix with the square root of the AVE for each construct. To evaluate discriminant validity, the square root of the AVE (diagonal values) for each construct was compared to the correlations between that construct and all other constructs (off-diagonal values in the same column) (Watkins, 2021). For discriminant validity to be established, the square root of the AVE for each construct should be greater than the correlations in its respective column. In this study, the square root of the AVE exceeded all inter-construct correlations in each column, indicating that the constructs are distinct from one another. For example, for the technology infrastructure (TI) construct, the square root of its AVE (0.79) was greater than all correlations in the TI column. This pattern was consistent across all constructs, confirming that discriminant validity was established for the measurement model.

Overall, results confirm that the measurement model was both reliable and valid.

4.8 Structural Equation Modelling (SEM)

After confirming the constructs and establishing their reliability and validity, the next step was to conduct Structural Equation Modelling (SEM) to test the hypothesised relationships between the latent variables. SEM is a statistical technique that combines factor analysis and multiple regression to examine the relationships among observed and latent variables simultaneously (Hair et al., 2010). In this study, SEM was used to test the hypothesised model and determine the strength and significance of the relationships between the latent variables. This involves specifying a structural model, estimating path coefficients, and evaluating the overall model fit using various fit indices.

Table 4.15: SEM fit indices

Fit Index	**Recommended value**	**Actual value**
Normed fit index (NFI)	Less than .80 (poor) Between [0.80-0.90] (acceptable) Above 0.90 (good)	0.806
Comparative fit index (CFI)	Less than 0.90 (poor) Above 0.90 (good)	.0.917
Incremental fit index (IFI)	Less than 0.90 (poor) Above 0.90 (good)	0.919
Root mean square error of approximation (RMSEA)	Less than 0.05 (good) Between [0.06-1] (acceptable) Above 1 (poor)	0.065
Chi-square (χ2 /DF)	Less than 3 (good) Between [3-5] (acceptable) Above 5 (poor)	1.581
Tucker-Lewis Index (TLI)	Less than 0.80 (poor) Between [0.80-0.90] (acceptable) Above 0.90 (good)	0.906

As shown in Table 4.15, the fitness of SEM was evaluated using multiple fit indices to ensure that the model adequately represented the data. The NFI was 0.806, indicating an acceptable fit. Both the CFI and the IFI exceeded the

recommended threshold of 0.90, with values of 0.917 and 0.919, respectively, demonstrating good model fit. The RMSEA was 0.065, which falls within the acceptable range of 0.06 to 0.08, indicating a reasonable approximation of the model. The Chi-square to degrees of freedom ratio (χ^2/df) was 1.581, below the recommended threshold of 3, suggesting a strong fit. Finally, the TLI was 0.906, surpassing the 0.90 threshold, further confirming the model's goodness-of-fit. Collectively, these indices indicate that the SEM provided an adequate and reliable representation of the hypothesised relationships among the latent variables.

The fitness of the model was enhanced by making adjustments guided by the modification indices reported in Table 4.16, which identified areas where improvements could be made. Specifically, some error terms were allowed to covary based on theoretical justifications and their high modification index (MI) values. For example, error terms e29 and e32 were covaried with an MI of 13.851 and a parameter change of 0.107, while e29 and e30 were covaried with an MI of 15.307 and a parameter change of 0.115. Similarly, error terms e22 and e23 were allowed to covary, resulting in an MI of 18.167 and a parameter change of 0.192. These modifications were made to address localised areas of model misfit and to improve the overall model fit indices without compromising the theoretical integrity of the model (Watkins, 2021).

Table 4.16: Modification indices

Covariances	M.I	Par Change
e29 <--> e32	13,851	0 ,107
e29 <--> e30	15,307	0,115
e22 <--> e23	18,167	0,192

SEM parameter estimates are reported in the following table.

Table 4.17: SEM parameter estimates

Hypothesis	DV		IV	Estimate	S.E.	C.R.	P	Comment
H1	DT	<---	TI	0.292	0.082	3.537	***	Supported
H2	DT	<---	RA	-0.094	0.069	-1.37	0.171	Not supported
H3	DT	<---	MS	0.143	0.057	2.498	0.012	Supported
H4	DT	<---	TO	0.468	0.061	7.631	***	Supported
H5	DT	<---	CP	0.065	0.059	1.097	0.272	Not supported
H6	DT	<---	GS	0.156	0.061	2.534	0.011	Supported

Based on the results, the final hypothesised model is illustrated in the following figure:

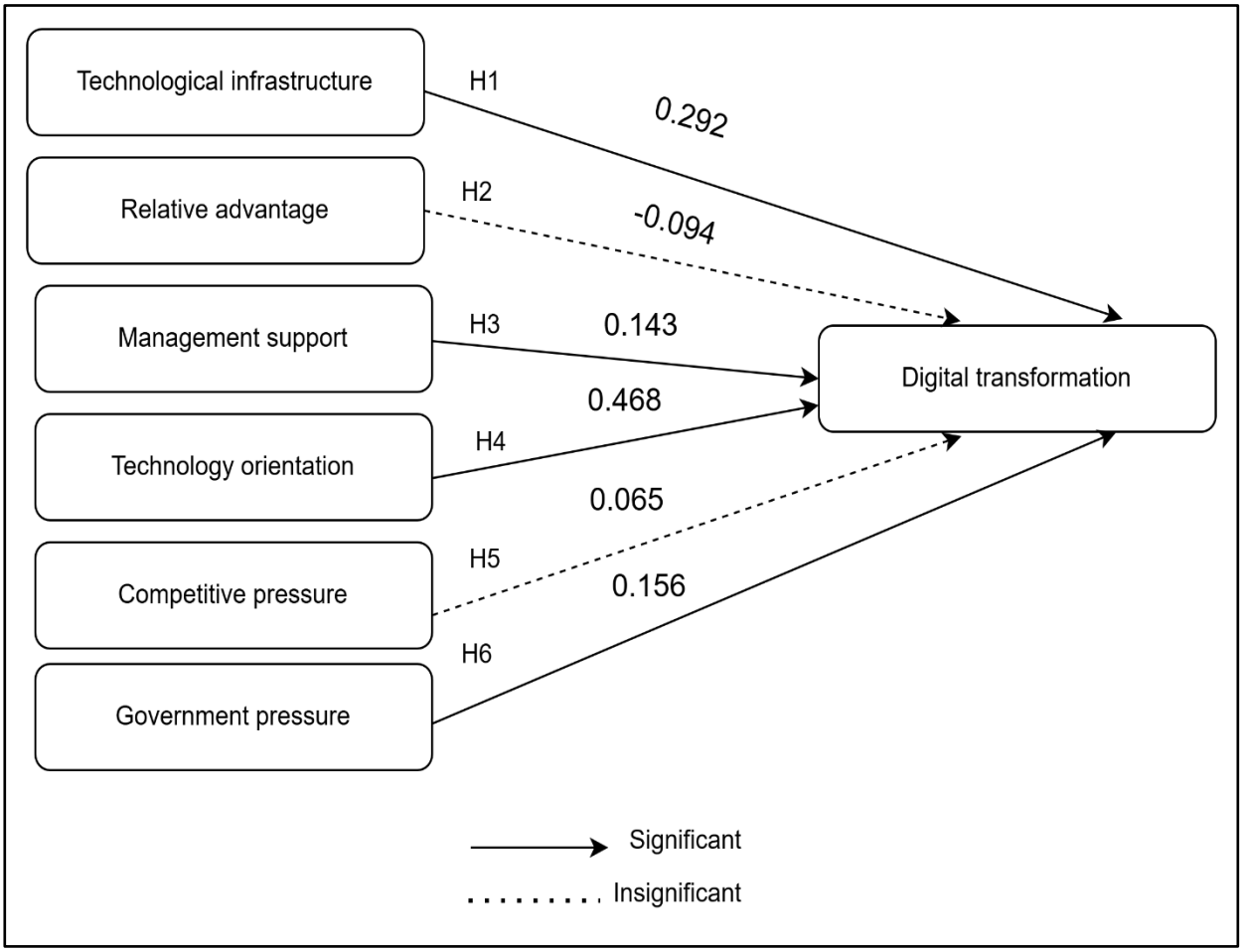

Figure 4.6: Final hypothesised model

Figure 4.6 illustrates the estimated structural equation model for the hypothesised relationships between the latent variables. Solid lines represent significant relationships where the path coefficients are statistically significant, indicating evidence to support the hypothesised linkages. Conversely, broken lines denote insignificant relationships, where the statistical tests did not meet the threshold for significance.

Hypothesis 1 (H1): **Technology infrastructure (TI)** positively influenced digital transformation, with a significant path coefficient of 0.292 *(C.R. = 3.537, p < 0.001),* supporting the hypothesis.

Hypothesis 2 (H2): **Relative advantage (RA)** did not significantly impact digital transformation, as the coefficient was -0.094 *(p = 0.171),* and the hypothesis was not supported.

Hypothesis 3 (H3): **Management support (MS)** showed a positive and significant effect on digital transformation, with a coefficient of 0.143 *(p = 0.012*), supporting the hypothesis.

Hypothesis 4 (H4): **Technology orientation (TO)** demonstrated the strongest positive influence on digital transformation, with a coefficient of 0.468 *(p < 0.001*), providing support for the hypothesis.

Hypothesis (H5): **Competitive pressure (CP)** did not significantly affect digital transformation, as indicated by a coefficient of 0.065 *(p = 0.272),* and the hypothesis was not supported.

Hypothesis 6 (H6): **Government support (GS)** positively influenced digital transformation, with a significant coefficient of 0.156 *(p = 0.011),* supporting the hypothesis.

Overall, the findings indicate that technology infrastructure, management support, technology orientation, and government support are significant predictors of digital transformation, while relative advantage and competitive pressure do not significantly impact the process. The results are discussed in detail in the next chapter of this study.

4.9 Chapter Summary

This chapter presented results on the digital transformation success factors. The chapter summarised sample characteristics, with 138 respondents making the final sample of this study. Descriptive statistics were used to conclude on respondents' perceptions of the digital transformation factors that were tested in this study. Normality tests were conducted, revealing that the data approximate a normal distribution, hence parametric statistical tests were used for all analysis conducted in this study. EFA was conducted to explore the factor structure, which was then confirmed using CFA. The reliability and validity of the constructs of the study was assessed using Cronbach's alpha and average variance extracted. Constructs were found to be reliable and valid and were therefore used to test the hypothesised model using SEM. Results revealed that the key factors that contribute to the success of digital transformation at Wits University are technology infrastructure, management support, technology orientation, and government support. The following chapter discusses these results.

CHAPTER 5. DISCUSSION OF RESULTS

5.1 Introduction

The preceding chapter presented results on the factors that influence digital transformation at a South African university. Based on the TOE framework, the study used SEM to test the hypothesised model, revealing that four factors are instrumental to the success of digital transformation. These results are discussed in this chapter in line with literature. The discussion focuses on results as they pertain to each of the six hypotheses that were specified and tested in this study.

5.2 Factors influencing digital transformation

5.2.1 *Technological infrastructure*

Hypothesis 1 (H1): Technological infrastructure positively influences digital transformation in universities

Technological infrastructure was found to be one of the key factors influencing digital transformation at the university. The study's results indicate that the availability, reliability, and effectiveness of IT infrastructure play a significant role in shaping the institution's ability to undergo digital transformation. This finding reinforces the notion that a university's digital advancement is heavily dependent on the strength of its technological infrastructure, which serves as the foundation for integrating digital initiatives and modernising operational processes.

In this study, technological infrastructure was assessed based on five key aspects: the availability of high-speed internet, the regular updating of hardware and software to support digital initiatives, the adequacy of digital tools for staff, the reliability of IT infrastructure, and the provision of effective technical support for digital technologies. These components collectively measure the extent to which the university possesses a well-developed technology ecosystem capable of enabling and sustaining digital transformation efforts. The results provided

insights into how respondents perceived the university's technological infrastructure and its effectiveness in supporting digital transformation.

The feedback from respondents suggested that, while the university has made notable investments in IT infrastructure, certain areas still require improvement. For instance, while high-speed internet was generally available, the adequacy of digital tools for staff to perform their duties effectively received a slightly lower assessment, indicating that some employees may experience limitations in accessing the necessary digital resources. Furthermore, although the university's IT infrastructure was found to be relatively reliable, some respondents highlighted occasional downtimes and technical inefficiencies. This suggests that, while the university's technological foundation is relatively strong, there remains room for enhancing system reliability, accessibility, and the availability of digital tools to further facilitate digital transformation.

Empirical analysis confirmed that technological infrastructure significantly influences digital transformation, supporting Hypothesis 1. The positive and significant path coefficient demonstrates that a well-established IT infrastructure enhances the university's ability to implement digital initiatives effectively. This result was expected, as previous research has consistently highlighted the critical role of technological infrastructure in driving digital transformation across various sectors (Bryan & Zuva, 2021; Guo et al., 2024).

This finding aligns with existing literature that underscores the importance of IT infrastructure in digital transformation. For instance, Manny et al. (2021) found that insufficient IT infrastructure presents a major obstacle to digital transformation, particularly in organisations that heavily rely on digital tools for their operations. Similarly, Li et al. (2025) demonstrated that investments in digital infrastructure, such as broadband expansion, directly influence the success of digital transformation initiatives in enterprises. The present study's results reinforce these conclusions, suggesting that universities, like businesses, require a robust technological foundation to successfully undergo digital transformation.

Furthermore, Nwankpa and Roumani (2016) argued that IT infrastructure, combined with human IT capabilities, significantly enhances organisational performance during digital transformation. While the current study focused on

infrastructure, it is important to consider how technological advancements interact with digital skills and institutional readiness. Without proper alignment and integration with broader organisational goals, investments in IT infrastructure alone may not yield optimal results (Schwertner, 2017; Lafioune et al., 2023). The findings of this study suggest that while the university has made considerable progress in enhancing its digital infrastructure, continuous improvements in digital accessibility, system reliability, and support services are necessary to fully unlock the potential of digital transformation.

Ultimately, this study confirms that technological infrastructure plays a crucial role in the success of digital transformation at the university. The result is now supported in the context of digital transformation at a South African university, highlighting the importance of continuous investment in infrastructure to ensure a sustainable and effective digital evolution.

5.2.2 *Relative advantage of the technology*

Hypothesis 2 (H2): Relative advantage of a technology positively influences digital transformation in universities.

Relative advantage was examined as a key factor influencing digital transformation at the university. This construct was designed to assess respondents' perceptions of whether adopting digital technologies provides tangible benefits to the institution. The study sought to determine whether digital tools contribute to operational efficiency, cost reduction, improved teaching and learning quality, competitive positioning, and better responsiveness to student needs. The feedback from respondents suggested that digital technologies were generally perceived as beneficial across various aspects of university operations. Most respondents agreed that digital technologies enhance efficiency, improve the quality of teaching and learning, and provide a competitive edge. Additionally, there was broad acknowledgment that digital transformation increases the institution’s ability to meet student needs effectively. However, despite these positive perceptions, statistical analysis revealed that relative advantage did not have a significant impact on digital transformation. This result indicates that, while

digital tools may offer advantages, their perceived benefits alone do not necessarily drive digital transformation at the university.

The lack of statistical significance was unexpected, given that previous studies have consistently shown that organisations tend to adopt digital innovations when they perceive clear benefits (Chatterjee et al., 2020; Bughin et al., 2019). Research has suggested that institutions that recognise the operational and strategic advantages of digital technologies are more likely to pursue digital transformation actively (Zhang et al., 2022). However, the current findings suggest that, within the university context, other factors may be more critical in influencing digital transformation beyond perceived advantages.

One possible explanation for this result is that while digital technologies are acknowledged as beneficial, their adoption and integration into university processes may be hindered by structural, cultural, or policy-related challenges. This aligns with N'Dri and Su (2024), who argued that realising the benefits of digital transformation requires not just recognition of technological advantages but also strong organisational capabilities, strategic alignment, and external support. Similarly, Sundaram and Sharma (2020) emphasised that institutions must effectively leverage the unique benefits of digital tools through deliberate strategic planning to achieve meaningful transformation.

Moreover, previous research in higher education suggests that technology adoption is not solely driven by its perceived advantages but also by institutional readiness, leadership support, and regulatory factors (Florek-Paszkowska et al., 2021). Even if digital tools are seen as advantageous, universities may struggle with the complexities of implementation, such as resistance to change, lack of digital skills, or inadequate funding. This could explain that despite acknowledging the benefits of digital technologies, respondents' perceptions did not translate into significant progress in digital transformation.

Overall, this study found that relative advantage did not significantly influence digital transformation at the university, diverging from expectations based on prior research. The result is now supported in the context of digital transformation at a South African university, reinforcing the notion the university must move beyond

merely recognising technological benefits and focus on the broader ecosystem that enables digital transformation.

5.2.3 *Top management support*

Hypothesis 3 (H3): Top management support has a positive influence on the digital transformation of universities

Top management support was found to be a significant factor influencing digital transformation at the university. The results indicate that when university leadership actively supports digital initiatives, it positively impacts the institution's ability to implement and sustain digital transformation efforts. This construct measured the extent to which respondents perceived university leadership to be committed to digital transformation. It assessed factors such as management's encouragement of digital adoption, communication about its importance, resource allocation, commitment to continuous improvement of digital systems, and support for staff training. The feedback from respondents suggested that while management was generally supportive of digital initiatives, there were areas requiring stronger leadership involvement, particularly in resource provision and communication about digital transformation priorities. Some respondents indicated that while university leadership encourages digital adoption, the actual support in terms of resources and structured implementation strategies could be further enhanced.

Empirical analysis confirmed that top management support had a positive and significant impact on digital transformation, supporting Hypothesis 3. The significance of this relationship aligns with previous research that has emphasised the role of leadership in driving digital initiatives (Maroufkhani et al., 2023; Nguyen et al., 2022). This result was expected, as studies consistently highlight that leadership commitment is essential in navigating digital transitions, mitigating resistance to change, and ensuring that digital transformation aligns with institutional strategies (Qi et al., 2023; Zhang et al., 2022).

The findings resonate with Heavin and Power (2018), who argued that top management plays a pivotal role in setting the vision for digital transformation and fostering employee engagement. When leadership actively communicates

the importance of digitalisation and provides necessary resources, employees are more likely to embrace digital change. Similarly, Kamdjoug (2023) emphasised that strong leadership support is crucial in managing resistance to change, particularly in organisations where digital transformation requires a shift in culture and operational processes. In the context of this study, while university leadership was found to be supportive, the findings suggest that their role could be strengthened through clearer communication and enhanced investment in digital transformation initiatives.

Moreover, Vogelsang and Liere-Netheler (2019) found that organisations with strong managerial support integrate digital tools more effectively, allowing them to maintain a competitive advantage. The present study reinforces this notion by demonstrating that universities, like businesses, rely on leadership buy-in to successfully implement digital transformation. Gurbaxani and Dunkle (2018) further argued that senior administrators must not only advocate for digital tools but also integrate them into long-term institutional strategies. The findings suggest that while the university's leadership is committed to digital transformation, there is a need for a more structured approach to resource allocation, continuous improvement of digital systems, and staff training to ensure a seamless transition.

Overall, this study confirms that top management support is a key enabler of digital transformation in universities. The result is now supported in the context of digital transformation at a South African university, demonstrating that sustained management engagement, clear communication, and adequate resource provision are crucial for successful digital transformation efforts.

5.2.4 *Technology orientation*

Hypothesis 4 (H4): Technology orientation has a positive influence on digital transformation in universities

Technology orientation was found to be one of the key factors positively influencing digital transformation at the university. This suggests that an institution's inclination towards adopting and integrating advanced technologies is a critical driver of digital transformation. In this study, the construct measured

respondents' perceptions of the university's readiness to adopt and integrate digital technologies. Technology orientation assessed factors such as the institution's willingness to explore and implement technological solutions, investment in advanced digital tools, encouragement of innovation among staff, and overall culture of technological experimentation. The feedback from respondents suggests that while the university demonstrates some degree of technology orientation, there is still room for improvement in terms of accelerating the adoption of new digital tools and creating a more innovation-driven environment. Although staff are encouraged to experiment with digital tools, the extent to which this encouragement translates into practical implementation remains moderate.

Empirical analysis confirmed that technology orientation had the most substantial impact on digital transformation, strongly supporting Hypothesis 4. This result aligns with existing literature that underscores the pivotal role of technology orientation in driving digital change (Nguyen et al., 2022; Mamduh & Pratikto, 2021). The strong relationship between technology orientation and digital transformation was expected, as previous studies have consistently highlighted that organisations with a proactive approach to adopting new technologies are better positioned to achieve digital transformation (Rupeika-Apoga et al., 2022).

These findings align with Kindermann et al. (2021), who described digital orientation as a strategic approach that ensures IT investments align with organisational goals, thereby maximising the impact of technological adoption. The present study reinforces this by showing that a university with a strong technology orientation is more likely to integrate digital tools effectively, leading to meaningful transformation. Furthermore, Cvijić Ćović et al. (2023) emphasised that technology-oriented organisations are more agile, enabling them to leverage emerging technologies and remain resilient in dynamic environments. This is particularly relevant in the higher education sector, where rapid technological advancements necessitate a forward-thinking approach.

Yu and Moon (2021) found that institutions with a strong digital strategic orientation foster digital competence among faculty and staff, improving institutional performance. The present study corroborates this by showing that

technology orientation plays a crucial role in digital transformation within the university setting. Investments in learning management systems, AI-driven analytics, and digital classrooms enhance both operational efficiency and student outcomes, reinforcing the importance of maintaining a strong technological focus. Moreover, Barba-Sánchez and Meseguer-Martínez (2024) highlighted that universities with a strong digital orientation are more likely to achieve organisational excellence. This is attributed to their ability to create an innovation-driven ecosystem that fosters adaptability. The findings of this study support this assertion, as they indicate that the university's ability to drive digital transformation is closely tied to its strategic approach to technology adoption. However, while the results demonstrate a positive influence of technology orientation, they also suggest that further strengthening this orientation; through increased investments in emerging technologies and fostering an innovation-driven culture; could further accelerate digital transformation.

Overall, this study confirms that technology orientation is a crucial determinant of digital transformation in universities. The result is now supported in the context of digital transformation at a South African university, demonstrating that fostering a strong technology orientation is essential for achieving long-term digital success.

5.2.5 *Competitive pressure*

Hypothesis 5 (H5): Competitive pressure is positively associated with digital transformation.

Competitive pressure was hypothesized to positively influence digital transformation, yet the results did not support this relationship. Despite the theoretical expectation that competition would drive digital adoption, the statistical analysis indicated that competitive pressure did not significantly impact digital transformation at the university. In this study, the construct measured respondents' perceptions of the extent to which their university responds to competitive forces by adopting new digital technologies. The responses indicated that the university is aware of digital advancements made by its competitors and acknowledges the need to match or exceed their digital capabilities. However, the findings also suggest that while competition is recognised, it does not necessarily

translate into tangible digital transformation initiatives. This implies that other factors may play a more decisive role than competitive forces.

The lack of a significant relationship between competitive pressure and digital transformation contrasts with existing literature, which often highlights competition as a catalyst for technological advancement. Oliveira et al. (2014) suggested that firms operating in highly competitive markets tend to invest in digital innovation to maintain relevance and gain a strategic advantage. Similarly, Nguyen et al. (2022) argued that market competition pushes firms to adopt innovative solutions as a survival strategy. However, the present study suggests that in a university setting, digital transformation may be driven more by internal strategic priorities than by competitive market forces.

One possible explanation for this result is that universities, unlike businesses in highly competitive industries, do not always perceive digital transformation as a direct response to competitive threats. Unlike corporations, which operate in markets where technological superiority directly impacts revenue and survival, universities may prioritize digital transformation based on factors such as pedagogical improvements, institutional vision, or government policy mandates. Zhang et al. (2022) suggested that while competitive pressure can create urgency, the extent to which it influences digital adoption depends on the organisation’s existing strategic orientation. If a university does not view digital transformation as a core component of its competitive strategy, then external competition may have a limited effect on driving technological change.

Additionally, the findings highlight the unique nature of competition in the education sector. While private institutions may experience stronger competitive pressures due to market-driven student recruitment, public universities often rely on government funding and accreditation rather than market competition to sustain their operations. Benavides et al. (2020) noted that universities worldwide are increasingly leveraging digital tools to enhance their offerings, yet their motivations are often tied to improving student experiences and administrative efficiency rather than outpacing competitors. Similarly, Abad-Segura et al. (2020) pointed out that while competition can influence digital adoption, universities

typically implement digital initiatives based on long-term strategic goals rather than immediate competitive pressures.

Overall, this study suggests that while competitive pressure is acknowledged within the university, it does not play a decisive role in shaping digital transformation efforts. The result is now supported in the context of digital transformation at a South African university, demonstrating that external competition alone may not be sufficient to drive technological change in higher education.

5.2.6 *Government support*

Hypothesis 6 (H6): Government support has a positive influence on digital transformation in universities.

The hypothesis that government support positively influences digital transformation was supported by the statistical results. This indicates that government policies, funding, and regulatory frameworks are key factors enabling digital transformation at universities. The study measured respondents' perceptions of the government's financial and non-financial support, such as policies, resources, and encouragement for adopting digital technologies. Feedback from respondents revealed that despite the presence of government initiatives, the actual level of funding and the degree of encouragement is not always adequate to facilitate swift digital adoption in the face of existing resource constraints within universities. This highlights a gap between the intent of government policies and their practical implementation, where universities often face significant challenges in accessing and utilising the available resources effectively.

The result aligns with previous research that underscores the vital role of government support in facilitating digital transformation. Studies by Hsu et al. (2014) and El-Haddadeh et al. (2021) stress that government financial support, infrastructure development, and regulatory frameworks help reduce the risks associated with adopting new technologies, making digital transformation more achievable. In particular, the education sector has benefited from national policies

designed to support digital innovation, as evidenced by Vachkova et al. (2021), who highlighted the impact of such initiatives in schools and universities.

However, the effectiveness of government support varies considerably across different economic and institutional contexts. In developed economies with advanced digital infrastructures, government support is often robust and ensures that higher education institutions receive sufficient financial backing and policy guidance (Yang et al., 2024). In contrast, in developing economies like South Africa, government support for digital transformation may be hampered by budget limitations, bureaucratic inefficiencies, or competing priorities within national policies (Sepúlveda, 2021). This study's findings suggest that while government support is available to South African universities, practical barriers such as delays in policy implementation, insufficient funding allocations, and a misalignment between government priorities and university-specific needs may prevent the full potential of government support from being realised.

Furthermore, the role of government support extends beyond financial assistance to include regulatory and policy frameworks. According to Brunetti et al. (2020), well-structured and clear digital policies create a conducive environment for technology adoption by ensuring that universities have access to comprehensive guidelines for implementing new digital systems. In contrast, unclear or inconsistent regulations can present significant challenges for universities, making it difficult to align their digital transformation strategies with national education frameworks. The findings of this study indicate that while government regulations are perceived as somewhat supportive, there is room for improvement in the clarity and consistency of these regulations. Clearer guidelines and stronger incentives could enhance the effectiveness of government support in encouraging universities to accelerate their digital transformation processes.

Overall, this study provides empirical evidence for the positive role of government support in driving digital transformation at South African universities.

5.3 Summary of key findings

This section synthesises the results presented in the preceding analyses, drawing overarching insights about the key factors influencing digital transformation in the university.

Technological infrastructure emerged as a foundational enabler of digital transformation. Its statistically significant influence supports the notion that robust IT systems, reliable internet access, and consistent technical support are prerequisites for successful digital adoption. However, limitations in digital tools for staff and occasional infrastructure inefficiencies suggest that infrastructure alone is not sufficient without complementary human and strategic capabilities.

Technology orientation demonstrated the strongest positive influence among all the factors. This underscores the critical importance of an institution's cultural and strategic commitment to exploring and integrating digital solutions. A proactive stance on technology adoption positions the university to respond agilely to digital trends and fosters an innovation-driven environment, critical for long-term transformation.

Top management support was also confirmed as a significant determinant. While leadership was found to be generally supportive, the need for improved communication, targeted investments, and structured implementation strategies highlights that leadership commitment must be both visible and operational. The role of leadership is especially important in creating alignment between digital transformation goals and institutional strategies.

Interestingly, relative advantage of the technology, despite being perceived positively by respondents, did not show a statistically significant effect on digital transformation. This result suggests that recognising the benefits of digital tools is not a sufficient motivator for transformation unless supported by systemic capabilities and strategic direction.

Similarly, competitive pressure did not have a significant impact. This contrasts with trends in the private sector, suggesting that in public universities, digital transformation is driven more by internal readiness, policy alignment, and institutional strategy than by market dynamics. This finding reflects the unique

characteristics of the higher education sector, particularly in contexts where universities are less exposed to market competition and more reliant on public funding.

Government support showed a statistically significant positive effect, affirming its crucial role in shaping the digital trajectory of universities. However, the practical implementation of government initiatives remains a concern, as funding limitations, regulatory ambiguity, and bureaucratic inefficiencies were frequently cited by respondents. These challenges suggest a need for better coordination between universities and government bodies to ensure effective support for digital initiatives.

5.4 Chapter Summary

This chapter presented and discussed the results of the study within the framework of the TOE model, focusing on the success factors for digital transformation at a South African public university. Each hypothesis was examined concerning its empirical findings, supported by descriptive statistics, and compared with existing literature. The study assessed six key factors: technology infrastructure, relative advantage, top management support, technology orientation, competitive pressure, and government support. The results revealed that technology infrastructure, top management support, technology orientation, and government support significantly influenced digital transformation, while relative advantage and competitive pressure did not show a statistically significant impact. These findings highlight the complex interplay of technological, organisational, and environmental factors in shaping digital transformation in higher education. The discussion also contextualised the results within prior research, reinforcing the relevance of the TOE framework in understanding digital adoption dynamics in universities. The following chapter concludes the study.

CHAPTER 6. CONCLUSIONS LIMITATIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter concludes the study on the digital transformation success factors. The findings of the study are integrated into the research objectives, and conclusions are drawn. The main objective of this study was to investigate the factors that influence the success of digital transformation at a South African university. In this chapter, the initial section will provide a conclusion on this objective. This is then followed by recommendations of the study. Thereafter, the areas that could require further research will be suggested, acknowledging the limitations of the current study.

6.2 Conclusions of the study

The main objective of this study was to investigate the factors influencing the success of digital transformation at a South African university, using the TOE framework (Tornatzky & Fleischer, 1990) as the guiding theoretical lens. The study focused on six key success factors: technology infrastructure, relative advantage, top management support, technology orientation, competitive pressure, and government support. The study sought to contribute to the growing body of knowledge on digital transformation, particularly within higher education, where research is still relatively scarce (Nguyen et al., 2022; Qi et al., 2023).

6.2.1 *Conclusion on the technological factors that influence digital transformation at a South African university*

The study concluded that technological factors are central to the success of digital transformation at the university. Among these, **technological infrastructure** emerged as a key enabler. A strong IT infrastructure comprising high-speed internet connectivity, reliable digital platforms, and effective technical support, was found to be critical in supporting digital transformation initiatives. The

university has made commendable progress in this regard; however, the findings highlight ongoing challenges, particularly in relation to system reliability and equitable access to digital tools and platforms.

In contrast, the **relative advantage** of technology did not significantly influence digital transformation. This suggests that awareness of the potential advantages of technology is not enough to drive meaningful change. The study indicates that even when staff and students recognise the benefits of digital tools, structural, cultural, and strategic barriers may hinder their effective use.

Taken together, these findings emphasise that while technological infrastructure lays the groundwork for transformation, it must be complemented by broader institutional efforts. Improving system reliability and accessibility is necessary, but the university must also address non-technological barriers to fully leverage digital technologies. The interplay between technical readiness and organisational alignment is therefore crucial for sustaining and scaling digital transformation.

6.2.2 *Conclusion on the organisational factors that influence digital transformation at a South African university*

The study concluded that organisational factors play a critical role in shaping the success of digital transformation at the university. Among these, top management support and technology orientation emerged as the most influential.

Top management support significantly influences digital transformation through strategic leadership, resource allocation, and the communication of a clear digital vision. The commitment of senior leadership was found to positively impact the direction and momentum of transformation efforts. However, the findings indicate that while leadership is generally supportive, improvements are needed in aligning resource distribution with strategic priorities and in adopting a more structured approach to implementation.

Technology orientation, on the other hand, was identified as the most impactful organisational factor. A proactive stance toward identifying, adopting, and integrating new digital tools was seen as essential for facilitating transformation.

The university demonstrates some commitment to technology adoption; however, the study found that deeper investment in emerging technologies and the cultivation of an innovation-driven culture could further enhance digital progress.

Together, these two factors interact to create a synergistic effect. While top management sets the strategic direction and enables the transformation through leadership and resources, technology orientation ensures that the institution remains agile and responsive to digital opportunities. Their combined influence can significantly accelerate the university's digital transformation journey, provided both are fully leveraged in a coordinated and forward-looking manner.

6.2.3 *Conclusion on the environmental factors that influence digital transformation at a South African university*

The study concluded that environmental factors significantly influence the trajectory of digital transformation at the university, with government support emerging as a major enabler, while competitive pressure showed no impact.

Government support was found to play a vital role through policies, funding allocations, and regulatory guidance that encourage the adoption of digital technologies. These external interventions create a supportive environment that enables universities to embark on or scale up digital transformation initiatives. However, the study revealed that while government support is present, its overall effectiveness is often constrained by budget limitations, bureaucratic processes, and inconsistencies in policy implementation. This suggests that more targeted, consistent, and efficient government interventions are necessary to fully unlock the potential of digital transformation in the higher education sector.

In contrast, **competitive pressure** did not significantly drive digital transformation. Although the university recognises the presence of competition from other institutions, this awareness does not necessarily translate into action. Unlike private sector organisations, where competition is closely linked to profitability and survival, universities tend to base digital transformation decisions on internal strategic objectives, educational imperatives, and compliance with regulatory frameworks, rather than on external market forces. This finding

underscores the unique institutional logic of higher education, where change is often mission-driven rather than competition-driven.

Together, these insights highlight the importance of external support structures, particularly from government, in fostering digital transformation. At the same time, the limited influence of competitive pressure suggests that transformation in higher education is shaped more by internal motivations and policy contexts than by traditional market dynamics.

6.2.4 *Conclusions on the factors that drive the success of digital transformation at a South African university.*

The study concluded that technology infrastructure, top management support, technology orientation, and government support significantly contribute to digital transformation at the university, whereas relative advantage and competitive pressure did not show significant effects. Specifically, technology orientation emerged as the strongest predictor of digital transformation success, followed by top management support. These conclusions highlight the importance of internal organisational factors such as a proactive technological stance and leadership engagement in driving the digital transformation process. Interestingly, competitive pressure, often emphasised in prior studies as a key driver of innovation, was found to have no significant effect in this study. This divergence from previous research represents one of the most striking findings of this study, particularly given the often-cited importance of competitive pressure in digital adoption within other sectors (Oliveira et al., 2014; Benavides et al., 2020).

One of the most significant differences between this study and previous research is the non-significant role of competitive pressure in influencing digital transformation. In other studies, such as those by Zhang et al. (2022) and Benavides et al. (2020), competitive pressure was often identified as a major driving force, especially in sectors like education where maintaining a competitive edge is crucial for attracting students and ensuring organisational relevance. However, this study found that the university did not perceive competitive pressure as a critical motivator for digital transformation. This could be explained by the relatively stable competitive environment within South African higher

education or the university's unique context, where internal factors such as leadership and technological orientation played more significant roles.

Another notable difference is the limited impact of relative advantage, a factor widely discussed in the literature as pivotal in encouraging technology adoption (Chatterjee et al., 2020; Zhang et al., 2022). This study found that despite respondents perceiving digital technologies as beneficial in enhancing operational efficiency and teaching quality, the relative advantage of technology did not significantly drive digital transformation. This could suggest that other factors, such as organisational readiness or alignment of digital strategies with broader institutional goals, might be more influential at this university, or that respondents may have perceived the benefits of digital tools as being more generic rather than distinctive enough to drive change on their own. This contrasts with studies like those by Lutfi et al. (2022), which demonstrated a strong link between the perceived benefits of technology and its adoption in other contexts.

This study contributes to the body of literature review. While much of the existing research on digital transformation focuses on sectors like business and manufacturing, there is a shortage of studies that examine the success factors for digital transformation within educational institutions, particularly in the context of developing countries like South Africa (Nguyen et al., 2022; Qi et al., 2023). Applying the TOE framework in a South African university context, this study provided new insights into how technology, organisation, and environment interact to shape digital transformation in higher education. The findings of this study suggest that, in this setting, a strong internal technology orientation, robust technology infrastructure, supportive top management, and government are more significant in influencing the success of digital transformation.

6.3 Recommendations

Based on the findings of this study, technology infrastructure plays a critical role in driving digital transformation at the university. The university must prioritize ongoing investments in robust and scalable technology infrastructure, including modern learning management systems, cloud computing platforms, and high-

speed internet connectivity. This infrastructure will serve as the foundation for implementing digital tools and solutions effectively. The university's leadership, particularly the IT department in collaboration with senior management, should ensure that adequate resources are allocated to this area and that infrastructure upgrades are regularly assessed to keep pace with technological advancements. Furthermore, the university should consider strategic partnerships with technology providers to ensure access to cutting-edge solutions that support teaching, learning, and administrative processes.

The study revealed that technology orientation was a key driver of digital transformation, highlighting the importance of cultivating a culture that embraces digital innovation. The university should actively promote and support an innovation-driven environment by encouraging faculty and staff to experiment with new digital tools, conduct research on emerging technologies, and collaborate on tech-driven projects. This can be done through the establishment of innovation hubs, training programs, and incentivising staff to adopt and integrate new technologies into their work. The leadership team, including senior management, should take the lead in demonstrating their commitment to this cultural shift by providing resources and leadership support for innovation initiatives. It is also important to integrate technology orientation into the university's strategic goals, ensuring that digital adoption is seen as essential for both academic and administrative success. Cultivating such a culture will help the university stay ahead of technological advancements and ensure its long-term competitiveness in the rapidly evolving educational landscape.

The results also highlighted the significant role of top management support in driving digital transformation at the university. To ensure the sustained success of digital initiatives, university leaders must become more actively involved in the transformation process. Senior management should not only endorse digital initiatives but also take an active role in guiding, overseeing, and championing these efforts. This could involve regular communication with faculty, staff, and students regarding the importance of digital transformation, addressing concerns, and creating buy-in for new technologies. Additionally, senior leadership should allocate sufficient resources and personnel to manage and implement digital projects, ensuring that the necessary expertise is available. Managers should

also lead by example by embracing digital tools in their own work and supporting the professional development of staff through training and development opportunities related to digital skills.

Government support was identified as a significant factor in digital transformation. To leverage this support effectively, the university should engage with national and provincial governments to advocate for more funding, policy support, and strategic guidance in digital transformation efforts. The university should participate actively in government-led initiatives aimed at advancing digital education and seek opportunities for collaboration on public sector digital projects. Additionally, the university should explore opportunities for partnerships with other institutions and government agencies to maximise the impact of digital initiatives.

6.4 Limitations

It is important to note that this study was not without its limitations.

First, the use of convenience sampling may have introduced sampling bias. Convenience sampling lacks the rigour of probability-based methods, which compromises the representativeness of the sample (Creswell & Creswell, 2017). As a result, the findings may reflect the views of staff members who are more engaged, digitally literate, or more accessible via institutional communication channels, thereby underrepresenting perspectives from less accessible or less technologically inclined individuals. This limits the external validity and generalisability of the findings to the broader university population or to other higher education institutions in South Africa.

Second, the study employed a cross-sectional design, collecting data at a single point in time. While appropriate for identifying current perceptions and associations, this design does not capture the temporal dynamics of digital transformation, which is an inherently evolving and iterative process (Westerman et al., 2014). The cross-sectional approach therefore limits the ability to draw causal inferences or to understand how technological, organisational, and environmental factors influence digital transformation over time. Longitudinal

research would be more appropriate for capturing such dynamics and identifying change trajectories.

Third, while the study utilised the TOE framework to structure the analysis, it did not fully account for broader contextual influences, particularly those unique to South Africa's socio-economic, political, and cultural environment. For instance, issues such as historical inequality, digital infrastructure gaps, and policy uncertainty may substantially shape how digital transformation initiatives are perceived, supported, or resisted within public universities (Czerniewicz, 2020). The omission of such contextual variables could result in an incomplete understanding of the barriers and enablers of digital transformation in the Global South context.

Moreover, the reliance on self-reported data through online questionnaires may have introduced response bias. Participants might have provided socially desirable responses or misunderstood some questions, which could compromise construct validity. Although efforts were made to design clear, neutral, and accessible questions, and to ensure anonymity to mitigate such biases, the potential for inaccurate or non-representative responses cannot be entirely ruled out.

6.5 Suggestions for further research

This study exclusively used quantitative methods to test predetermined factors. While this approach provides valuable insights into the strength of relationships between factors, it lacks the depth of understanding that qualitative research can offer. Future research could adopt a mixed methods to also incorporate a qualitative approach to explore the perspectives of different stakeholders involved in digital transformation at universities. Qualitative studies could uncover the nuances of how different individuals within the university perceive government support, technology adoption, and the role of institutional culture in digital change, thus providing a more comprehensive view of the digital transformation process.

Future research could conduct longitudinal studies to assess the long-term impact of digital transformation initiatives on university performance, student

outcomes, and organisational effectiveness. This would allow researchers to track the progress of digital initiatives over time, identifying the factors that contribute to sustained success and those that may impede long-term transformation.

Further research could examine how aspects such as organisational culture, institutional readiness for change, and regional disparities in access to technology affect the adoption of digital tools.

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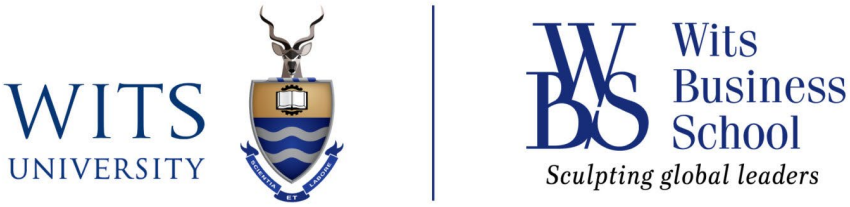
APPENDIX A: RESPONDEND AGREEMENT FORM



Dear Respondents,

You are invited to participate in an academic research study conducted by Mpendulo Desiree Ngubeni for a qualification in Masters of Management in Digital Business from the University of Witwatersrand Business School.

The study aims to investigate the factors that influence digital transformation in selected South African universities.

This survey is **conducted** anonymously; hence, your name or directly identifiable information will not be requested. Your responses will be handled with extreme **confidentiality** because they cannot be used to identify you personally.

▪ Your participation in this study is very important to us. However, there are no negative effects if you decide not to participate or if you decide to stop at any point.

▪ Please select an answer that applies from the option provided. Please respond as honestly as possible about your experience.

The survey should not take more than **15** minutes of your time.

▪ The study results will be used for academic purposes only and may be published in an academic journal.

Please indicate your acceptance or refusal to complete the survey by ticking the options below.

- o I agree to continue with the survey.
- o No, I do not agree to continue with the survey.

APPENDIX B: INSTRUMENT

SECTION A: DEMOOGRAPHIC INFORMATION

1. Gender

Gender	Tick
Female	
Male	
Prefer not to say	

2. Age group

Age group	Tick
18 to 30 years	
31 to 40 years	
41 to 50 years	
Over 50 years	

3. University/institution

4. Department in the organisation

Department	Tick
IT	
Finance	
Administration	
Academic staff	
Human resources	
Other	

SECTION B: DIGITAL TRANSFORMATION FACTORS

In this section, indicate the extent to which you agree or disagree with statements pertaining to factors that might influence digital transformation in your organisation (1= strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree).

Digital transformation refers to the process of using digital technologies to fundamentally change how an organisation operates, delivers value to customers, and adapts to market demands. It involves integrating technology into all areas of a business or institution, leading to significant improvements in efficiency, innovation, and customer experience. Essentially, it's about moving from traditional ways of doing things to more modern, tech-driven methods.

Technological infrastructure

Statement	1	2	3	4	5
The university has sufficient high-speed internet access for all staff					
The university's hardware and software are regularly updated to support digital initiatives					
There are adequate digital tools available for staff to perform their duties effectively					
The university's IT infrastructure is reliable and experiences minimal downtime					
The university provides effective technical support for the use of digital technologies					

Relative advantage

Statement	1	2	3	4	5
Digital technologies make operations more efficient					
Integration of digital technologies lowers operational costs					
Digital technologies enhance the quality of teaching and learning					
Digital tools provide a competitive advantage for the university					
Adopting digital systems increases the university's ability to meet student needs					

Management support

Statement	1	2	3	4	5
University management actively encourages the adoption of digital technologies					
There is clear communication from management about the importance of digital transformation					
Management provides sufficient resources for implementing digital initiatives					
University leadership is committed to the continuous improvement of digital systems					
Management supports staff training on new digital tools and technologies					

Technology orientation

Statement	1	2	3	4	5
The university is quick to adopt new digital technologies					
There is a strong culture of innovation within the university					
The university frequently explores new technological solutions to enhance operations					
Staff are encouraged to experiment with and implement innovative digital tools					
The university actively invests in the latest technological advancements					

Competitive pressure

Statement	1	2	3	4	5
The university feels pressure from other institutions to adopt advanced digital technologies					
Competitive forces drive the university to continuously enhance its digital offerings					
The university is aware of the digital advancements made by its competitors					
There is a need to match or exceed the digital capabilities of other universities					
Competitive pressures influence the university’s decisions on digital transformation initiatives					

Government support

Statement	1	2	3	4	5
The university receives adequate funding from the government for digital initiatives					
Government policies support the university's digital transformation efforts					
There is strong government encouragement for universities to adopt digital technologies					
The university benefits from government-provided resources for digital innovation					
Government regulations facilitate the university's adoption of new digital systems					

SECTION C: DIGITAL TRANSFORMATION

Indicate the extent to which you agree or disagree with the current digital transformation efforts within your organisation

Statement	1	2	3	4	5
The university has successfully integrated digital technologies into its core operations					
Digital tools have significantly improved the teaching and learning experience at the university					
There is a noticeable shift towards online and digital platforms for university services					
The university's digital transformation has enhanced its ability to respond to student needs					
Staff and students are well-equipped to use digital technologies in their daily activities					
The university has established a clear strategy for ongoing digital transformation efforts					