Digital transformation of the administrative systems at a major South African university

By

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1.1. Background

Market and environmental changes have forced educational institutions to revisit their strategy for its administrative and learning systems. COVID-19 is just one example of how higher education institutions were forced to adapt to meet changing digital demands. Many institutions that considered themselves contact-only had to transform to administer digital and remote learning services (Yanckello 2019:1). Yanckello (2021:2) suggests that this somewhat forced digital transformation journey necessitated higher education organisations to re-evaluate their digital strategy; a strategy intended to take them from digital enablement through digital optimisation to digital transformation (Yanckello 2019:1).

Even before the pandemic in 2019, many universities embarked on a mission to develop digital strategies. These strategies comes as a response to a shift towards using new technologies in higher education administration, and teaching and learning activities (Babington and McCusker 2018:3). Gartner also confirmed this in a recent study amongst technology decision-makers in the higher education domain (Yanckello 2019:3). Their research showed that 61% of respondents agree with the need for technological transformation to enable the organisation to meet its objectives and stay relevant in the higher education sector (Yanckello 2019:3). Digitalisation strategies in the context mentioned above are important when wanting to accommodate shifting demographics and changing expectations from staff and students (Yanckello 2021a:1). More importantly, however, is the task of sustained digital transformation to ensure that challenges faced today are effectively addressed and catered for in future capabilities (Yanckello 2021b:2).

One such challenge universities face today comes from within and is the lack of vision, capabilities, and commitment to implement digital transformation strategies (Babington and McCusker 2018:3). These factors and the lack of progress in the digital transformation domain led Babington and McCusker (2018:3) to believe that the

problem stretches beyond technology only. Babington and McCusker (2018:3) suggest that digital transformation can only be sustainable once sufficient support networks are put in place to address lacking digital literacy amongst students, staff, and academics. They further note (Babington and McCusker 2018:3) that far too many universities are still too obsessed with developing and implementing digital strategies instead of having a business strategy fit for a digital age. In this context, Yanckello (2021b:2) suggests that institutions should use the transformational power of digital as an opportunity. According to Yanckello (2021b:2), the transformative power of digital can be used as a lever to change business models and simultaneously address capabilities.

Saunders (2019:2) note that although business models, capabilities, and strategy are the primary consideration for digital transformation, technology still plays a critical role. Technology and especially administrative system such as ERP (Enterprise Resource Planning), and SIS (student information systems), are essential enablers in delivering and supporting digital transformation of administrative systems (Saunders 2019:2).

1.2. Problem statement

Even though technology resources are accessible more than ever before, the South African higher education administrative sector remains mainly unchanged (Ng'ambi, Brown, Bozalek, Gachagoa and Wood 2016:4). In this context, Ng'ambi *et al*. (2016:4) note that digitisation should not be mistaken for digital transformation. Whereas many resources and processes may have been digitised, South African higher education institutions still lack exclusive rights to digital innovations that benefit students, staff, and organisations equally (Ng'ambi *et al*. 2016:4).

Torri and Schenck (2020:2) note that digital transformation represents a "turn" in an organisation's momentum and requires critical decisions. In the context of digital transformation in higher education, these decisions need to be fast and deliberate (Torri and Schenck 2020:2). However, a problem exists where survey analysis on initiating legacy modernisation in higher education suggests that technical debt keeps these institutions from reaching their digital aspirations (Yanckello 2019:1). The complexity of historic ERP and SIS systems has left the higher education

administrative environment unresponsive to business transformation needs (Thayer and Yanckello 2020a:1).

ERP and SIS represent one of the most significant investments by higher education institutions. There is also a mounting concern amongst universities that the maintenance of these administrative systems siphons resources away from more strategic matters, such as business and digital transformation (Thayer and Yanckello 2020a:2). Thayer (2020:1) notes that postmodern ERP and SIS transformation are vital to the delivery and enablement of digital transformation. For this reason and those mentioned above, administrative IT systems in higher education are often referred to as a necessary evil (Thayer and Yanckello 2020b:2).

Benavides, Aria, Serna, Beoya and Burgos (2020:2) state that if higher education institutions do not want to disappear from the highly competitive digital transformation stage, they will have to react quickly. Furthermore, to be sustainable in their digital transformation efforts, they must evolve integrally (Benavides *et al*. 2020:2). At a major South African university, a problem now exists. Digital transformation needs to be implemented successfully and sustainably, but there is very little time to do so.

1.3. Objectives of the study

The objectives of this study was to investigate digital transformation of the administrative systems at a major South African university[1].

1.3.1. Secondary objectives

The following secondary objectives support the primary objective and was informed by studying available literature:

i. To identify common topics and trends for digital transformation of administrative systems across industries and sectors.

[1] Major South African University refers to a specific entity, as per the study title.

ii. To investigate and identify critical components forming part of digital transformation.
iii. To investigate and identify factors that play a role in digital transformation of university administrative systems.

The following secondary objectives support the primary objective through the conclusions reached from having done an empirical analysis:

iv. To investigate and identify how themes in the literature relate to the staff experience and sentiment relating to digital transformation at a major South African University.
v. To make recommendations to a major South African university on considerations for enabling digital transformation of its administrative systems.

1.4. Research methodology and design

The study was conducted as a qualitative study, that focused on a major South African university and the components that have an impact on digital transformation of its administrative systems. The study used phenomenology as a research philosophy. Phenomenology is a methodology that focuses on shared experiences from the first-person point of view (Cresswell 2007: 58). Furthermore, this approach ensures that the context between role players and objects is understood.

1.4.1. Sampling strategy

There are two general types of sampling methods; they are probability sampling and non-probability sampling. Non-probability sampling implies that some units in the population have a greater chance of being selected, and therefore does not include random sampling (Bryman, Bell, Hirschsohn, Dos Santos, Du Toit, Masenge, Van Aardt and Wagner 2018:31). This method is considered to be more economical and less complex when the sampling method involves judgement (Showkat 2017:1). Probability sampling makes use of random selection to ensure the chance of the unit to be selected is known.

1.4.2. Sampling method

A phenological study requires data collection from several individuals of their experience with a concept or phenomenon (Cresswell 2007:58). For this reason, individuals should be selected with the utmost care. Individuals selected for this study require direct involvement in administrative systems at a major South African university. Therefore, the sampling method requires specific individuals (non-probability sampling) to be selected based on their experience and knowledge in the administrative system's domain (expert sampling).

1.4.3. Sample size

The support services at a major South African university comprise of a human resources department, a financial department, a facilities department, an IT department, and a housing and residence department. Each department forms part of the core sample and has at least one administrative system that supports that department's core service. Each system furthermore has at least a system owner and a functional business analyst. If the sample size is limited to core individuals, Sekaran and Bougie (2009:268) suggest interviewing the total population where possible. For this study, thirteen individuals, in total, was interviewed from all the identified departments.

1.4.4. Inclusion criteria

The data subjects included in the study must have sufficient oversight and experience of a major South African university's administrative system domain. The combination of experience and having a broader perspective of the university’s administrative domain allows for an extended view on considerations that impact digital transformation.

1.4.5. Data collection methods

A phenomenology study approach suggests that data be collected using interviews with individuals, although documents and observations may also be considered (Cresswell 2007:61).

The study was conducted as a qualitative study whereby individual interviews in a semi-structured format was used to collect data. Semi-structured interviews have the added advantage of allowing the researcher to acquire in-depth knowledge of the individual's experience. Semi-structured interviews also allow for asking clarifying questions and, if needed, to follow-up on significant replies (Bryman *et al.* 2018:216).

1.4.6. Ethical considerations

Ethical considerations apply when protecting the participants' anonymity and protecting them from embarrassment or harm (Bryman *et al.* 2018:122). Informed consent was obtained before each individual semi-structured interview. The participants had the opportunity to withdraw at any stage of the research if there were a longing to do so. Ethical clearance approval was obtained from the University of the Free State's Research Ethical Committee before the interviews were conducted.

1.5. Demarcation of field study

The study's primary purpose was to investigate the considerations for enabling digital transformation of a major South African university’s administrative systems. The study was conducted at a major South African university, focussing on the core administrative systems within the support services domain.

1.6. Conclusion

Research shows that digital debt and the lack of digital transformation in higher education institutions' administrative systems keep them from reaching their digital aspirations. Environmental changes are forcing higher education institutions to consider new and differentiated delivery models, which further adds to the need for

digital transformation. In light of this problem, consideration has to be given when approaching a major South African university’s core administrative systems' digital transformation.

A qualitative study was conducted at a major South African university that focused on five support services departments' core administrative systems. The study attempted to understand the current trends pertaining to core administrative systems in the higher education environment. The sample will be restricted to specific support services departments of the major South African university.

Chapter 2: Literature review

2.1. Introduction

This chapter starts by defining digital transformation and the need therefore, as described in the literature. The chapter further explores the components of and the basic building blocks of digital administrative solutions to allow for a structured approach to the various factors that should be considered in digital transformation. The chapter also explores current trends in the digital transformation of administrative systems in the higher education domain by studying the current administrative systems trends through literature and circumstantial evidence. Lastly, considerations for enabling digital transformation are formulated based on the combination of building blocks and digital transformation trends of administrative systems in higher education.

2.2. What is digital transformation?

The terms Fourth Industrial Revolution (4IR) and digital transformation have become synonymous in that they are often used to emphasise the need to transform businesses in a technology-driven era (Mahlow and Hediger 2019:2). Terms like digitisation, digitalisation, and digital transformation are often used in a similar context but have distinctly different meanings (Mahlow and Hediger 2019:3).

Digitisation primarily refers to the optimising of processes through utilising digital technologies (Schallmo and Williams 2018:6). The objective of digitisation, in most cases, is to reduce cost and better service delivery (Chapco-Wade 2018:4). On the other hand, digitalisation is a strategy or process to utilise technology and, in so doing, implies core changes to the business model and the way of working (Chapco-Wade 2018:5). In turn, digital transformation is an aggregation of the two previous terms and uses people, information, modern tools, and processes to solve business problems (Boulton 2020:6). Digital transformation requires organisations to rethink how they use the combination of technology, people, and processes to change business performance (Westerman 2014:4).

Proctor (2019:3) differentiates digital transformation by considering its relationship to business process reengineering (BPR). BPR is a process of eliminating non-value-adding work activities or outdated procedures and legacy business policies. BPR gets executed by streamlining rule-based operations through either automation via technology or clarification of a process (Proctor 2019:2). Digital transformation, on the other hand, is the leveraging of technology to disrupt traditional industry models and business practices with the intent of delivering value to the business and customer. Therefore, Schallmo and Williams (2018:18) suggests that digital transformation can be recognised as such when digitalisation happens at a company level and subscribes to the following four dimensions: the use of technology, change in value creation, structural changes, and financial aspects.

The use of technology and how it is applied in an organisation to exploit opportunities also indicate its technological ambitions (Matt, Benalian and Hess 2015:5). In this context, technology as part of digital transformation emphasises the application of technology rather than the technology itself (Schallmo and Williams 2018:6). Therefore, the organisation needs to decide whether it will conform to best practices and standards or whether it wants to lead technology innovation in its sector (Matt *et al*. 2015:5). The World Economic Forum (2018:6) supports this statement by noting that an organisation's digital ambitions should be supported but not driven by its digital infrastructure.

The realisations of how technology can be applied ultimately allow for a change in value creation. The deployment of new technologies in a digital transformation process can add value based on the following two points of departure (Matt *et al.* 2015:4):

i. Through combining or replacing digital with historic analogue business processes and in doing so, enrich services offered.
ii. By exploring new market segments realised through digital enablement. Such a change in the scope of business is frequently a result of new capabilities brought about through digital enablement.

The World Economic Forum (2018:6) notes that the actual value of both these departure points lies in the richness of its data-driven outcomes. The data collected can be analysed through advanced analytics and presented back to users instantaneously (Babington and McCusker 2018:5).

Consideration has to be given on how to structurally and financially enable and sustain the value proposition of digital transformation. Technology enablers that are used to create value often impact various aspects of business administration systems reaching beyond the implementing department. Digital transformation, according to Boulton (2020:10), can be seen as a cross-departmental collaboration effort where business-focussed philosophies are paired. Matt *et al*. (2015:4) suggest that such collaborative efforts require structural changes to provide an adequate basis for new operations. Structural changes are also necessary to establish the correct placement of digital technologies in the corporate structure. Such structural changes are required given a possible shift in products, processes, or skills needed for digital enablement and sustainability (Matt *et al*. 2015:6). When implementing changes related to digital transformation, financial elements are considered as both a driver and abounding force (Matt *et al*. 2015:6). With diminishing core business, finances can be lacking, which are a critical enabler to fund transformation. Organisations should, therefore, openly and timeously confront the need for digital transformation in a structured manner.

The above definition of digital transformation indicates what it is and how to differentiate it from terms like digitisation or digitalisation. Digital transformation, however, consists of more than only an organisation's digital aspirations (Blewitt 2021:8). Blewitt (2021:7) suggests that a clear indication or purpose of why digital transformation is required, is needed.

2.3. The reason for digital transformation

Historically, larger organisations' incumbency and dominance over smaller rivals allowed the luxury of not needing to move as quickly as smaller rivals (World Economic Forum 2018:8). Digital technology, however, allowed ideas to spread much faster, which almost immediately turned the assets of the incumbents into potential liabilities

(World Economic Forum 2018:8). The value of speed and data has increased, so incumbent companies are no longer assured of the dominance they once possessed. The World Economic Forum (2018:7) further suggests that the traditional way of doing business has been disrupted, not primarily by technology but also by how humans apply technology and interact with it. The definition of digital transformation, therefore, carries a close relation to its need in an organisation. The need for digital transformation similarly indicates the creation of value by doing things differently. Blewitt (2021:6) suggests that the need for digital transformation is motivated by one or more of the following value-adding reasons: to drive sustainability, improve productivity, and deliver a more engaging customer and employee experience.

Schallmo and Williams (2018:4) suggests that sustainability forms part of the core definition of digital transformation. Digital transformation is a sustainable company level transformation with new business operations and business models that is achieved through value-added digitisation initiatives, according to Williams (2018:4). This transformation ultimately also results in improved profitability and value to the staff members and clients.

Sustainability and productivity complement each other in that digital transformation enable repetitive and procedural tasks to be done quicker and in a more straightforward manner over multiple departments (Lauby 2020:3). Organisations are now able to automate manual tasks and simultaneously produce valuable data. The data derived from advanced analytics and integrated data sets also save time through real-time reporting (Lauby 2020:3). Real-time strategic and operational information further helps employees to make better decisions more timeously and save valuable time (Lauby 2020:5). This saving in time also opens up valuable human resources to focus on tasks that machines can't necessarily perform, like business expansion, and focus on the customer (Lauby 2020:5).

Digital enabled experiences where customers get real-time updated information created a new normal for all industries and could pose either a threat or opportunity to an organisation (World Economic Forum 2018:5). The opportunity, however, outweighs the threat if the organisation can spark sustained digital transformation and, in such doing, set a foundation for a continuous improvement of customer and

employee experience (World Economic Forum 2018:5). Applying such approaches to higher education administrative solutions allows the exploitation of complex relationships between multiple actors (Benavides *et al*. 2020:1).

2.3.1. The need for digital transformation of higher education administrative solutions

Benavides *et al*. (2020:1) suggest that higher education institutions face a disruptive scenario as the competition for the best students and researchers increases. The challenges and opportunities in attracting these sought-after individuals partially reside in a wealth of technologies. Technology plays an integral part in supporting new business models, and the entire value chain the clients interact with (Benavides *et al*. 2020:2).

Thayer and Yanckello (2020a:1) suggests that transformation might not be an easy task as universities built up a legacy of technical debt which they need to overcome. Structurally, universities have evolved over long periods and as a result, developed multitudes of duplicate administrative systems over multiple locations. These systems are often customised to the extent where they have become lethargic and unresponsive to changing business needs (Thayer and Yanckello 2020b:1). Such legacy systems are often costly to maintain and has a total disregard for the integrated-ness of a digitally transformed environment (Thayer and Yanckello 2020b:3). Shadow IT systems are also expanding and do not support an integrated value-based approach. As a result, many institutions are required to either replace or modernise their existing administrative solutions (Torri and Schenck 2020). According to Thayer and Yanckello (2020a:2), these systems are often referred to as a necessary evil. Gartner's 2020 and 2021 CIO surveys emphasised the need for digital transformation of these higher education administrative systems. These surveys stated that the industry lacks the ability to navigate and cope with digitally transforming itself (Thayer and Yanckello 2020a:2).

Hopkins (2018:9) suggests that the speed to adapt to and anticipate business needs through new technology implementations, has become more critical for universities in securing a strategic advantage. Technological change is non-linear but stretches over

an entire sector, as per Metcalfe's Law. Metcalfe's Law suggests that a network's total value summarises the community's values (Nosovicki 2016:1). Hopkins' (2018:9) concern regarding the speed of adoption and the lack of an inclusive network are that organisations and higher education institutions still think linear. Hopkins (2018:9) is concerned that the world would have already changed by the time higher education institutions negotiated an action plan for digital transformation. However, Hogan (2020:1) believes that too many higher education institutions still primarily focus on digital. Digital transformation efforts should instead focus on business processes and operating models (Hogan 2020:1). Stauffer (2006:180) also notes that digital transformation is primarily about the enablement of the customer and not about digitising everything.

However, higher education trends show similarities in what Blewitt (2021:7) suggests as the key motivators behind digital transformation: sustainability, productivity, and customer experience. Morgan and Lowendahl (2021:4) suggest that higher education business solution trends can be sub-divided into four major categories, namely:

i. **Student and staff experience:** Here, Lai (2016:7) suggests that the industry's expectations of better service and user experience stay the same irrespective of the industry. Customers should still be able to choose how they want to interact with the business. Regardless of whether the channel is virtual or physical, a customer must always receive the same price, products, and level of service (Stauffer 2006:180). These expectations on experience are driven mainly by the pursuit of novel and emotionally satisfying experiences. A diverse range of digital devices, services, and information sources contribute to the customer's sense of empowerment (Lai 2016). This vertical expectation from customers, therefore, becomes a standard that is inconsiderate of industry. Babington and McCusker (2018:5) emphasise that universities need to understand that they have a new breed of customers and competitors and therefore need to compete in new and different ways.

   Contributing to this demand for a better experience, there is also a heightened awareness of what is possible in a digital era. Today, students and staff are also increasingly aware of the private sector's service and experiences versus

public or semi-state organisations (Saha, Satyanarayana and Vig 2019:2). The need for a better experience has, therefore, in a sense, become synonymous with a more demanding customer. These customers expect accountability and effective governance for how their money gets spent and the service offered to them (Saha *et al*.2019:2). Employee needs have also evolved and required experiences that suit their way of working better, such as working remotely, irrespective of the device they are using.

For this reason, administrative software solutions are adding features like voice assistance, chatbots, personalised experiences, and mobile-friendly interfaces. ERP system is a critical component to delivering data to employees, and therefore administrative solutions are turning to more mobile, intuitive interfaces (Weinburg 2021:4). The focus is increasing to include customer relationship management (CRM) systems, virtual experiences, collaboration platforms, and electronic credentials (Morgan and Lowendahl 2021:5). All these additional features are intended to enable students to interact more fluently with the organisation (Weinburg 2021:4). These enhanced experiences apply throughout the student life cycle from recruitment up to graduation and after that.

ii. **Sustainability:** Digital administrative solutions carry a high cost, and more cost-effective cloud solutions on the market have increased options for financial sustainability (Morgan and Lowendahl 2021:2). Traditional administrative solution providers amongst themselves are in a battle to transfer customers to the cloud. From a customer's perspective, the cloud further deliver speed, agility, resilience, and innovation, which are all critical components to maintain sustainability (Larner 2020:1).

Hogan (2020:5) suggests that outdated digital tools cause companies to waste time, prolong transformation, risk mistakes and all at the cost of the customer. For this reason, apps and user interface-driven administrative systems are already being replaced with AI interfaces (Hogan 2020:5). Such systems will predominantly rely on natural language input, can check for error tolerance, and make decisions on behalf of the user (Hogan 2020:5). Weinburg (2021:4) also

notes that 5% of all ERP solutions have already started to release new functionality through downloadable apps to improve cost-effectiveness and speed to the market. Apps allow users to install functionality in a self-service manner that is already fully integrated with the greater solution. Cost sustainability, because of resources that becomes scarcer, is also a need for staff and students. For this reason, society, governments, and organisations are forced to create sustainable operations (Saha, Satyanarayana and Vig 2019:2). One such example is the use of machine learning. Organisations are increasingly starting to utilise machine learning algorithms to detect anomalies in processes, for example, fraud and error detection in procurement. AI further provides the ability to perform contingency and emergency planning through data analytics and free up valuable resources (Herbert 2021:7). This need for sustainability is also increasingly driving control back into the users' hands, whereby they can easily configure certain functionalities under their specific business processes or needs without the need to do technical coding. Skilled technical development resources are increasingly hard and costly to come by and require ample time to add or remove a custom code deemed fit by the organisation (Weinburg 2021:5).

iii. **Scaling change:** Many higher education institutions are looking to extend and scale the change initiated by a global pandemic to all their core administrative systems. Even before the pandemic, Gartner (Saunders 2019:3) suggested that forty-nine percent of higher education institutions indicated that they have and/or are in the process of changing business models (Thayer and Yanckello 2020a:2). Through these initiatives, trends like online anywhere, cloud, chatbots, hybrid classrooms have gained more focus (Morgan and Lowendahl 2021:3). Before this change in outlook, the general approach was to scale these changes by improving administrative procedures and modernising essential parts of the institution's services (Thayer and Yanckello 2020b:3).

Babington and McCusker (2018:6) noted two further reasons why higher education institutions lack in effectively responding and scaling change linked to digital transformation. Most higher education institutions lack the essential capability to evolve current ways of working whilst adding new tools, processes

and capabilities at the same time (Babington and McCusker 2018:4); a culture that does not embrace rapid development and deployment of new technologies (Babington and McCusker 2018:6).

Yanckello (2020:4) suggested that scaling change is not only about the speed of introducing new technologies, but that critical gaps will also need attention. These gaps can either be due to legacy processes or arise from digital transformation initiatives. Considerations, therefore, need to include (Yanckello 2020:4):

- Determining the readiness for change by both IT and the respective business units,
- Reaching a consensus as to what is the minimum viable product and maximum change at a certain point in time,
- Determine new skills, roles and culture alignment that will need to be managed and scaled according to the initiatives.

iv. **New normal:** The global pandemic suggests new ways of operation that will likely continue. Trends like hybrid offices, faculty information systems, remote observation and measuring gained more focus (Morgan and Lowendahl 2021:3). This hybrid business model allows breaking down business silos by having an overarching service that integrates many applications, systems, and business processes (Weinburg 2021:4). What has also become evident is that at the same time, integration services are increasingly starting to blur the lines between different service systems, such as ERP and CRM systems. (Weinburg 2021:5). Society is converging to an "anywhere anytime" delivery of services model which utilises social, mobile, cloud, AI, and blockchain technology (Saha *et al*. 2019:2). This new and most likely future standard way of doing things differently, through digital technology, forces institutions to consider providing services more efficiently through distributed services that integrate (Saha *et al*. 2019:2).

However, Babington and McCusker (2018:6) reported that many universities lack trust in digital services and cloud technologies and their reliability and agility. Blewitt (2021:6) also suggested that a significant number of digital

transformation initiatives still fail to reach their goals due to a fragmented implementation approach. Such a fragmented approach is mainly due to the implementation of specific digital technologies to solve individual business problems instead of reimagining the whole business (Blewitt 2021:9). Blewitt (2021:6) further agreed that technology implementations should be driven and led by customer needs and a clear digital strategy. This level of transformation should be guided and supported by leadership and a culture of change and transformation. According to the World Economic Forum (2018:8), technology trends and the needs of customers and staff cannot be separated from the businesses operating models. For this reason, the approach to digital transformation should follow a holistic component-based approach to determine its scope and ensure a sensible outcome.

2.4. Components of digital transformation

The World Economic Forum (2018:6) reported that many organisations struggle to implement and integrate digital transformation initiatives on a scale that make true economic sense. They suggested that digital transformation is not the responsibility of technologists but are the responsibility of business thinkers through clearly established objectives (World Economic Forum 2018:6). In a study by the World Economic Forum in collaboration with Bain and Company, a model to guide the components in digital transformation was established (World Economic Forum 2018:1). The model suggests four key topics that need to be addressed as part of a holistic, structured approach to digital transformation. The key components are digital strategy, business model, enablers, and orchestration.

Before implementing specific technologies, an organisation should first decide on a digital strategy and consider where its industry is heading and how it will look in a digital future (World Economic Forum 2018:6). Such a strategy should support the organisation's goals and objectives and should align with the organisation's digital aspirations (World Economic Forum 2018:12).

Foster (2001:51) suggested that as part of a digital business strategy, organisations should always consider the three critical factors that determine an organisation's

lifespan. These factors are the ability to run operations effectively, developing new business streams following customer needs, and shedding business streams not deemed viable (Foster 2001:51). For this reason, the World Economic Forum, in conjunction with Bains and Company, reported that digital strategy is a fact-based exercise and should be accommodative of longer-term visions and goals (World Economic Forum 2018:8).

In the context of the organisation's vision and goals, a digital transformation strategy allows the organisation the opportunity to reimagine its business model (Blewitt 2021:9). At the same time, services and products can be aligned and packaged to address the digital transformation needs of both the customer and the organisation (Blewitt 2021:9). As part of this digital transformation strategy to support a new business model, the World Economic Forum (2018:18) proposed that the company will benefit most by simplifying existing processes rather than introducing new digital technologies to support a new or revised structure. When, however, the company decides to integrate new digital capabilities, old capabilities will need to be retired to avoid digital complexity. The new capabilities should then synchronise on both an operational and front-end services level and should support the customer's needs. (World Economic Forum 2018:18)

Once again, when assessing the organisation's digital business model, the primary consideration should be enablement and value to both the organisation and customer. Lauby (2020) proposed that digital transformation is primarily about the enablement of employees and customers. Therefore, the capabilities that drive and enable digital transformation should also be seen and applied according to the value proposition they offer. According to the World Economic Forum (2018:22), the primary enablers to digital transformation are data and analytics, systems and technology, operating models and partnerships, talent, and culture. These enablers could support customers and the organisation through real-time predictive data rather than retroactive data when applied correctly. The retooling of staff simultaneously allows for talent and culture to fulfil cross-functional tasks rather than the traditional one-track lifelong tasks. According to the World Economic Forum (2018:22), these characteristics correlate with organisations' and individuals' ability to survive in a constantly changing environment.

Lastly, digital transformation and the changes it entails needs to be managed, and therefore it also needs to be measured. Orchestration entails managing transformational change (Blewitt 2021:10). The World Economic Forum (2018:33) model suggested that the approach and measurement of digital transformation differ substantially from the past. In the past, organisations determined the success of an initiative through its return on investment (ROI). Because digital transformation is an integral part of how things get done, organisations should use the future net asset value instead to determine the success of digital transformation (World Economic Forum 2018:33). Organisations are also moving away from hierarchical structures to flatter structures. This flattened structure is required to allow project teams the agility and flexibility to test digital initiatives and move between initiatives based on skills and expertise (World Economic Forum 2018:33).

The research done by the World Economic Forum and Bains and Company (World Economic Forum 2018:34) reported that the following characteristics stood out when considering an organisation's ability to orchestrate its digital transformation efforts:

i. **Scalability:** The ability to break initiatives into manageable components allows smaller teams to build momentum and respond more timeously.
ii. **Good governance:** Clear guidelines, risk management, and monitoring allow for effective tracking and better decision making to abandon projects that are not working.
iii. **Leadership and engagement:** Leaders that align to a clear vision cultivate mass engagement and buy-in.
iv. **Funding and investor management:** Budgeting that allows for experimentation outside of annual budget cycles cultivates new ideas to benefit investors and customers.
v. **Regulatory and community engagement:** Proactive approaches allow better-designed solutions that add value instead of just driving compliance.

Digital transformation is, therefore, much broader than only an initiative to implement new technology. Digital transformation and the value it offers, plays a part in the organisation down to the level where the importance, speed, and relevance of

administrative tasks, skills, and capabilities needs to be questioned. Administrative systems and their components must be scaled to ensure that operations and digital transformation execution are synchronised (World Economic Forum 2018:32). This synchronisation is especially relevant since the administrative systems of an organisation link the organisation to its customers. For this reason, the industry and enabling factors, such as customer profiles, needs to be considered in a digital transformation effort.

2.5. Considerations for enabling the digital transformation of higher education administrative systems

Digital administrative solutions are commonly known as enterprise resource planning systems (ERP). An ERP is a digital platform that consists of integrated software applications that streamline and integrate business processes across various departments, for example, human resources, finances, procurement, and other administrative departments (Perkins 2020:1). ERP solutions are typically applied to facilitate cross-departmental and cross-functional collaboration through automating business processes. Even though not all administrative solutions form part of the ERP systems domain, such systems will derive business rules, standard definitions and critical data from the ERP (Perkins 2020:2). ERP systems form the basis for enterprise-wide integration of business processes and also serve as a vital platform for administering and processing transactions related to an organisation's core services (Perkins 2020:3).

Information systems are an integral part of how organisations compete in the market. It supports business objectives, governance execution, and business processes. Davenport (2006:176) noted that both the opportunity and difficulty in enterprise information systems reside in integrating the business functions they support. For this reason, administrative systems must closely align with the organisational business processes, information, structure, and strategy.

Westerman (2014:25) suggested that organisations must consider people and processes when approaching digital administrative solutions. Through this statement,

Westerman (2014:25) implies that a digital administrative solution consists of more than just technology components.

At its core, a business is an organisation that uses actors, for example, employees, to perform various functions with or for other actors (Townson 2008:9). Processes show the interaction between these functions and how information flows from and to certain actors. A process on a lower level consists of various events, which indicates the multitude of triggers or business rules that directs the outcome of that event or step and, ultimately, the process (Townson 2008:10). To be more efficient and flexible, an organisation can decompose or group its functions into various business services. Each service's granularity gets determined by that organisation's objective and focus (Townson 2008:9). One of the main enablers to become more effective is to automate specific key business processes through information technology (Townson 2008:9).

Similar to Westerman (2014:25), Townson's explanation (2008:12) confirms that a business process or administrative function consists of more than one component. An organisational system or function utilises actors to interact with other actors through a process. During this interaction, information gets exchanged between processes and is governed by various business rules or triggers. Lastly, a combination of actors, methods, and information can be logically grouped to represent an administrative function or business process (Townson 2008:12).

Proctor (2019:7) noted that when a company wants to enable digital transformation of an administrative system or process, there needs to be a differentiation between rules-based work in a process versus knowledge and judgment-based work (Proctor 2019:7). While the nature of rules-based work is mechanical, knowledge-based work requires a decision to be made based on skills, wisdom, and experience (Proctor 2019:7). These two distinct mechanisms of an administrative system allow us to differentiate between human and technology components. Proctor (2019:7) reported that this vital differentiation enables the organisation to consider roles for automation versus those that require human wisdom and intervention.

Most work activities within an administrative system consist of rules-based work and knowledge-based work (Proctor 2019:7). The digital components of an administrative solution can therefore operate in more than one dimension; *firstly* by automating rule-

based work activities to free up knowledge-based resources that can apply knowledge and judgement and *secondly*, by supporting knowledge-based activities through the data that is generated by and through a process.

Historically, organisations had to sift through piles of data and by the time the first report was produced, the information was already outdated (Lauby 2020:5). This becomes more problematic when timeous decisions need to be taken on data originating from multiple departments. By making use of modern-day technology, this problem is easily solvable. Lauby (2020:6) suggested that while technology is a critical enabling component when it comes to in time data processing and quality data, digital transformation is not about technology only. Rather, digital transformation is about a different way of working and, in doing so, enabling employees to make better decisions (Lauby 2020:6). Chapco-Wade (2018:5) confirmed this statement by noting that in digital transformation, technologies are leveraged as enablers to business processes and staff, and results in changes in the corporate culture and better service to the client. To achieve such an integrated environment where technology gets used as an enabler, Townson (2008:10) emphasises the importance of understanding a technology solutions' components and its linkage to business.

The above-noted considerations of an administrative system or solution, closely relate to the elements that are impacted when implementing a digital transformation initiative. *Firstly*, a transparent business model is needed to ensure that the administrative systems still meet the customers' basic needs (World Economic Forum 2018:19). *Secondly*, enablers such as data and analytics, systems and technology, operating models, partnerships, talent, and culture should align between the administrative system and the organisations' digital transformation goals (World Economic Forum 2018:21). *Thirdly*, digital transformation requires that an organisation prioritise the modularity and flexibility of its administrative IT solutions to support its digital aspirations (World Economic Forum 2018:26). *Lastly*, digital transformation requires the orchestration of an organisation's digital efforts to ensure processes, capabilities, and services match its objectives (World Economic Forum 2018:34).

Yanckello (2021a:3) suggested that the components of an administrative system remain the same across industries. However, the emerging business trends of that

sector play a critical role in how these components apply to digital transformation (Yanckello 2021a:3). Education institutions worldwide are not exempt from the changes that come with digital transformation. The expectations from staff and students and trends specific to the sector, significantly impact higher education administrative systems (Yanckello 2021b:3). For this reason, it is essential to understand the trends in digital transformation of administrative systems in the organisation's context. This level of understanding further guides the organisation to ensure that it can operate with the needed flexibility and agility to meet its specific goals.

Digital administrative systems' transformation must be driven by an adaptive business-led strategy (Torii and Schenck 2020:7). On a technical front, Torii and Schenck (2020:7) noted that an adaptive strategy may imply the replacement or renovation of an existing administrative solution. When the objective is to transform an administrative system digitally, several factors need to be considered before a decision is made to either replace or renovate. Table 2.1 (Torii and Schenck 2020:8) gives an overview of what these considerations would typically be in the higher education sector.

Table 2. 1 Considerations for the replacement or renovation of higher education administrative solutions.

Administrative solution component	Question to ask	Critical consideration whether to replace or renovate
People and capabilities	How capable is the staff in applying current technology as an enabler to business?	Consider the complexity of the business procedures and the expertise needed to maintain them. The system should be renovated if available offerings allow the system to continue operating with nominal cost and staff reskilling.

Administrative solution component	Question to ask	Critical consideration whether to replace or renovate
		Systems that are too expensive to maintain and does not provide technical staff career opportunities should be replaced.
People	What is the system users' experience in terms of it enabling them to do their work better?	Consideration should be given if new users can navigate the system successfully and if sufficient self-help functionality and basic reporting are available. The system should be renovated if the system experience can be turned around with limited intervention and additions. If the system is complex and requires excessive training, it is better to replace it.
Business	Does the technology layout match and enable the objectives of the organisation?	Consider business capabilities to address short- and long-term objectives. If business objectives can be supported with minor integrations or added functionalities, the system should be renovated. The system should be replaced if the underlying infrastructure and functionalities are so inflexible that it

Administrative solution component	Question to ask	Critical consideration whether to replace or renovate
		prevents the organisation from reaching its objectives on time.
Technology and information	Is there new technology that can better support the information and process needs of the organisation?	Consider which emerging technologies can support achieving business objectives faster. If business objectives can be better supported with minor integrations or added functionalities, the system should be renovated. If the current system is outdated and does not offer a future improvement path, it should be replaced.
Technology	What is the impact of application maintenance and technology upgrades on productivity?	Consider the complexity of upgrades and maintenance and disruptions in the business domain. If the upgrades and maintenance can be achieved relatively risk-free or through outsourcing at a lower price, the system should be renovated. If the upgrades are so complex and costly that it causes business risk or downtime, the system should be replaced.

Source: Torii and Schenck (2020:8)

From Table 2.1, it is evident that digital transformation in higher education is dependent on technology and organisational skills and capabilities. Digital transformation is guided through clear objectives and needs to be viable in terms of execution, support, and maintenance. For higher education institutions to cope with the complexity of how these different components fit together, Franke, Cohen and Sigholm (2018:17) suggested that adequate enterprise architecture management capabilities need to be evaluated and established first.

Enterprise architecture looks to address the definite challenge in translating business objectives into a digital transformation strategy that produces consistent and transformative outputs (Hornford, Hornford, Sabesan, Searle Street, and Toder 2017:10). Enterprise architecture also provides a framework (TOGAF 2011) to structure an organisation and its functions into logical entities. These logical entities, such as people, processes, information, and technology, link up in a structured manner to show the relationship between IT and business and how it can achieve universal business objectives together (Bijata and Piotrkowski 2014:13). This model-based approach aligns with what Yanckello (2021a:3) and Lauby (2020:6) eluded too when they noted that administrative solutions, irrespective of sector, are primarily intended to enable the objectives of the organisation and user. Therefore, enterprise architecture can be applied to structure the digital transformation efforts of a university administrative system environment. It can do this through nine distinct phases encapsulated in the Enterprise Architecture Development Method (ADM). The ADM phases can be summarised as follow:

i. **Preliminary phase:** This phase builds a team, establishes principles, and define governance structures.
ii. **Architecture vision phase:** This phase imagines the future vision of capabilities and business value to be delivered, establish partnerships, and get stakeholder buy-in.
iii. **Business architecture phase:** This phase describes how the organisation must operate to achieve its transformational goals and incorporate strategic drivers.

iv. **Information and system architecture phase:** This phase describes the digital application and data requirements to allow the organisation to meet its transformational goals.
v. **Technology architecture phase:** This phase establishes technical infrastructure requirements that will address stakeholder concerns.
vi. **Opportunities and solutions phase:** This phase determines the incremental approach that will deliver continuous transformation and business value by identifying opportunities from the combined previous phases' outcomes.
vii. **Migration planning phase:** This phase establishes a roadmap on how to get to the end goal, inclusive of a change plan to build capabilities.
viii. **Implementation governance:** This phase ensures the project stays on track and conforms to the target architecture.
ix. **Architecture change management:** This phase continuously deals with change and ensures all capabilities are established to implement and maintain the digital transformation.
x. **Requirements management:** This phase continuously ensures the requirements for each of the ADM phases are tracked and adapted where needed.

The ADM phases still only provide a structure and do not dictate strategy and objectives. Implementing a digital transformation effort still relies on the organisation's digital aspirations and orchestrating digital platforms to solve a problem or address a need (World Economic Forum 2018:34).

2.6. Conclusion

A wide range of literature shows that the digital transformation of administrative systems is not only about technology. The combined working of people, process, technology, data, and governance towards a greater vision brings about digital transformation. The success and sustainability of such a digital transformation effort rely on various factors, from leadership and capabilities up to how the organisation deals with legacy processes and business models.

Higher education institutions face a disruptive scenario as the competition for the best students and researchers increases. At the same time, available resources and new ways of working forces universities to provide its customers with an improved value-adding experience. Many universities struggle to harness the transformative power of digital. Experts, however, believe that far too many universities focus on digital plans instead of having a strategy fit for a digital age. In this sense, digital transformation requires that organisations rethink how they use technology, people, and processes to change business performance. Since university administrative systems link the client to the organisation on an operations, data, and services level, these systems play a critical role in digital transformation. In providing sustainable value to an organisation, the digital components of an administrative solution can be applied to automate rule-based work activities. Automated rule-based activities open up valuable staff resources and generate valuable analytical information to inform strategic decisions.

For digital transformation to be measurable, it must be implemented in a structured manner. Enterprise Architecture offers a matching framework (TOGAF 2011) to measure and structure digital transformation efforts and seeks to build a solution around a central problem. In the process, it considers all the components of an administrative solution and the context under which they operate.

Chapter 3: Research methodology

3.1. Introduction

This chapter discusses the research methodology used to address the research problem and objectives of the study. The main sections of this chapter are research design, sampling, data collection methods, ethical considerations, and demarcation of the study. Each subsequent section gives a brief explanation and a motivation of the specific paradigm for the study.

3.2. Research design

The research design is the master plan of the study. It contains the study objectives, the research question, and it visualises the use of data to address the problems experienced (Saunders, Lewis and Thornhill 2009). There are two types of research methodologies, namely qualitative and quantitative, according to Bryman *et al.* (2018:31). Qualitative research follows a more interpretive approach and incorporates social actors, whereas quantitative research is more concerned with objectivism and regards people and natural objects as each having a life of their own (Bryman *et al.* 2018:31).

This research study looks to investigate considerations for enabling digital transformation of the administrative systems at a major South African university. Given that each administrative system has various components and operates in the organisation's context, it is essential to understand this context. Further, when dealing with a live-work environment, people with first-hand knowledge and shared experiences have valuable insight into how a topic relates to that environment. Since this research study sought to understand considerations that function against a social and cultural backdrop, a more suitable subjective approach was followed. This philosophy also fits in with the paradigm of an organisation existing beyond only actors, where personal experience also plays a vital role. Bryman *et al*. (2018:20) confirm that the organisation as a social construct and research guided by a need for change are more interpretivist. On the other hand, an objective approach would be

more scientific, focusing on solving a problem based on rationale and deductive testing of a theory (Bryman *et al*. 2018:31). A possible disadvantage of an objective paradigm would have been the lack of an integrated approach which requires considering concepts like change, perceived value, and organisational culture. Such concepts are usually associated with qualitative rather than quantitative research approaches (Bryman *et al.* 2018:19).

A quantitative approach involves emphasising the collection of numerical data and analysis thereof. Theories are then tested in a deductive manner to come to a research conclusion (Saunders, Lewis and Thornhill 2016:472). A qualitative approach emphasises words and the context of the relationship between objects rather than data analysis (Saunders et al. 2016:472). As such, a qualitative research method was used in this study. In this sense, the subjective approach also satisfies the following parameters Bryman *et al.* (2018:31) link to a qualitative approach. The approach tends to view social reality as constantly evolving and as seen by individuals. It further emphasises the generation of theory from data and it also emphasises words rather than the quantity of data. Lastly, a more subjective approach highlights the way in which individuals interpret their environment.

An interpretive, subjective outlook also closely relates to a qualitative study approach (Bryman *et al*. 2018:15). One such interpretive outlook is phenomenology which focuses on a collective or shared experience between participants to reduce individual experiences. The data gathered from a phenomenology study further looks to draw the essence from the combined group's experiences (Cresswell 2007: 58). Phenomenology's definition also fits in with this study in that it focuses on the shared experience of various knowledgeable role players with similar experiences.

The information gained from the shared wisdom of the parties interviewed and the literature studied, was used to produce a final report.

3.3. Sampling

The study's primary purpose was to investigate considerations for enabling digital transformation of a major South African university's administrative systems. The study will be conducted at a major South African university, focusing on the core administrative systems within the support services domain. In a university context, the support services domain commonly refers to services that are organised to support and make education more effective (Van Schalkwyk 1995:20). When referring to administrative support systems, these support systems would typically include enterprise-wide resources planning (ERP) type systems such as human resources, finances, facilities, and information technology services (Saunders 2019:2). The administrative support platforms are further considered a key component of digital transformation as they link and expose various business services and departments to clients (Saunders 2019:2).

3.3.1. Sampling strategy

Sample size refers to the number of participants included in a study (Bryman *et al*. 2018:170). The sample size is made up of a segment or subset of a larger group or population. With a larger sample size, the possibility for sampling errors becomes less (Bryman *et al*. 2018:176). Fugard (2014:18) suggested that the following additional factors play a role in sample size in qualitative studies:

i. Whether the theme of the study has a specific focus present only in a particular sample.
ii. The number of participants that are required to be confident at a specific level implied.
iii. The cost of data collection and the depth of analysis required.

There are two general types of sampling methods, and they are probability sampling and non-probability sampling. Probability sampling makes use of random selection to ensure the chance of the unit being selected is known. Non-probability sampling implies that some units in the population have a greater chance of being selected, and therefore does not include random sampling (Bryman *et al*. 2018:31).

Probability sampling was selected for this study as it allows for studying a phenomenon that applies to a specific group. Choosing a specific sample also relates closely to a phenomenology design and qualitative methodology (Fugar 2014:18). This method is considered more economical and less complex when the sampling method involves judgement (Showkat 2017:1).

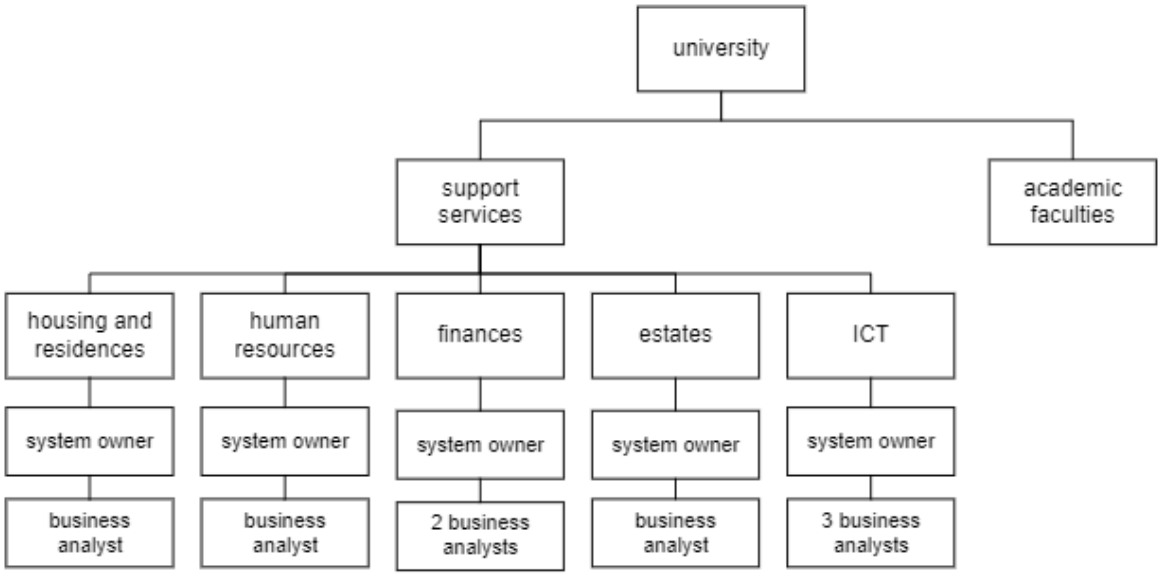
3.3.2. Sampling size

When choosing a sample size, the sample must be representative of the population of that study (Bryman *et al*. 2018:177). Other considerations include the time and cost of interviewing individual subjects (Bryman *et al.* 2018:177). This study's target population comprised individuals who knew the systems and services architecture of that department's core administrative system.

Intimate knowledge and understanding of the combined services offerings of a department and its relation to an administrative system are especially relevant to digital transformation (Franke *et al*. 2018:17). The target population needed a basic understanding of the components of an administrative solution and how to apply them towards a specific objective. This level of understanding was relevant given that an administrative solutions transformation success is dependent on a multitude of factors and components. Practical knowledge and experience in the implementation of an administrative solution at a major South African university further ensured that expert knowledge could be shared towards the study objective.

Five departments made up the core support services group, with each of these departments having at least one organisational, administrative system that supports its core operations. The individuals interviewed for this study comprised of the system owner and business analyst(s) for each department's core administrative system. The five departments representative of the core administrative systems of a major South African university is noted in Figure 3.1. The departments are housing and residences, human resources, finances, estates and ICT services.

Figure 3.1 Representative sample structure.



Sekaran and Bougie (2009:268) suggested the following sliding scale when working with a limited population and sample group in a qualitative study:

i. In the case of ten individuals, interview all ten.
ii. In the case of fifteen individuals, at least fourteen should be interviewed.
iii. In the case of twenty individuals, at least nineteen should be interviewed.

However, since a level of differentiation exists in the study population, it was decided to include the entire population to be interviewed. Each department has a system owner per department, thus five in total. Each department further has a business analyst except for Finances and ICT. Finances have two business analysts, and ICT has three business analysts. The entire population, therefore, when added up, comprises thirteen individuals in total.

The two factors where differentiation could be found were:

i. The difference in seniority between a system owner and a business analyst. In this context, a system owner at a major South African university has a higher post level than a business analyst. Although a higher post level may not be indicative of experience, it does indicate a greater level of responsibility. For

this reason, the system owner is allowed greater decision power on strategic matters when it comes to how services, processes, and systems should integrate. It is further essential to differentiate on the level of seniority as it may directly impact the shared experience needed for a qualitative phenomenology-focused study.

ii. Although it was mentioned that a difference in post levels is not always indicative of experience, the possibility of this variable to have an impact on the study could not be ruled out entirely. At a major South African university, it is generally agreed upon that the unit head also fulfils the role of the system owner. Therefore, it can be argued that the system owner has progressed in career paths to ultimately assume the role of owner and thus may have a greater level of experience.

The entire study population of thirteen individuals from all the identified departments were selected to be interviewed for this study. Figure 3.1 gives an overview of the system owners and business analysts per identified department.

3.3.3. Inclusion criteria

Participants that were suitable to be included in the study were employees of a major South African university. These employees had to have experience as a system owner or business analyst in their department's core administrative systems. System owners and business analysts of the following core administrative departments were selected: housing and residences, human resources, finances, estates and ICT. These parties are especially relevant in that they assume responsibility for implementing and executing effective technology and information management as a delegated function prescribed by King IV (2016:62). King IV (2016:62) further noted that these individuals play a critical role in integrating people, processes, technology, and information across the organisation. Furthermore, the IIBA (2017:2) confirms that terms such as a business analyst, product and process owner, and system owner are used interchangeably depending on the organisation's preference. Irrespective of the naming convention deployed, the universal emphasis still resides in understanding the business solutions and interaction between the various components (IIBA 2017:6). In the context of a major South African university, it was found that the terminology used

for those assuming responsibility in guiding administrative system deployment and integration conforms to the noted literature from the IIBA (2017:6) and King IV (2016:62). The inclusion criteria are also limited to the five core administrative departments indicated in section 3.1, which had these functions in their respective structures. Before identified individuals were contacted, approval was first obtained from the management of a major South African university. This approval and their contact details were obtained by following the university's prescribed ethical clearance procedures. Once permission was obtained to contact the respective individuals, they were contacted telephonically and by email to arrange an initial engagement. Prior to the initial meeting, an introductory email with the disclaimer notice was sent to the parties concerned.

3.4. Data collection method

A phenomenology study approach suggests that data should be collected using interviews, although documents and observations can also be considered (Cresswell 2007:61). A phenomenology study starts with collecting data from individuals that share an experience or phenomenon (Cresswell 2007:61). In this study, users shared experience in managing the administrative systems in their domain at a major South African university. Interviews can be either structured or semi-structured, according to Bryman *et al*. (2018:199). Structured interviews do not allow for deviating from the pre-set list of questions, whereas semi-structured interviews allow to engage in a conversation to obtain clarifying information.

This study consisted of semi-structured interviews justified based on the research design. Semi-structured interviews further have the added advantage of allowing the researcher to acquire in-depth knowledge of the individual's experience through probing by building on responses (Saunders *et al*. 2016:315). The interviews were conducted using Microsoft Teams, an electronic video calling platform. This approach was adopted to avoid close contact with participants during the Covid-19 pandemic. There was also a concern that participants could, on short notice, move back to working home-based in fear of potential disruptions at work. The interviews were recorded and electronically scribed by making use of the standard voice recognition functionality provided by Microsoft Teams. Afterwards, the electronic

transcribed data were transferred over to a Microsoft Word document. Any transcription errors were rectified by listening to the recordings, reviewing the interviewer's notes and correlating them with the transcribed data.
Comparing the data in this manner allowed for a triangulated approach and treating it with the necessary vigour to ensure its quality and trustworthiness for further coding and interpretation.

3.4.1. Research instrument

The questions that were used during the interview were guided by:

i. Literature of digital transformation of administrative systems in higher education and in general.
ii. The current trends in the digital transformation of administrative systems in higher education.
iii. The joined experience of possible considerations to enable digital transformation of the administrative systems of the major South African university.

The interview categories were subdivided into three distinct areas of interest as per the title of the study. The areas of interest were digital transformation, administrative systems, and digital transformation of administrative systems in the context of a major South African University. Table 3.1 explains the area of interest addressed and the purpose of each question in the interview guide (Appendix A). The link to the relevant literature for each area of interest is also indicated. The interview guide was the same for the system owners and the business analysts. The same interview guide allowed drawing on a collective or shared experience rather than individual experiences.

Table 3.1 Area of interest, purpose, and link to literature.

Number	Area of interest	Purpose	Link to literature
1	General	Introduction. To set the stage for the interview, indicating the reason for the study.	Interview introduction (Bryman *et al*. 2018:228)
2	General	Biographical information. To obtain information on location, department, management level.	Biographical information (Bryman *et al*. 2018:226)
3	Digital transformation	The definition of digital transformation. To determine the participants' understanding of digital transformation and the aspects thereof.	Boulton (2020:6), Chapco-Wade (2018:4), Proctor (2019:4), Schallmo and Williams (2018:18)
4	Digital transformation	The reason for digital transformation. To determine the participants' understanding of why digital transformation is needed.	World Economic Forum (2018:8), Blewitt (2021:6), Lauby (2020:2), Schallmo and Williams (2018:4)
5	Digital transformation	The importance of digital transformation for a university from the participants perspective. A probing question to determine the importance of digital transformation from the view of the participant.	Blewitt (2021:6), Schallmo and Williams (2018:4)

6	Digital transformation	Contributors to digital transformation sustainable success. To determine the participant's view on what would make a digital transformation effort sustainable.	Hogan (2020:8), Stauffer (2006:180)
7	Administrative system	The reason for an administrative system. To determine the participants understanding of the purpose of an administrative system.	Davenport (2006:176), Perkins (2020:3)
8	Administrative system	The components of an administrative system. To determine the participants understanding of the components of an administrative system.	Westerman (2014:4), Townson (2008:12)
9	Digital transformation of administrative systems in the context of a university	The need for digital transformation. To determine the participant's view of the importance of digital transformation and the advantages that digital transformation will hold for the major South African university.	Torii and Schenck (2020), Yanckello (2021a:3)
10	Digital transformation of administrative systems in the	Role player to drive digital transformation. To determine the participant's view of who the ideal role players and drivers of digital transformation of	Torii and Schenck (2020:8), Yanckello (2021b:3)

	context of a university	administrative systems at a South African university should be.	
11	Digital transformation of administrative systems in the context of a university	How would a digitally transformed administrative system look in the context of the major South African university? To determine the objective and value proposition of digital transformation of administrative systems at the major South African university.	Torii and Schenck (2020:8), Yanckello (2021b:3)
12	Digital transformation of administrative systems in the context of a university	Factors to consider for digital transformation at the major South African university. To determine the challenges and factors that play a role in digitally transforming administrative systems at the major South African university.	Hogan (2020:8), Morgan and Lowendahl (2021:2), Saha, Satyanarayana and Vig (2019:2)
13	Conclusion	Conclusion. To determine any aspects that were not discussed during the interview, which the participant felt was important from their point of view.	

3.4.2. Data analysis

According to Saunders *et al*. (2016:470), qualitative data refers to non-numeric and non-qualified data obtained from interviews and open-ended questions. For qualitative data to be useful, the data needs to be analysed, and its meaning must be understood

(Saunders et al. 2016:470). Bryman *et al.* (2018:336) suggested that because qualitative data creates large volumes of data, the coding of the interview data has to be done as soon as possible after each individual interview. The process of analysing qualitative data starts with coding the data. Coding is a process whereby the researcher interprets and re-represent data without losing the context in which it was collected (Bryman *et al*. 2018:216). Saunders et al. (2016:479) further noted that qualitative data coding or labelling is the most effective way to draw connections between evidence and possible causes. Data coding, however, has been criticised that if it is not done correctly, it can cause results that lose the context of what was said (Bryman *et al*. 2018:336)

For this study, the electronic transcription was done on Microsoft Word, whereafter the coding of themes were done on Microsoft Excel. This method was used to simplify administration by making use of familiar and easy to use tools between interviews.

The data analysis method selected for this study was thematic analysis. Thematic analysis is most commonly used in qualitative research studies (Bryman *et al*. 2018:350). The goal of thematic analysis suggests the identification of patterns and themes across a data set (Bryman *et al*. 2018:350). This method fits in well with the study as it seeks to understand contexts and understand the viewpoints of individuals with a shared experience. For this reason, a more flexible approach like thematic analysis is needed as it allows flexibility in associating the importance of a theme with the context of that environment (Bryman *et al*. 2018:350). Atlas.ti was used as the analysis tool. Atlas.ti supports thematic analysis of qualitative studies in that it allows for noting themes and relationships between groups and objects (Friese 2019). A data analyst furthermore assisted with the initial analysis in Atlas.ti after coding has been done.

3.5. Ethical considerations

Ethical considerations in business studies can be categorised into four main areas (Bryman *et a*l. 2018:120), namely:

i. Whether there was harm to the participants.

ii. Whether there was a lack of informed consent.
iii. Whether there is an invasion of privacy.
iv. Whether deception is involved.

Ethical considerations further apply when protecting the participants' anonymity and protecting them from embarrassment or harm (Bryman *et al*. 2018:122). Consideration was given to protect participants from harm, especially since the participants could be expressing views or experiences that brought about a negative connotation. For this reason, all participants were provided with an informed consent document that gave them the option to withdraw at any time if they felt it necessary to do so. All participants were informed that the interview is conducted on a voluntary basis and that only the researcher will have access to the interview recordings and the backup thereof. The details of the participants was kept anonymous, and only the processed data will be shared with the major South African university for the purpose of advising on potential considerations and as well as for the purposes of the researchers' studies.

3.5.1. Permission to conduct the study

Permission to conduct the study was obtained from a major South African university as part of its standard ethical clearance process before informed consent was obtained from each participant in the interviews.

3.5.2. Harm to participants

Harm can also be caused by negatively affecting the participant's self-esteem, causing stress to the participant or harming career prospects (Bryman *et al*. 2018:121). Saunders et al. (2016:153) further suggested that the research design should not subject the research population to embarrassment or materially disadvantage them. For this study, precaution was taken to not expose participants to factors that could cause them harm. Data were further kept safe by the researcher by maintaining their anonymity throughout the study.

3.5.3. Informed consent

The researcher is required to inform all participants in the study of any reasonable considerations that may have an impact on their willingness to participate (Bryman *et al*. 2018:124). For this study, all participants were provided with an informed consent form prior to the interview, indicating the purpose and reason for the study conducted. As part of the electronic interview, a voting poll was further included that asked for informed consent by means of an electronic vote.

3.5.4. Invasion of privacy

The study objective does not provide the researcher with a basis for intruding on the participant's privacy (Bryman *et al*. 2018:127). For this study, the participants were informed that the data would be kept anonymous and handled as confidential.

3.6. Conclusion

This chapter described the research methodology used in this study by considering different research designs and motivating the most suitable one. The chapter further provided context to the specific sample strategy, sample size, and sample inclusion criteria. The chapter also expanded on different data collection methods, motivated the most suitable method based on the study design, and outlined the purpose of the different question categories. Lastly, ethical considerations as well as the demarcation of the study were included.

Chapter 4: Results

4.1. Introduction

This chapter discusses the data analysis and the interpretation of the interview results. The data of this study were collected by interviewing system owners and business analysts that form part of the administrative support domain of a major South African university. The study results presented in this document are structured to show the interpretation directly after the analysis. This structure is deemed more suitable as it enhances readability and the flow between the analysis and interpretation of the study data.

4.2. Analysis and interpretation of biographical data

Participants were selected based on their roles, knowledge, and exposure to working with administrative systems at a major South African university. The participants were subdivided into two functional groupings, system owners and business analysts. This section provides insight into the participants' work experience and their functional role in working with administrative systems at a major South African university. Table 4.1 contains the details of the entire cohort of thirteen participants, five system owners, and eight business analysts. The number of years of experience in the table indicates the total years of experience in the specific functional role in working with administrative systems.

Table 4.1 Interview subject experience.

Interview number	Interview participant	Functional role	Years' experience in functional role
1	Participant 1	Business Analyst	9 years
2	Participant 2	Business Analyst	2 years
3	Participant 3	Business Analyst	18 months
4	Participant 4	Business Analyst	7 years
5	Participant 5	Business Analyst	4 years

6	Participant 6	Business Analyst	15 - 25 years
7	Participant 7	System Owner	15 years
8	Participant 8	Business Analyst	15 years
9	Participant 9	System Owner	10 years
10	Participant 10	System Owner	10 years
11	Participant 11	System Owner	15 years
12	Participant 12	System Owner	12 years
13	Participant 13	Business Analyst	2 years

The functional roles of a system owner versus that of a business analyst differ and influence how they interact with the administrative system's domain. This difference in roles could ultimately also impact how they see digital transformation of administrative systems at a major South African university. For this reason, and based on a phenomenology study approach, whereby shared experience informs the data analysis and results, differences between these two groups were highlighted.

Compared to the role of a business analyst, the role of a system owner tends to be more focused on the management and strategy of the administrative systems under their control. Furthermore, system owners share a level of seniority in their respective functional roles when it comes to decision-making power and influence over administrative systems. This level of seniority relates to their years' experience in managing administrative systems and knowledge acquired through managing or influencing functions ancillary to administrative systems. Ancillary functions in this context would typically include business services offered and people and processes that control and support those services. The results presented in Table 4.1 show that the five participants' experience as system owners ranged from between ten to fifteen years.

Although also exposed to a broad range of components that have an impact and form part of an administrative system, business analysts usually have a different focus than system owners. Business analysts are more analytically focused and tend to logically structure systems, concepts, and ideas to produce measurable outputs that form part of a collective whole. For this reason, business analysts are more prone to share

similar experiences and viewpoints with fellow business analysts. Table 4.1 shows that the eight business analysts interviewed had anything from eighteen months to twenty-five years' experience in analysing administrative systems and their related functions.

4.3. Analysis and interpretation of the study data

This section discusses the data analysis and interpretation based on the interviews conducted with business owners and system analysts. The topics highlighted in the literature and also explored as part of the interview questions were:

i. The definition of digital transformation.
ii. The reason for digital transformation.
iii. Components of digital transformation.
iv. Components of administrative systems.
v. Considerations for enabling the digital transformation of higher education administrative systems.

Several themes were derived from the topics discussed. These themes were discussed as subsections in the noted topics. Themes were further considered and discussed in the context of the role and shared experience of the implied participants.

4.3.1. The definition of digital transformation

Table 4.2 summarises the respective systems owners' and business analysts' definitions of digital transformation.

Table 4.2 Participants' definition of digital transformation.

Participant number	Summary of participant's comments during the discussion
1	Digital transformation speaks to introducing and facilitating change. This change can happen on a departmental level or in the greater context of the institution. The nature and objective of this change are to move from point A to point B, and part thereof would be the

	introduction or more effective usage of electronic systems. Such change could ultimately impact business processes, operations, and clients to whom services are delivered.
2	Digital transformation is to move from a historical way of doing things to a more modernised way of doing things. This modern way of doing things also results in quicker services, given manual tasks are automated.
3	Digital transformation in our world would mean eliminating paper first by becoming more digital.
4	As technology evolves, current business processes are getting transformed. At the same time, people in the business also have to change.
5	Digital transformation speaks about how we transform systems and processes to work more streamlined in a digital manner. It is also about how we apply available digital resources to achieve optimal efficiency.
6	It is about how we change or transform existing software tools to become more effective and efficient.
7	Digital transformation is when one moves away from manual actions and automating systems to allow for better tracking. A digitally transformed system should enable staff to be more effective, but to do that, staff also need to be adequately skilled.
8	Digital transformation is working more online and digitally, both internally and with contractors and stakeholders. It means processes are more streamlined and require constant development, adaptation and growing your business.
9	Digital transformation is to get systems digital and do away with paper-based systems that make information less accessible. Digital systems should also be accessible to all staff members and not be bound to a single computer. The people forming part of a digitally transformed environment should be computer literate and knowledgeable in using these systems.

10	Digital transformation is to migrate or transform paper-based systems to digital platforms.
11	Digital transformation would be to make our operations more digital in all spheres of operations.
12	Digital transformation is about enabling the environment. In optimised systems, accuracy and completeness are better, and management can be more effective and efficient. Digitally transformed systems also have less user input and better checks for data accuracy.
13	Digital transformation is transforming your systems and what you do in the digital field.

The definitions noted by the participants in table 4.2 were addressed in chapter 2, section 2.2. Literature, is more specific and states a distinct difference between digitisation, digitalisation and digital transformation. At the start of each interview, it became apparent that both business analysts and system owners were more focused on the digital aspects of digital transformation. The definitions highlighted how digital and digital transformation allow for different ways of doing things and how that could result in optimal outputs and better utilisation of time and resources. Besides focusing on digital, many definitions acknowledge digital transformation as an item of action that involves a change in people, technology, and processes.

In the case of system owners, answers showed further insight into other factors that may play a role in digital transformation. Participants 7, 9, 11 and 12 stated that operations, staff enablement, and data also play a critical role in defining digital transformation.

Literature is also much more intentional when defining digital transformation (section 2.2). Although doing things digital and making changes is part of digital transformation, the digital aspirations of the organisation are considered less critical. Digital transformation is instead a cross-departmental collaborative effort where business-focussed philosophies get paired. Digital transformation is leveraging technology to

disrupt traditional industry models and business practices to deliver value to the business and customers.

4.3.2. The reason for digital transformation

This section gives an overview of the reasons for digital transformation as seen by the respective role players in the context of a major South African universities' administrative systems. Table 4.3 notes the major reasons for what business analysts see as the reason for digital transformation.

Table 4.3 Business analysts' reason for digital transformation.

Theme	Summary of participant's comments during the discussion	Addressed in the study
Relevancy in a changing environment	Participant 1 stated that digital transformation is required to remain relevant in the market and attract students. Participant 6 noted that change is occurring in the market and is also applicable to students and a younger generation who prefer online systems that are more intuitive. Participant 2 highlighted the need for change by stating that it is essential that we change with the times and not stagnate in the old way of doing things in the era that we're living in. The participant emphasized this further by stating: "Remember, we live in the 21st century, and many things have changed." This level of change was also stressed by participant 5 when noting that international bodies clearly show how the world is changing and that everything is moving over to digital. Participant 4 emphasized the need to remain relevant by stating: "We have to keep ahead of times and look into the future. Otherwise, we fall behind	Chapter 2, section 2.3.1, i, iv

Theme	Summary of participant's comments during the discussion	Addressed in the study
	and lose everything." Participant 8 also said that progress is equally as significant as keeping up with a changing environment. "At the end of the day, we want to move ahead and keep up with technology." Participant 4 summarised it well by noting that progress does not come without change. "If you do not transform your administrative systems, you become stagnant. We want to be classified as a world-class university. But it becomes challenging to deliver on a world-class level if your household lacks and is not equipped to be word-class."	
Accessibility	Participant 5 noted that COVID taught us that systems need to be accessible from anywhere and not be bound to a physical location from an administrative point of view. The participant further mentioned that digital transformation makes access to systems over a digital platform possible without being "on-site". Digital transformation would also mean that services to staff and students are much more accessible, according to participant 13. Participant 2 explained it as follows: "Digital transformation makes it easier for people to be part of the university without being physically on campus." According to participant 6, this correlates with the preferences of a younger generation that prefer their functions to be accessible online and digital.	Chapter 2, section 2.3, section 2.3.1
Enablement and customer experience	Participant 2 stated that by digitally transforming, "we can enable many people to access the university. Digital transformation of administrative systems	Chapter 2, section 2.3.1, i

Theme	Summary of participant's comments during the discussion	Addressed in the study
	should also be seen as an enabler and something that assists people in doing their job better." Participant 1 noted that digitally transformed administrative systems play a direct role in enablement. "You'd have client satisfaction because your output will meet customer needs. Digital transformation will thus add value to whoever uses the service. Digital transformation of administrative systems also impacts the students as the administrative systems and processes integrate into teaching and learning systems, and service could thus be much faster. Digital transformed administrative systems will make things easier in that data is accurate and readily available to the right people."	
Efficiency and productivity	Participant 6 noted that digital transformation is a way of working smarter and not harder. To work smarter, participant 3 pointed out that the system should have capabilities to check itself. At the same time the system will be more enabling and save time. Participant 4 notes that digitally transformed administrative systems will also save time and make manual tasks more manageable. Staff will also be more effective and efficient. Participant 5 emphasized that many of these benefits link to digitally transformed administrative systems that can better support processes. Participant 5 said: "Digitally transformed administrative systems enable processes to work more streamlined over a digital platform." Participant 1 also highlighted that	Chapter 2, section 2.2

Theme	Summary of participant's comments during the discussion	Addressed in the study
	processes and integration as part of digitally transformed administrative systems will reduce duplication and resource wastage. Participant 2 further noted that digital transformation is required: “To enhance the speed of service as computerized systems enable higher outputs.”	
Governance and controls	Participant 3 noted: “We are working too hard for the system. The system should have capabilities to check itself.” Participant 8 emphasized controls and governance that would otherwise have been a challenge: “The system can track dates as a control to inform parties of scheduled maintenance to be done.” Participant 1 summarized this by stating: “The digital transformation of administrative systems allows for improvement and compliance with governance standards in people, process, technology, and data.”	Chapter 2, section 2.4
Management and reporting	Participant 3 noted that a component of digital transformation is data and information. Management furthermore also requires data and reporting for effective planning.	Chapter 2, section 2.3
Financial sustainability	Participants 1 and 8 emphasized the direct and indirect reason and impact of digital transformation on financial resources. Participant 1: “If you have client satisfaction, then you tend to be more profitable and use resources better.” Participant 8: “At the end of the day, it's more cost-effective.”	Chapter 2, section 2.3, ii

Theme	Summary of participant's comments during the discussion	Addressed in the study
Communication	Participant 13 noted that there would be a lot better collaboration between people if there were one system that was equally understood by all.	Chapter 2, section 2.2

Table 4.4 notes the significant reasons for what system owners see as the reason for digital transformation.

Table 4.4 System owners' reason for digital transformation.

Theme	Summary of participant's comments during the discussion	Addressed in the study
Relevancy in a changing environment	Participant 7 noted that it's not only about the optimization of systems but also the integration of systems. “Strategically, that's crucial. If you don't follow that route, you know the university will not be successful in the Fourth Industrial Revolution or even if you look at the future.”	Chapter 2, section 2.3.1, i, iv
Communication	Participant 9 noted that a digitally transformed system would be “Utopia” as it would mean better communication. “For instance, if something changes in the HR system, we would be automatically informed.”	Chapter 2, section 2.2
Enablement and customer experience	Participant 12 noted that digital transformation could help the university improve prompt service delivery where a customer can get the correct answer the first time. Participant 7 suggested that digital transformation as an enabler goes beyond tangible benefits by noting, “From a human perspective, I think it will allow us inclusivity, for instance, including disabled people.”	Chapter 2, section 2.3.1, i

Theme	Summary of participant's comments during the discussion	Addressed in the study
Efficiency and productivity	Participant 10 noted that digital transformation of administrative systems would enable the institution to be quicker and more effective in its services and that management would also be more straightforward. Participant 9 further suggested digital transformation as necessary by stating: “It is impossible to go without it. It makes life so much easier on digital transformation, though.”	Chapter 2, section 2.2
Governance and controls	Participant 10 noted the following about the reason for digital transformation: “It comes back to controls again. Controlling and enforcing processes.”	Chapter 2, section 2.4
Management and reporting	Participant 7 noted: “The university will be able to make better decisions because sometimes decisions are not based on facts or information.” Participant 10 also emphasized informed decision making by noting, “The digital transformation of administrative systems will allow better-informed decisions.” From a management perspective, participant 9 noted that digitally transformed administrative systems assist you in measuring, managing, controlling, and dedicating your future efforts through the information you're getting back.	Chapter 2, section 2.3
Financial sustainability	Participant 7 noted that it is also part of the return on investment. We will be much more effective and efficient, which will help with the university's financial sustainability. Participant 9 also noted the following regarding saving resources: “So if the people are using it, it's real-time, and we can save a lot of time and man-hours. “	Chapter 2, section 2.3, ii

The business analysts' answers showed similarities in the following reasons for digital transformation: relevancy in a changing environment, accessibility, enablement and customer experience, efficiency and productivity, and governance and controls. Management and reporting, financial sustainability, and communication were also mentioned as reasons for digital transformation, but to a lesser extent. System owners, however, emphasised the following reasons more: enablement and customer experience, efficiency and productivity, management and reporting, and financial sustainability.

Below, the interpretation of the reasons for digital transformation of administrative systems at a major South African university is given:

i. **Relevancy in a changing environment:** Literature suggests that relevance in a changing environment is not only about technological advancements. Relevancy in this context is about how humans apply and interact with technology to conduct their business. The literature suggests that relevancy is also about driving sustainability, improving productivity, and delivering a more engaging customer and employee experience. In this sense, the feedback from the business analysts is in line with what the literature suggests. The feedback in Table 4.3 indicates that business services and systems have to cater to and adapt to serve a changing user community (staff and students) that are more prone to using technology. Such a changing environment becomes even harder to ignore if already entrenched in the lives of new entering students. Staff members also acknowledged this when one party noted, “current trends show that many people, especially potential students, are using technology.” More than one participant further pointed out that the community must “guard against becoming stagnant and less attractive in the market”. The feedback further suggests that relevance also entails anticipating future needs and transforming digitally to address those needs.
ii. **Accessibility:** The feedback from the interviews in Table 4.3 suggests that accessibility has two spheres. The first sphere of accessibility speaks to online systems and the ability to access systems from anywhere. This level of access would also imply that critical information is not only office bound but available on-demand when and where needed. The availability and access to information

were noted as factors that frustrate many. It was pointed out that “information is constantly somewhere in a drawer or on someone's computer and has to be searched for. Another party noted that they “have to wait long periods and constantly ask for new and updated information”. The “utopia”, as indicated by one participant, will be when systems are transformed digitally, making information and communication accessible and more straightforward. The second sphere speaks to inclusivity. Making the institution's services available online allows access to those previously excluded because of location and/or cost of travel. One participant noted this as “providing an opportunity to be part of the institution that otherwise would have never been possible for some.” Another participant also noted that “students want the convenience of having their services online”, which gives them a level of comfort and a sense of control. The literature agrees that digital transformation supports the enablement of new lines of business. A participant also noted that “all of a sudden classes could be presented online and watched anytime even allowing working people to enrol for classes.” The literature further supports the notion of society converging into an "anywhere anytime" delivery of services model which utilises technology.

iii. **Enablement and customer experience:** The feedback from the interviews in Tables 4.3 and 4.4 suggest that digital transformation can help improve service delivery to customers. This improvement is especially true for digitally transformed administrative systems, given they integrate and serve as a data source for other systems. A further reason provided is that transformed systems can assist people in doing their jobs better and provide a better experience to customers. More than one participant referred to this notion as “work smarter and not harder”, opening up time to focus on people and students. Literature suggests the need for a better customer experience is heightened by an awareness of what is possible in a digital era. Therefore, enablement and customer experience are a necessity and not a mere value add.

iv. **Efficiency and productivity:** The reasons provided in Tables 4.3 and 4.4 suggest that digitally transformed administrative systems improve efficiency and productivity. In their motivations, participants noted that this is because digitally transformed administrative systems have less duplication, promote

task automation and facilitate system checks. One participant noted that “it would be impossible to do the amount of work today with the number of staff we have if the administrative system did not have built-in checks.” The effect is that “these staff members now use their time to check the system instead of manually capturing data and doing calculations.” The literature agrees that the need for digital transformation is motivated by one or more of the following value-adding reasons: to drive sustainability, improve productivity, and deliver a more engaging customer and employee experience.

v. **Management and reporting:** Literature suggests that real-time strategic and operational information helps employees make better timeous decisions. Digitally transformed systems also save time, opening up human resources to do tasks that machines cannot do. The feedback from the interviews showed that system owners emphasise management and reporting as a reason for digital transformation. The explanations provided are that it allows for “fact-based decision-making” and an improved capability to measure, manage, and control operations and strategic tasks.

vi. **Financial sustainability:** Literature suggests that digital transformation allows for improved productivity and an opportunity to exploit new business streams. Systems owners emphasised economic sustainability more compared to business analysts. Reasons provided by participants for supporting digital transformation to enhance financial sustainability were:

   i. Digitally transformed administrative systems are more effective and efficient and therefore consume fewer resources.
   ii. Digitally transformed administrative systems are real-time and save a lot of man-hours.
   iii. Digitally transformed systems allow for doing more with fewer staff resources. Appointing more staff resources is expensive, hard to come by and less sustainable in the long run.
   iv. Digitally transformed administrative systems improve customer service and satisfaction and, as a result, also financial sustainability.

From the answers provided by both system owners and business analysts, there was no specific proof that digital transformation is seen as a tool for exploiting

new business streams and income. Literature, however, states that realising new business opportunities is part of digital transformation and cannot be dismissed.

If seen from a holistic viewpoint, there could be many reasons for digital transformation. Literature, however, states that the definition of digital transformation carries a close relation to its need in an organisation. For this reason, participants were asked a follow-up question on how they think this university would look different if its administrative systems were digitally transformed? As well as why they believe this university would perhaps embrace digital transformation? These questions led participants to provide more concrete and focused answers to why digital transformation is relevant and needed for a major South African university's administrative systems. Whereas Tables 4.3 and 4.4 provided a view of the reasons for digital transformation, Table 4.5 summarises a more specific need in the current context of administrative systems at a major South African university.

Table 4.5 The need for digital transformation.

Theme	Summary of participant's comments during the discussion	Addressed in the study
Better communication, collaboration, and service delivery as a result of integration.	Participant 1 noted the following concerning the need for digital transformation: “People, systems, and processes function in silos at the moment.” Participant 1 further stated that the administrative systems that are digitally transformed would be integrated, and their output would be accessible via dashboards. Operations and communication will therefore be more seamless, allowing time to focus on improvement. Participant 9 also confirmed a need for digitally transformed systems that are integrated and, as a result, help improve communication. “A digitally transformed system would be Utopia as it will mean better communication. For instance, if something changes in the HR system, we are	Chapter 2, section 2.2

Theme	Summary of participant's comments during the discussion	Addressed in the study
	automatically informed." Participant 11 also confirmed that communication and collaboration will be better by stating: "Because if systems are not integrated, informed decisions cannot be taken." Participant 12 also indicated the positive effect of integrated systems from a customer's perspective: "We will have prompt service delivery and I think digital transformation can do that. Our systems are not integrated in all places and you can therefore give a person a correct answer the first time and make sure the transaction goes through correctly the first time." The quote as mentioned earlier also stresses the importance of support staff giving a decisive answer. Participant 13 emphasized this need by noting: "In my view, there would be a lot more collaboration between people if we're all working from one system and we understand that one system that we're working from."	
Accessibility	According to participant 2, digital transformation will assist systems in being more accommodating of different demographics. Through systems being accessible online, individuals will be able to interact and be part of the university even if they reside at a different physical location. Participant 4 also felt that services would be more accessible through digital transformation. According to participant 6, it would be advantageous for systems to be available everywhere, and one will be able to work from any location. Systems will be more	Chapter 2, section 2.5

Theme	Summary of participant's comments during the discussion	Addressed in the study
	digital and online and, therefore, also more accessible, according to participant 8.	
Efficiency and productivity	Participant 3 mentioned that digital transformation would allow the system to be agile to adapt to changing business rules quickly. Participant 3 indicated increased efficiency and productivity by saying: “Once configured, the system can govern itself and save personnel time.” Participant 4 also stressed that things would generally be easier, more efficient and effective and save time. Participant 10 said that digitally transformed systems would allow quicker turnarounds and that things would be faster and more effective.	Chapter 2, section 2.5
Management and reporting	Participant 7 indicated that the university would be able to make better decisions as, in this participant’s opinion, decisions are sometimes not based on facts or information. This participant went on to say that better decisions would be made, and planning would also improve. He also added that shortcomings would be identified and that the university would be able to be more proactive. This quote from participant 10 highlighted better management and reporting: “Digitally transformed systems will allow for analysing data and making better decisions and reporting.”	Chapter 2, section 2.5
Sustainability	The words of participant 12 encompass sustainability: “The economy and the land are under pressure. There is also a greater demand for NSFAS, high unemployment figures, etc. So, we know we can't only rely on state subsidies in the	Chapter 2, section 2.5

Theme	Summary of participant's comments during the discussion	Addressed in the study
	future. A significant portion of our students is NSFAS funded. We need to make technology work so we can distinguish ourselves in the marketplace and draw the students."	

Below is the interpretation of the needs as expressed by both system owners and business analysts as summarised in Table 4.5. These needs were expressed in a context where digitally transformed administrative systems are seen as part of the ultimate solution. The needs are:

i. **The need for better communication, collaboration and service delivery:** Feedback suggested that digitally transformed administrative systems that are integrated and can host business processes will support and improve communication, collaboration, and service delivery. The literature agrees that legacy IT systems that are not integrated do not support a value-based approach and make sharing and effective communication more difficult.
ii. **The need to be more efficient and productive in how things are done:** Participants felt that a lot of manual and timely report actions could be done by the administrative systems and save time and money. Research suggests that automation is only a way to free up critical human resources. The time that is saved can then be used to strategise on how digital transformation can be applied to add value to the customer.
iii. **The need for up-to-date information that can help with decision making:** Because systems and processes are not fully integrated, the true value of up-to-date reporting hampers decision making. Feedback suggests that digitally transformed administrative systems will allow decisions to be made on facts rather than perceptions. Such up to date information and reporting capabilities will further enable the university to act preventatively, anticipating future needs. The literature agrees that integrated up to date information creates a valuable platform for asking critical questions and exploring unrealised opportunities.

iv. **The need for sustainable solutions that speak to plausible futures:** Feedback suggests that the current financial environment of the country is not conducive to growth, and only relying on state funding is also not feasible. Here, digitally transformed administrative systems are seen as a key to better utilising resources and serving as a differentiator to attract and serve students. Again, research suggests that digital transformation will enable better throughputs and open up potential additional digital business streams.

4.3.3. Components of digital transformation

This section gives an overview of the components of digital transformation as seen by the respective role players in the context of major South African universities' administrative systems. Table 4.6 notes five areas that align with what literature suggests as being components of digital transformation.

Table 4.6 Components of digital transformation.

Components	Summary of participant's comments during the discussion	Addressed in the study
Technology	Participant 1 noted that digital transformation is about effectively using technology. “The technology is the digital part, but it also doesn't work alone.” Participant 5 noted that digital transformation is also about how components such as systems and processes that are transformed work together in a more streamlined manner. Participant 6 noted automation is an essential component of digitally transformed administrative systems. Lastly, more than one participant pointed out that digital transformation has more components than only systems. Participant 7 suggested the following components: “So that is it's about the people. It's about the processes, and it's also about the systems	Chapter 2, section 2.4

Components	Summary of participant's comments during the discussion	Addressed in the study
	as well." Participant 10 again summarised the components of digital transformation as being: "People, process, data, technology, governance, and I think the risk component behind it."	
Data and information	Participant 2 noted that you transform in the technology space, data space, processes, and organisation. Participant 7 indicated that, "You have to do forecasting, and you have to have certain information available to do proper strategic planning and make sure that the university is successful. So, I think it's more about the integration and that you can use this data for forecasting and planning for the university for the future." Data and information were also emphasized by participants 9 and 10 as being crucial components for digital transformation.	Chapter 2, section 2.4
Process	Participant 1 noted that the way things are done gets transformed, and therefore processes inevitably has to change. Participants 5 and 7 also stated that digital transformation speaks about how we transform systems and processes to work more streamlined. It is, therefore, two components that are inseparable from each other. Participant 9 further noted that processes and data give you a trail that you can follow. Participant 10 also confirmed that one or more components such as process, people, data, technology, governance, and risk always work together.	Chapter 2, section 2.4
Governance	Participant 1 noted that digital transformation enables improvement to comply with governance standards. "So, in our experience, we look across	Chapter 2, section 2.4

Components	Summary of participant's comments during the discussion	Addressed in the study
	those five areas of people, process, technology, governance and data." Participant 5 noted that instead of the user manually capturing data, the role would change to assume a role of interrogating components such as governance, data, and process. Other participants also agreed that governance is the glue that keeps people, processes, and technology together.	
Stakeholders	Participant 1 noted that transformation has to do with people and that the individuals are the people in the process that enable transformation." Participant 4 also mentioned that people are an essential part of digital transformation. "I mean, it's not just transforming the systems; you will be transforming people as well." Other participants noted that stakeholders such as users, customers, contractors, management, and students form an essential part of digital transformation. Participant 13 stated the very reason for digital transformation is to improve systems and delivery of services to customers.	Chapter 2, section 2.4

Below is the interpretation of the component of digital transformation as expressed and summarised in Table 4.6.

i. **Technology:** The feedback from system owners and business analysts suggests that technology is a part of digital transformation, but it is not the reason for digital transformation. It was noted that technology should serve as an enabler by making life easier. Even though literature agrees with this statement, it also suggests that the organisation should apply technology strategically to drive value and not only for automation and personal benefit.

ii. **Data and information:** Both system owners and business analysts agree that data and information enable effective management. Data and information further allow for effective decision making and being proactive. It was also noted that data becomes most valuable when systems are integrated and allow one to see a holistic picture. In addition, the literature suggests that data is critical to tracking the success of digital transformation efforts. Data should be used to gain insight into new business opportunities and track customer satisfaction.

iii. **Governance:** Both system owners and business analysts agree that systematic checks and controls will save time and enable compliance. Literature, however, suggests that digitally transformed systems should add value instead of just driving compliance. In this sense, compliance and being risk-averse could further serve as a barrier to realising opportunities.

iv. **Stakeholders:** Several stakeholders were highlighted by both system owners and business analysts. They include administrators, business managers, data capturers, students as the client, and outside contractors that use the system. The literature and feedback agree that people are an essential component of digital transformation. In this context, it is not only transformed systems but also people.

4.3.4. Components of administrative systems

This section gives an overview of the major components of an administrative system as seen by the respective role players in the context of a major South African universities' administrative systems. Table 4.7 notes five areas that align with what literature suggests as being components of administrative systems.

Table 4.7 Components of administrative systems.

Components	Summary of participant's comments during the discussion	Addressed in the study
Process	Participant 1 noted that administrative systems facilitate processes and operations. Participant 2 also stated this by saying, “We can’t rely on	Chapter 2, section 2.5

Components	Summary of participant's comments during the discussion	Addressed in the study
	technology alone because it can't do anything on its own. Technology requires a process to inform it what to do to be effective." Participant 3 also noted the relationship between data and processes hosted on administrative systems. "Administrative systems allow for tracking and tracing processes through its data." Participants 5 and 6 also noted that administrative systems must assist the process and are used to manage daily administrative tasks and processes. Participant 8 also stated that administrative systems host and enable the execution of standard operating procedures. According to participant 10, administrative systems also control and enforce processes. Participants 9 and 11 also noted that administrative systems make use of people, data, and technology and follow processes to make administrative tasks more manageable.	
Data	Participant 1 noted that administrative systems facilitate data used for statistics, reporting, and management decisions. Participant 2 noted that administrative systems are critical for capturing and hosting data and maintaining processes. According to participant 3, administrative systems also allow tracking and tracing processes through the data it collects. The data from these systems also help with management reporting. Participant 5 noted that administrative systems also provide management with information or feedback by capturing the input and output of a process. "Administrative systems	Chapter 2, section 2.5

Components	Summary of participant's comments during the discussion	Addressed in the study
	provide information so that managers can use that information to do proper planning and costing activities." Participant 12 also noted that administrative systems support operations and governance and provide data to aid further decisions. Participant 10 noted that administrative systems also host and keep institutional data safe.	
People	Participant 1 noted that administrative systems have users who use it and people who manage it. Participant 2 further explained that technology and people work hand in hand. "Technology helps provide speedy service while individuals assist in maintaining the technology." Participant 6 also noted the importance of people as part of an administrative system by stating: "Of course, you cannot exclude the human component, so your staff would be a vital part of those processes". Participants 7 and 8 also noted people as an essential component of administrative systems. According to them examples of such include both internal and external stakeholders.	Chapter 2, section 2.5
Governance	Participant 3 noted administrative systems help with enforcing business policies and processes. Participant 7 noted that administrative systems allow for the enforcement and execution of specific legislation. Participant 12 also noted that administrative systems support operations and governance and provide data to aid further decisions in this regard.	Chapter 2, section 2.5

Components	Summary of participant's comments during the discussion	Addressed in the study
Technology	Participant 7 noted that administrative systems consist of technology and other components. Participant 9 noted these components as people, data, technology, and processes.	Chapter 2, section 2.5

Below is the interpretation of the components of an administrative system as expressed and summarised in Table 4.7.

i. **Process:** The feedback from Table 4.7 suggests that administrative systems are primarily there to host processes and the data derived from those processes. Literature agrees that administrative and ERP systems host and facilitate cross-departmental and cross-functional collaboration through business processes. These processes and systems are also critical to track how the organisation competes in the market.
ii. **Data and information:** The feedback from Table 4.7 suggests that critical business data and information originates from administrative systems. This information originates from the processes hosted on these systems and are also critical for tracking operations. The literature agrees and notes that data is the basis on how administrative systems function and communicate.
iii. **People:** The feedback from Table 4.7 suggests that people are a core part of the process and, therefore, the system. The people interact with the system, manage, maintain, and set it up according to a specific need. Literature notes that users and people interact and exchange data at the core of an administrative system.
iv. **Governance:** Several stakeholders highlighted that the combination of processes and the ability to setup business rules allows for compliance to regulatory standards. Literature again agrees and suggests that the business rules that are set up in the system also govern the system and its outcomes.

From the answers provided in Tables 4.6 and 4.7, we can note that digital transformation components closely relate to those that play a role in administrative systems. Literature, however, notes that when considering the digital transformation of administrative systems, it is more about how those components are applied as a collective to achieve a goal or add value. It is also for this reason that it would make little sense to grow a technological capability without keeping track of how staff, data, governance, and processes align.

4.3.5. Considerations for enabling the digital transformation of higher education administrative systems

This section gives an overview of the considerations that will enable digital transformation of administrative systems at a major South African university. Current challenges also need to be identified and addressed to implement sustainable solutions. For this reason, participants were asked what they experience as things keeping the institution from digitally transforming its administrative systems. Table 4.8 shows the five key challenges experienced by both system owners and business analysts.

Table 4.8 Key challenges experienced.

Key challenge	Summary of participant's comments during the discussion	Addressed in the study
Resistance to change	Participant 1 noted the need for change management to overcome challenges: “For me, it speaks to introducing change. Change management would require informing and consulting with stakeholders.” Participant 5 also specifically noted change as being a challenge: “Some people are reluctant to accept change on different levels, and change management will be needed.” Participants 3, 6, 8 and 10 also noted resistance to change as a challenge to making progress in the field of digital	Chapter 2, section 2.3.1. iii

Key challenge	Summary of participant's comments during the discussion	Addressed in the study
	transformation: “I would say that often there would be a bit of resistance towards change”, “People really are opposed to change”, “People in positions of power are not always change-ready”, and “The majority are resistant to change. There may also be a minority group that would like to change. From my experience, older people are more resistant”.	
Culture	Participant 1 noted that institutional culture is also a real challenge when wanting to make progress in digital transformation. Participant 7 expressed the culture as being a real problem. “There's lots of resistance to change. People will identify all the things why we can't do it; they will not identify solutions.” Participant 10 noted that the biggest hurdle would be a culture of conservative thinking and not visionary thinking.	Chapter 2, section 2.3.1. iii
Skills and capabilities	Participant 7 noted that staff members must also be skilled in using systems. Participant 12 noted that skills and capabilities also need to be considered in executing on digital transformation. “I wonder if we have sufficient of the right skills and the people who understand what should happen and to drive that.” Participants 7, 8, and 9 further emphasized the need for particular skills and capabilities necessary to execute on digital transformation. “You want to change, but you don’t know how to change and don’t have the skills to implement change.” “We assume individuals are skilled”. “If you upskill people, they will see that it's not that bad.”	Chapter 2, section 2.3.1

Key challenge	Summary of participant's comments during the discussion	Addressed in the study
Capacity and resources	Participant 1 noted that it's challenging to be operational in an old way and be innovative simultaneously. Participant 5 stated: “I would say it's a combination between administrative red tape and people pushing or wanting to see certain things happen in certain orders, which cannot always happen due to the resources.” Participant 7 also emphasized capacity as a challenge in holding digital transformation back: “And then also capacity. Do we have the capacity to implement such a strategy? At this stage, all the departments are running on skeleton staff. They are still so involved or stuck with the day-to-day activities that they can’t tend to things that can make a difference.” Participants 12 and 13 also noted capacity as a problem by stating: “There are capacity problems in certain divisions” and “I think the resources are a problem because you need someone to manage the system at the end of the day.“	Chapter 2, section 2.3.1. iii
Time to change and implement	Participant 1 noted that the time it takes for change to happen is not necessarily the fastest and that governance is also holding the process back. Participant 5 explained further by stating: “The implementation time also depends on how fast the resources can assist in changing the system and making it easier and testable for a new person.” Participant 5 also noted that more than one component impacts the time it takes to implement digital transformation. “I would say it's a combination between administrative red tape and people pushing	Chapter 2, section 2.3.1

Key challenge	Summary of participant's comments during the discussion	Addressed in the study
	or wanting to see certain things happen in certain orders, which cannot always happen due to the resources.”	

Below is the interpretation of the key challenges that hamper the implementation of digital transformation of administrative systems at a major South African university.

i. **Resistance to change:** Business analysts and systems owners agree that the university has a culture of resisting change. Resistance to change and being stagnant in how things get done harms progress in digital transformation of administrative systems. Literature suggests that higher education institutions are not necessarily opposing change, but that change is complicated by structure and legacy systems and processes.
ii. **Culture:** System owners and business analysts suggest that the university culture is closely related to resisting change. The feedback further indicates that being risk-averse and conservative in thinking also holds the university from moving forward. Literature notes that culture is specific to an organisation. However, a culture with resistance to embracing new technologies' rapid development will negatively impact digital transformation.
iii. **Skills and capabilities:** Both system analysts and system owners agree that many staff want to change. In many of these cases, change does not always realise that the given staff do not always know how to change. There are also only a few people with skills to guide them on how to support and drive the digital transformation process. Literature notes that higher education institutions lack essential capabilities to implement digital transformation in most cases.
iv. **Capacity and resources:** Here system owners noted that departments are understaffed. Adding digital transformation to their portfolio will also burden managers who are already operationally involved. System owners, together with business analysts, further suggested that specific enabling departments

such as the IT department also require more staff to deliver on their needs quicker. The literature does not explicitly note capacity and resources to be the biggest problem in the digital transformation of administrative systems and higher education institutions.

v. **Time to change and implement:** Business analysts and system owners further noted that change is slow and that there might be numerous reasons for this. Reasons include:

   i. The amount of governance and red tape
   ii. Conservative thinking in positions of influence
   iii. The complexity and size of the university

   The literature agrees that there is a concern that significant opportunities might have been lost by the time digital transformation realises in higher education.

Next, participants were asked what they felt would make a digital transformation effort successful and sustainable. Table 4.9 shows the five key considerations proposed in the context of challenges experienced.

Table 4.9 Considerations for enablement.

Proposal	Summary of participant's comments during the discussion	Addressed in study
Understanding the scope and purpose	Participant 1 noted that adequate research needs to be done to understand the need of everyone. Participant 5 also agreed by stating, “This will help understand how value can be added.” Participant 1 further noted that digital transformation needs to be measured as part of the plan with set metrics.	Chapter 2, section 2.3, section 2.4

Proposal	Summary of participant's comments during the discussion	Addressed in study
Change management	Participant 4 noted that enabling digital transformation will require communication, active involvement, and selling the idea and its benefits. Participant 10 noted that people are uninformed about the positive results of changes. “If they don't buy-in, you get immediate resistance. They should feel part of the solution and take ownership; else, it will feel like a forced solution.” Participant 1 noted: “For me, it speaks to introducing change. Change management would require informing and consulting with stakeholders.” Participant 8 also agreed that change management would be required to help enable digital transformation. “Digital transformation must be accompanied by a change mechanism so that people can become acquainted with the benefit of the change. You need to work with those kinds of people and swing their perspectives.” Participant 5 also noted that change management will be required to convince those that are reluctant to accept change on different levels. Participant 9 also suggested that change management should address issues where people feel change is forced onto them. “If they understand it and see the results, they will be eager also to be able to do that.” So, if I don't tell the people what's going on, they won't know. Showing people the benefits of doing stuff in a new way and sitting down and listening to reasons why people resist change”,	Chapter 2, section 2.5
Training and guidance	Participant 8 noted that staff would require training and mentorship to implement and apply changes.	Chapter 2, section 2.3.1

Proposal	Summary of participant's comments during the discussion	Addressed in study
	Participant 11 also noted that people need to be trained, and therefore you will need trainers who are completely conversant in whatever system you are introducing. Participant 12 also noted that skills need to be applied very specifically. “So, there is a shift from captures and approver to needing more BA’s and data analysis skillsets.” Participant 9 suggested that digital transformation is a journey that will require a longer term perspective to develop skills. “So, we need a digital partner who can help implement changes since people do not always have the skills and knowledge.”	

Below is the interpretation of considerations to enable digital transformation of administrative systems at a major South African university.

i. **Understanding the scope and purpose:** The feedback from Table 4.9 suggests that adequate research has to be done to identify the actual need. This will allow the opportunity to add real value and also measure the impact of digital transformation of administrative systems. The scope and purpose will again inform measurables, which will inform time to the intended outcome.
ii. **Change management:** The feedback from Table 4.9 suggests that many people are not aware of the benefits such change would hold. Without adequate change management, ownership and communication, you get resistance. The literature suggests that change applies to the greater environment and most possibly will include a change in skills, services, objectives, and outcomes to satisfy a need and add value. Change, however, happens incrementally and should also be paced through monitoring and managing it.
iii. **Training and guidance:** Both system owners and business analysts agree that although staff see the need for change, they often lack the skills and capabilities to change and implement change. The literature agrees that universities

frequently lack in the ability to navigate and cope with digitally transforming themselves.

To ensure sustainability in the digital transformation of a major South African university's administrative systems, the institution needs, to:

i. Ensure people, processes, technology, governance, and data capabilities are simultaneously developed and stay in sync throughout the process.
ii. Make sure visible changes and benefits are delivered frequently and in increments.

4.4. Conclusion

In conclusion, digital transformation offers many advantages to an organisation, its employees, and its customers. The reason for digital transformation would thus make sense in most environments. However, the concept only becomes real when asked how things will look different if implemented in your environment. This question compels role players to consider if the reason for digital transformation relates to addressing a real need.

In the case of a major South African university, the digital transformation of its administrative systems poses challenges and opportunities. Challenges in the sense that digital transformation first needs to be clearly defined and understood. There also needs to be a clear definition of what role administrative systems play in the process and why they are of critical importance. One participant captured this well by saying: "We mustn't look at our ability to do teams meetings and virtual exercises such as virtual classes through blackboard, and confuse those abilities with digital transformation. Digital transformation impacts all spheres of operations, from our suppliers to our students and administrative systems. Lastly, if we are not doing it for our students, why are we doing it?"

When it comes to administrative systems, the users of those systems know the challenges and opportunities the best. For this reason, it is critical to get their buy-in and consult with them. Buy-in could also be very hard to achieve without adding real

value to both the users and clients. Here, the results of digital transformation can serve as a lever to convince those that oppose change. A participant noted that resistance falls away when digitally transformed administrative systems enable users instead of adding work: “I think resistance to change would not be the biggest problem. If you asked me this question five years ago, it was hard then to convince people to use the electronic system. Once they saw how easy it was and how it helped them, they changed their opinion.”

Furthermore, digital transformation is a dedicated effort that requires careful planning and measuring its execution. In this sense, roles and responsibilities need to be clearly defined. Participants felt that it is the role of management to provide the strategic intent and business operations to execute. However, execution is a challenge if there are no dedicated resources. Resistance to change and conservative thinking adds to this challenge.

When it comes to opportunities, administrative systems play a significant role. These systems collect data and host processes as well as enforce business rules. By integrating processes and systems and using the data generated, staff and management will be able to make informed decisions and plan better. Students will get the right answer the first time and will experience a much better service in a quicker time. As part of digitally transforming administrative systems and the environment surrounding these systems, opportunities will arise for new business streams, which could ultimately improve sustainability.

Chapter 5: Conclusion and recommendations

5.1. Introduction

This chapter provides the conclusion and recommendations for this study and suggestions for further research. This chapter also reflects and responds to the primary and secondary objectives as set out in Chapter 1.

5.2. Conclusions

The objective of this research study was to investigate digital transformation of the administrative systems at a major South African university. To achieve this, the following secondary research objective was set:

5.2.1. Secondary Objective 1

To identify common topics and trends for digital transformation of administrative systems across industries and sectors

This objective was addressed through a literature study that was done in Chapter 2. This chapter presented literature on reasons for digital transformation and trends in digital transformation (see Section 2.3) and how it relates to industry and higher education (see Section 2.3.1).

Here literature stated that universities and traditional face to face higher education institutions no longer enjoy the dominance they once had in the market. New entrants into this market have the advantage of not having to deal with legacy systems and processes. Digital technology, however, becomes secondary when considering the trends and drivers for the digital transformation of administrative systems. Across industries, digital transformation is driven by customers that are now much more familiar with how things can and should be rather than how they are. Digital transformation, in this sense, is regarded as an enabler to people and processes that can enhance quality, productivity, and transparency in the business. Digital

transformation is also meant to support the organisation's goals and, through doing so, help them to realise new opportunities.

5.2.2. Secondary Objective 2

To investigate and identify critical components forming part of digital transformation

This objective was addressed in both the literature study (Chapter 2) and the field study (Chapter 4). Section 2.4 of Chapter 2 addressed the components of digital transformation as defined in the literature. Section 2.5 further addressed how these components relate to an administrative system's elements according to the research done by (Lauby *et al*. 2020) individually (see section 2.5). Section 4.3.3 of Chapter 4 addressed the participant's views and what they see as the components of digital transformation and its relation to the literature in Chapter 2.

From the start, the literature clearly stated that digital transformation and administrative systems are not only about technology. Digital transformation is about the culture change of an organisation through the smart integration of digital technology into its processes and competencies. Similarly, administrative systems consist of a solution whereby people, processes, technology, governance, and information must work together to achieve an objective. Participants also agreed that digital transformation should make the world easier and enable solving the problems of both employees and customers.

5.2.3. Secondary Objective 3

To investigate and identify factors that play a role in digital transformation of university administrative systems

This objective was addressed in both the literature study (Chapter 2) and the field study (Chapter 4). To understand the context of this objective, Section 2.3.1 first addressed the need for digital transformation of higher education administrative solutions. After that, section 2.5 addressed further factors and considerations as defined by the literature. Section 4.3.2 of the field study accordingly addressed the

need for digital transformation of higher education administrative solutions from the participants' perspective. After that, Section 4.3.5 addressed factors and considerations that play a role in digital transformation of university administrative systems.

Higher education institutions are complex organisations that were formed over many years and are therefore also slow to adapt and adopt. Both literature and the participants agreed that lacking capabilities to improve the way of working while adding new tools, processes, and capabilities is a challenge. Limited staff resources, the slow speed of change, and a level of resistance to change also add to this challenge. Because of these challenges, factors such as scaling change, change management, and a structured implementation approach to digitally transforming administrative systems are needed.

5.2.4. Secondary Objective 4

To investigate and identify how themes in the literature relate to the staff experience and sentiment relating to digital transformation at a major South African university

To address this objective a field study was done (Chapter 4). The literature components addressed in Chapter 2 were tested in the field study against two staff groupings, namely system owners and business analysts. These groupings were necessary to ensure a true reflection of a shared experience in accordance with the phenomenological study approach. Differences in experience, advice and sentiment were noted in each sub-section of Section 4.3. Each sub-section of Section 4.3 further referenced the topics discussed by noting where they were addressed in the literature study (Chapter 2).

System owners highlighted the need for readily available information to enable management to make informed decisions. System analysts and system owners believe that better-integrated systems and a well thought through process will help to improve communication and service delivery. Participants in this sense also agree that

automation of processes will save human resources that can then be applied to tend to more critical issues.

5.2.5. Secondary Objective 5

To make recommendations to a major South African university on considerations for enabling digital transformation of its administrative systems

This objective was addressed in Section 5.3 (next section) as well as in the field study (Chapter 4). Section 4.3 of the field study outlined the considerations for enabling digital transformation of higher education administrative systems. Firstly, through noting key challenges (see Section 4.3.5) and secondly, through considerations for enablement (see Section 4.3.5). Section 2.5 of the literature study further also addresses considerations for enabling digital transformation of higher education administrative systems as seen through the perspective of the broader industry.

5.3. Recommendations

5.3.1. Align strategic efforts to make a difference

Digital transformation efforts are less fruitful and more resource-intensive if each department wants to run projects independently. Like a human body with different components and functions, the institution also has capabilities and skills spread over multiple departments. These resources must work together as task groups to ensure optimal value and that abilities get developed cross-departmentally. A team effort in this sense will also be more sustainable in that given skills and resources will not be contained or created in one department or silo. Such a team effort also requires agility in skills and resources but at the same time needs to measure their outputs and progress in a structured manner to reach pre-defined and agreed on KPIs.

5.3.2. Digital transformation requires active communication, change management, consultation and strong leadership

Many staff members and stakeholders are uninformed of the potential benefits, reasons, and components of digital transformation and the role of administrative systems therein. Different audiences and stakeholders also differ in how they need to be approached. Therefore, the approach to digitally transform administrative systems at a major South African university needs to be one of listening and coming up with mindful solutions rather than forced solutions. Strong leadership is required to pursue this change, but at the same time, it is the staff members on an operational level that knows best as to what can and what cannot work.

5.3.3. Enabling digital transformation requires assessing current skills, capabilities as well as future needs

Participants agreed that although many role players and stakeholders want to make the change, many lack the skills and capabilities to do so. The lack of dedicated and sufficient staff resources makes it even harder to transform administrative systems while working full time in operations. In this sense, the project team need to consider what new skills staff will need to learn and enable them to do so. Positions that become redundant should also be carefully assessed and filled with new skills that understand the combination of data, processes, governance, and technology. Stakeholders and departments should also not be left to go their own way. They need to be guided by an adequately skilled professional who can serve as a business partner, take their hands, and make them strong.

Section 4.3.3 and 4.3.4 define the components of digital transformation and administrative systems as elements that closely align. There are also disciplines such as enterprise architecture (TOGAF 2011) and frameworks in the form of ADM (see s\Section 2.5) specifically designed to address the integration of these components to form a solution. However, combining business architecture, information and system architecture, and technology architecture to develop a solution requires adequate gap analysis and migration planning. First, the gap between current and future intended capabilities must be assessed. Secondly, a migration plan needs to be developed and

implemented to enable migration from a current to a future state. During all these phases, the transformation effort needs to be governed to ensure that the people, process, technology, information, and governance components align and complement each other.

5.3.4. The reason for digitally transforming administrative systems should be to assist the university's strategic goal

Digital transformation holds many benefits to the organisation, customers, and employees. These benefits include improved productivity, better controls and compliance, and adequate data to make informed and better decisions. The ultimate goal of the organisation, however, comes first. Therefore, a major South African university must not ask what digitally transformed administrative systems can do for us but how we can apply digital transformation to help us achieve our strategic goals. An example of this would be to automate certain functions to open up the capacity to spend more time on strategic matters, such as digital transformation.

For this reason, digital investments need to be assessed holistically both in terms of current and future value. The following questions, as well as feedback, need to be considered:

i. How will the investment under consideration help build the digital transformation capabilities the university envisages for the future? In Sections 4.3.2 and 4.3.5, systems owners and business analysts highlighted the components needed to enable a digital transformation capability. These include:
   - A digital capability where integrated systems promote information and knowledge sharing and enable communication.
   - A process and governance capability where processes are streamlined and executed consistently to enable effective monitoring and management.
   - A capability whereby relevant and quality information enables informed decision-making processes.

- A capability whereby existing human resources is applied, not to perform manual tasks but to govern and optimise the value of services offered to clients.

ii. How will the investment under consideration impact services and the accessibility thereof? In Section 4.3.2, both business system owners and business analysts agreed that a younger community prefers services accessible online at a time convenient to them. However, literature also suggested that where services lend themselves to face-to-face and online delivery modes, there should be no discrimination in quality. This question and considerations from further discussions will address the potential negative divide between process and customer satisfaction.

iii. Does the investment under consideration align and enable the university's strategic goals? Both literature and feedback from the study participants confirmed that digital transformation is an enabler to adding value to the organisation, its staff and clients. In the case where digital became the driver, it lacked sustainability or significance in adding value.

iv. Will the investment value of the digital transformation effort be contained to a part of the community or the whole community? Digital transformation efforts intended to benefit only a limited number of individuals may instead be digitisation or digitalisation.

v. What is the minimum time lapse from initiating a digital transformation effort until the investment is first required to show expected results? Section 4.3.5 noted that many digital transformation efforts in the administrative system domain are negatively impacted by resistance to change, culture, skills, capabilities, and capacity. With several potential factors that could negatively affect project deliverables, there is a need to continuously monitor and assess whether changes are required to be made.

vi. Has clear ownership been established in terms of who are the Responsible, Accountable, Consulted and Informed (RACI) parties in executing and maintaining the digital transformation effort? Section 4.3.5 notes that decisions and guidance toward reaching digital transformation goals must be clear and intentional. Given that people form a critical part of digitally transformed administrative solutions, this factor could dictate if a solution will be successful or not.

5.3.5. The university cannot be regarded as digitally transformed if all components of digital transformation and the administrative systems were not considered

As noted by one participant: “We cannot regard ourselves digitally transformed because we are doing things in a more digital manner (P62, Participant 11).” Digital transformation consists first and foremost of a strategic intent. Once the goal is clear, then only can components be orchestrated strategically and progressively to help achieve that goal. These comprise of but are not limited to stakeholders, customers, reporting outcomes, information and data, technology integration, and regulatory requirements.

5.4. Limitations of study

The study’s limitations include the fact that the entire user community, including students and external stakeholders such as contractors, could not be included due to cost and time limitations. The study was further constrained to a major South African university, and therefore the outcomes may not be the opinion of the broader South African higher education landscape. However, these limitations open up further opportunities for research and allow for arguments of parties not directly implicated in the administrative systems landscape.

5.5. Conclusion

This research study aimed to investigate digital transformation of the administrative systems at a major South African university. The major findings of this study were that digital transformation of administrative systems only became sensible in its execution when planned carefully, measured endlessly, and applied intentionally. Even though digital technology forms part of digital transformation, it should be seen as an enabler rather than a driver. Digital transformation of administrative systems is less about the individual components that make up a solution and more about how these components can be applied to change individuals' lives and assist the organisation in reaching a specific predefined goal. However, none of this is possible without proper change management and a strong sense of wanting to make a positive change.

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7. Appendix A – Interview Guide

7.1. Section A: Demographics

This section seeks to gather some background information about you. The information is essential as it will contribute to the context of the results of the interview

[Applicable to both System Owners and Business Analysts]

Question	Answer
How long have you been employed at this institution?	
How long have you been occupying the role of System Owner [In Case of System Owner] Business Analyst [In Case of System Owner]?	

7.2. Section B: Research Interview Guide

[Applicable to both System Owners and Business Analysts]

Question Number	Area of Interest	Question	Probe
1	Digital Transformation To determine the participants understanding of digital transformation and the aspects thereof.	In your mind, what is the definition of digital transformation?	Do you think there might be more aspects or components to digital transformation based on the definition you gave?
2	Digital Transformation To determine the participants understanding of why digital transformation is needed.	Based on your definition of digital transformation, would you advise digital transformation as a strategy?	Why or why not will you advise digital transformation as a strategy?
3	Digital transformation To determine the importance of digital transformation from the view of the participant	Would you advise a university to transform itself digitally?	Why do you think it is essential or not essential for a university to transform digitally?

Question Number	Area of Interest	Question	Probe
4	Digital transformation To determine the participant's view on what would make a digital transformation effort sustainable.	What in your mind would make a digital transformation effort successful and sustainable?	Do you believe the measures you described apply to higher education institutions only or in general to all types of organisations and businesses?
5	Administrative System To determine the participants understanding of the purpose of an administrative system.	What do you feel is the importance and purpose of an administrative system?	Would you regard your answer as the definition of an administrative system?
6	Administrative System To determine the participants understanding of the components of an administrative system	Do you believe there is more than one component that makes up an administrative system?	To your mind, would it be accurate to suggest that an administrative system comprises out of more components than technology components only?
7	Digital transformation of administrative systems in the context of a university To determine the participant's view of the importance of digital transformation and the advantages that digital transformation will hold for the major South African university.	How do you think this university would be different if its administrative system was "digitally transformed"?	Do you feel what you described would be regarded as a positive or negative outcome?

Question Number	Area of Interest	Question	Probe
8	Digital transformation of administrative systems in the context of a university To determine the participant's view of who the ideal role players and drivers of digital transformation of administrative systems at a South African university should be.	Who in the university do you think should form part of a digital transformation effort of its administrative systems?	Do you think the mentioned parties in the university context, who do you believe should be responsible for driving a digital transformation effort?
9	Digital transformation of administrative systems in the context of a university To determine the objective and value proposition of digital transformation of administrative systems at the major South African university.	Why do you think would this university embrace digital transformation?	Do you think that it is the same for all universities?
10	Digital transformation of administrative systems in the context of a university To determine the challenges and factors that play a role in digitally transforming	What is holding this university back from digital transformation?	What to your mind would help digital transformation at this university?

Question Number	Area of Interest	Question	Probe
	administrative systems at the major South African university		
11	Conclusion	Do you feel there is something that you wanted to say that was specifically asked during the interview?	Please elaborate [Where applicable]

8. Appendix B – Ethical Clearance

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA
UFS UV

GENERAL/HUMAN RESEARCH ETHICS COMMITTEE (GHREC)

03-Dec-2021

Dear Mr Jacobus Kotzé

Application Approved

Research Project Title:
Digital transformation of the administrative systems at a major South African university

Ethical Clearance number:
UFS-HSD2021/1834/21

We are pleased to inform you that your application for ethical clearance has been approved. Your ethical clearance is valid for twelve (12) months from the date of issue. We request that any changes that may take place during the course of your study/research project be submitted to the ethics office to ensure ethical transparency. furthermore, you are requested to submit the final report of your study/research project to the ethics office. Should you require more time to complete this research, please apply for an extension. Thank you for submitting your proposal for ethical clearance; we wish you the best of luck and success with your research.

Yours sincerely

Dr Adri Du Plessis
Chairperson: General/Human Research Ethics Committee

Dr Adri du Plessis
Digitally signed by Dr Adri du Plessis
Date: 2021.12.03 15:12:36 +02'00'

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9. Appendix C – Language Editing Certificate

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28 June 2022

To whom it may concern,

Herewith I, Marietjie Schutte-Smith (ID 8304050227089) declare that I have proofread and edited the following thesis by Mr Jacobus Kotzé (Student number 2019174115): 'Digital transformation of the administrative systems at a major South African university.' This includes the evaluation of the grammar, content relevance, indexing, and referencing. All changes were indicated by track changes and comments. Mr Kotzé confirmed by email that he will address these changes and suggestions.

M Schutte-Smith
PhD (Chemistry, UFS)