

The barriers to digital transformation in the Wits School of Oral Sciences

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ABSTRACT

Owing to changes in technology industries are going through digital transformation but in some instances, the digital transformation endeavours fail. This study focused on Wits School of Oral Health Sciences (WSOHS) with a view to understanding the barriers to digital transformation and proposing strategies for circumventing the barriers. The study used a combination of stakeholder theory and the status quo bias theory as the lens. Using quantitative research methods, stratified random sampling was used to select participants who included employees which added up to 245 and 218 student population. A total of 168 participants eventually took part in the research by completing a questionnaire. The responses were then analysed using SPSS, Various statistics which includes frequencies, measures of central tendency and dispersion as well as unadjusted ordinal logistic regression were calculated, and the study found out that lack of connection to strategy and execution and lack of collaboration across departments were the two major reasons why digital transformation was failing. The possible strategies that can be employed to make digital transformation a success include aligning on the why of digital transformation as well as preparing and dealing with culture change. Results of the unadjusted ordinal logistic regression analysis on factors associated with enabling digital transformation were that students, impact of digital transformation, extent of barriers, and intentions impact were significantly associated with digital transformation at the 5% significance level. The conclusion drawn from the study is that there is a multiplicity of factors that impeded digital transformation and that multipronged strategies need to be used to make sure that digital transformation initiatives succeed.

KEYWORDS

Digital transformation; stakeholders; technology; resistance to change; strategy.

DECLARATION

I, **DONALD DANDAWA**, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Name: **DONALD DANDAWA**

Signature:



Signed at **JOHANNESBURG**

On the **30**, day of **JUNE**, 20 **23**

DEDICATION

I dedicate this work to my wife and children. Special dedication also goes to participants which included students and staff of School of Oral Health Sciences who provided the data that was used for research.

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LIST OF ACRONYMS

AI: Artificial Intelligence

DT: Digital Transformation

ICT: Information Communication Technology

WOHC: Wits Oral Health Centre

WSOHS: Wits School of Oral Health Sciences

CHAPTER 1. INTRODUCTION

1.1 Statement of purpose

This research is a quantitative study which uses stakeholder theory as the theoretical framework as it applies to Witwatersrand School of Oral Health Sciences (WSOHS) as it undergoes digital transformation. The study intended to understand why the WSOHS is not digitalising at the expected pace and what can be done to circumvent these barriers to digital transformation at WSOHS.

1.2 Background of the study

The University of the Witwatersrand School of Oral Health Sciences (WSOHS) is one of the nine schools in the faculty of Health Science. The school was initially formed as the Faculty of Dentistry in 1929 (Evans, 2012) and has evolved to its present-day format as one of the schools under the ambit of the Faculty of Health Sciences. Besides the academic function, WSOHS also runs the Wits Oral Health Centre (WOHC). The WSOHS has 245 staff members, and 218 students enrolled in various oral health programmes. WSOHS currently employs one Information Technology Specialist responsible for the school's smooth operation and the implementation of any new information technology innovations that the school might adopt. The Information Technology Specialist is supported by Wits ICT team which is responsible for all university ICT-related issues. The Information Technologist Specialist is the only ICT specialist who is stationed at WSOHS, with the rest of the ICT support coming from the Wits University IT department, given that WSOHS is a part of the university. The focus of the study was on both the WOHC and WSOHS (Wits School of Oral Health Sciences Newsletter, 2021). Rundqvist and Schinkel (2020) state that hospitals and schools globally have prioritised becoming fully digital, but WSOHS is still lagging in this regard. From the researcher's observations, the school has thus far not managed to be a thought leader in the application of information and communication technologies (ICTs) in the field of oral health sciences. Given WSOHS' stature, it must

be at the forefront of the digital revolution. While there have been some positive developments in implementing innovative ICTs, as is the case with the implementation of X-ray and Imaging systems, the WSOHS has faced several challenges in its endeavour to meet its digital transformation imperatives. One of the goals of the WSOHS is to digitise all the operations of the school fully.

According to Glaser and Shaw (2022), globally there has been progress that has been reported in terms of technology and the digitisation of patient records and the adoption of ICTs particularly has changed how many aspects of hospitals function. The major changes have been in care delivery, financing, and operations. While the health fraternity has embraced many technologies including artificial intelligence, the medical field is still lagging behind other industries (Glaser & Shaw, 2022). It is the assertion of Gleiss and Lewandowski (2022) that all over the world health institutions are looking for efficient opportunities to discover, apply and integrate ICTs into their existing IT landscapes. Furthermore, although a plethora of digital innovations is available on the market, many barriers have worked against the successful implementation and adoption of the innovations (Gleiss & Lewandowski, 2022). Against this background, this study assesses typical digital innovation barriers in hospitals with a special focus on WSOHS.

1.3 Research problem

The changing technology is the driving force behind digital transformation initiatives and digital transformation is often premised on the need to take advantage of changes (Rundqvist & Schinkel, 2020). WSOHS serves two functions in that it is an institution of higher education as well as a hospital and because of that it has a unique value chain through which it not only brings value to its students, patients, and other stakeholders.

Technology has been developing at a very fast pace and sectors such as the retail and transport industries have been quick to embrace the ICTs and use them to serve customers better and to gain first mover and, in some instances, competitive

advantage. The healthcare sector has not been spared of these developments and the related technologies have been evolving quickly. Healthcare technology is developing rapidly, and the ongoing digital innovations that are among the factors are changing the healthcare landscape (Coile, 2000; Iliffe & Manthorpe, 2020). These rapid technological advancements make it imperative for health institutions to embrace these technologies and transform and change their operations (Walsh & Rumsfeld, 2017). To digitally transform, the health and higher education sectors must put in processes and mechanisms to acquire and implement the technologies to ensure their survival and progress in a changing environment. Furthermore, it is imperative to put in place mechanisms to deal with the institutional, legislative, and systemic challenges that might stand in the way of the implementation of these technologies. There might also be a need to train and sometimes hire human resources to implement and use the ICTs which will result in the digital transformation of the systems and processes that the institution will be using (Walsh & Rumsfeld, 2017).

WSOHS has been in existence for more than 90 years and it is a well-established and recognised institution. Despite this, WSOHS has not yet fully embraced the technology of digital innovation, with the only notable progress being the implementation of imaging and X-ray technologies. Technology is often lauded for streamlining processes and systems as well as making information available. If an institution does not adopt ICTs, it is likely to be not efficient and effective in the discharge of its mandate. WSOHS is lagging in its technology adoption and implementation and is being left behind by other institutions. It is therefore necessary to understand the determinants (barriers, enablers) of digital transformation in the context of a healthcare institution.

The study aimed to look at the nature of the barriers to digital transformation at the Witwatersrand School of Oral Health Sciences (WSOHS). The study was intended to understand why the WSOHS is not digitalising at the expected pace and what can be done to circumvent these barriers to digital transformation at WSOHS. The study aims to determine the nature of resistance to digital transformation in healthcare institutions.

1.4 Research objectives

The main research objective was:

- To establish the determinants of digital transformation in the context of a healthcare institution.

The secondary research objectives are:

- To identify the barriers to digital transformation at WSOHS.
- To establish the extent to which the barriers are impacting digital transformation at WSOHS.
- To suggest solutions to circumvent these barriers to digital transformation at WSOHS.

1.5 Rationale

Authors such as Malenkov et al. (2020), DataDriven (2020), and Deloitte (2017) have reported on digital transformation in economic sectors that include retailing. They suggest that companies at the forefront of adopting and utilising ICTs like Amazon, Alibaba and Takealot are better positioned to serve better customers. Even though the healthcare sector has embraced ICTs there is consensus that it is lagging behind the other sectors. Mureyi (2022) suggests that the healthcare sector has tried to digitally transform without changing the underlying human and institutional impediments. This leads to the uptake failure of the initiatives as there are too many barriers to navigate. The research, therefore, seeks to find ways to navigate the barriers for health institutions to be digitally transformed.

In an analysis of the research published on digital transformation, Kraus et al. (2021) found out that the research fell into five clusters namely: those that emphasised patient approaches, operational efficiencies of healthcare institutions, organisational factors and managerial implications, impact on the practices of the workforce and the socio-economic effects. This research aims to add to the discourse on digital transformation

in the healthcare sector by assessing the barriers to digital transformation at the WSOHS. The study will benefit the management of WSOHS and the management of other health institutions in Africa in strategizing to deal with the digital transformation barriers in the health sector. The study will also contribute to the field of digital business by applying digital business principles, processes, and systems to the healthcare sector. This can result in increased efficiencies for healthcare institutions.

1.6 Delimitations of the study

The study focussed on only WSOHS and WOHC which focuses on oral healthcare issues. WSOHS is part of the University of the Witwatersrand and is located at Charlotte Maxeke Hospital though it is not part of the hospital. The oral health centre has a total staff complement of 278 which consists of academic joint staff, support staff and Gauteng health staff. WSOHS has 218 students who are enrolled for the various undergraduate and postgraduate oral health courses that the school offers. The school also has different stakeholders which include the Witwatersrand, the Department of Health, and patients, among others.

The study was guided by the stakeholder theory. At the heart of the stakeholder theory is the notion that if a business or project is to succeed it should create value for all the stakeholders. As a manager in an organisation, it is not prudent to look at the various interests that the stakeholders have in your organisation in isolation (Mainardes et al., 2012). The interests must be looked at together and given the same prominence to finding areas where the goals of the various stakeholders are aligned (Goel & Ramanathan, 2014). The study will therefore identify all the stakeholders and look at how the needs and perceptions of those stakeholders are either enablers or barriers to digital transformation. The study will also focus on what can be done to make the stakeholders more amenable to digital transformation.

1.7 Definition of terms

Digital transformation

Schallmo et al. (2020) define digital transformation as a process that involves using and adopting digital technologies to either come up with new or to modify existing already obtaining business processes, culture, and customer experiences as the market and business requirements change. Digital transformation entails the reimagination of businesses in the digital era and from a healthcare perspective, digital transformation is the reimagining of all the facets of healthcare from administration to diagnosis and healthcare provision (Schallmo et al., 2020). The Enterprises Project (n.d) defines digital transformation as a process that entails integrating digital technology into all facets of a business. The process fundamentally involves changing how the business operates, changing the culture and ways of delivering value to customers. Vial (2019) defines digital transformation as *“a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies”*.

The common thread in all the definitions is that a company has to embrace IT across all departments and that the culture has to change. The rationale for digital transformation is always delivering value. The definition of digital transformation that is used in this study is the one given by Schallmo et al. (2020).

Legacy systems

These legacy systems include both hardware and software systems that have become outdated but are still being used, and they function according to the design parameters but do not allow for growth (Srinivas et al., 2016). Kulkarni (2019) defines a legacy system as an old but still in-use computing software and/or hardware that is more than ten years old. The system will still be functional and can still accomplish the tasks for which it was installed but it does not give room for expansion. The definitions are very similar, and both will be adopted for this study.

Stakeholders

These are groups or persons with direct or indirect interests or who have certain rights to or own a project and they can be impacted by or impact project positively or

negatively and they also contribute to the success or failure of a project (McGrath & Whitty, 2017). Benn et al. (2016) provide a simple but concise definition of stakeholders when they say that a stakeholder is a person or group of persons to whom the organisation has a responsibility. Erasmus et al. (2016) define stakeholders as individuals or groups who have an interest or some aspect of rights or ownership in the project, can contribute to the success of the project in the form of knowledge or support, or can impact or be impacted by the project. For purposes of the study, the definition by Erasmus et al. (2016) is used since it more encompassing.

1.8 Assumptions

The research results are predicated on the truthfulness of the information the research participants will give. Since the participants will either be employed by WSOHS or studying at the institution their answers might be tainted by bias emanating from the need to not be seen as negative or by the fact that they are too close to the research problem to be objective.

The other assumption is that all the stakeholders have the same goal, which is to see the institution digitally transform. Due to the possibility of differences in the goals of the stakeholders, there is a likelihood that some respondents will give tactful answers which may result in wrong conclusions being reached.

1.9 Chapter Outline

The research is delineated into five chapters which entail the following:

Chapter 1

The first chapter focused on delineating the research by outlining the background of the research before focusing on the research problems as well as the research questions. The rationale of the study was spelt out before the boundaries of the research were delineated. Lastly, the first chapter looked at the assumptions that guide the research.

Chapter 2

The second chapter focused on reviewing the literature that has been written about digital transformation and the barriers thereof. The literature review has been organised according to the research questions. The first section deals with the identification of the barriers to digital transformation before shifting focus to a discussion on the extent to which the barriers have worked against digital transformation. The third part deals with the mechanisms that can be put in place to deal with the barriers. Lastly, the theoretical and conceptual frameworks are outlined.

Chapter 3

The third chapter dealt with the research methodology that was used for this study. The study is quantitative, and focus is placed on the research design, the research methodology, data collection and the analysis thereof. Lastly, the third chapter deals with the issues around quality of the research with a focus on ethics and issues around generalisability.

Chapter 4

Chapter 4 presents the results of the study. The chapter focuses on presenting the quantitative results. Various measures of central location and dispersion are presented as well as various statistics that are linked to the research questions.

Chapter 5

Chapter 5 discusses the results of the study. The results are discussed and then compared to literature and other similar and contrasting studies from the health sector and other industries in general.

Chapter 6

Chapter 6 sums up the whole research by stating the findings and the conclusions from the research. The chapter also deals with the practical and academic recommendations that arise from the study.

1.10 Conclusion

The chapter situated the study by looking at the research problem as well as the rationale for the research. The research questions and research objectives were stated. The research methodology was briefly outlined before the main terms were defined. The chapter closed by highlighting the research format. The next chapter (Chapter 2) discusses some of the literature that has been written on digital transformations before discussing the theoretical framework of the study.

CHAPTER 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

This section interrogates what has been written about digital transformation. The chapter starts by highlighting the main concepts that guide the research. The focus then shifts to a discussion of the barriers to digital transformation in general before focusing on the digital transformation of the healthcare sector. The barriers to digital transformation are then discussed before discussing the strategies that can be used to overcome the barriers to digital transformation in the healthcare sector. The analytical framework which is broken down into theoretical framework and conceptual framework is then outlined.

2.2 Digital transformation – an overview

Vial (2019) opines that digital transformation at its simplest incorporates the changes that are happening in day to day lives of people as technologies emerge and are adopted by societies. At the level of the organisation digital transformation is about how businesses can embrace and innovate around these technologies with a view to bettering operational performance while at the same time delivering value to customers. The same sentiments are echoed by Nissar (2022) who posits that digital transformation has become an imperative for all firms considering Industry 4.0. It has become necessary for firms to integrate and exploit digital technologies since all business are impacted by digital technologies. The need to digitally transform is spurred by growth, the need to satisfy customers, increased efficiency in operations, competitive advantage, and increased business agility.

Gertzen, der Lingen and Steyn (2022) are of the opinion that digital transformation (DT) entails radical changes in the way that business is done by leveraging advanced digital technologies. These new digital technologies when leveraged can result in

adoption of new business models, improved operational efficiencies, and enhancement of customer experiences.

Solnet (2016) state that there are 4 Ps of digital transformation in the same way that there are 4 Ps of marketing. The 4 Ps of digital transformation are people, process, platform, and product. People are always at the centre of every digital transformation initiative, and this is achieved by developing a culture of digital innovation and putting in place efficacious design and delivery processes. The second P is process, and it can be argued that businesses need to review operational processes as a first step towards becoming a digital business. When business processes are simplified then it becomes possible to optimise the customer journey and to deliver products and solutions more quickly. Thus, with DT it becomes possible for organisations to automate, simplify and streamline their processes. When the above obtains then better customer experiences are achieved via the mapping and simplification of complex processes. Platform is the third P, and this entails having modern platform tools. This can mean investing in cloud technologies that provide the flexibility and scalability. Companies to have an effective application programming interface (API) strategy and framework that makes it possible for the business to leverage the reach of partners, customers, suppliers' own digital ecosystems and other stakeholders (Solnet, 2016).

Mapingire et al., (2022) say that for DT to succeed a business should have a deliberate strategy. A DT strategy is different from an information technology strategy in the sense that a DT strategy which focuses on the transformation of products, processes, and organisational aspects due to new technologies". In that regard a DT strategy is used to signpost the way towards digital transformation and guides managers through the transformation process resulting from the integration and use of digital technologies. When coming up with a DT strategy the focus is on being holistic and making sure that the strategy spans the entire organisation and that there is alignment with other functional strategies. Once the strategies are in place it then behoves the organisation to *"convert strategies into deployable practices with concrete rules, process, structures, and a timeline of activities in order to be able to orchestrate and manage all relevant resources."* (Mikalef & Parmiggiani, 2022).

2.3 Digital Transformation in the Oral health care Sector

Like other health practitioners' dental practice has gone through several changes. Some of the changes have been occasioned by the emergence of new knowledge others have come about because of technological changes. Oral health deals with making sure that people do not have any diseases that affect the oral cavity. The human parts that oral health covers include the face, teeth and throat cancer (Mohd-Dom et al., 2015). WSOHS is an institution that is involved in the teaching of oral health as well as being a teaching hospital.

As with other medical fields, the use of technology has changed the way oral health is practiced. Over the years there have been developments in the field of medicine that include the development of X-ray and imaging equipment, diagnostic equipment, and the internet. The growth of the internet has changed the way medicine is practiced and concepts such as telehealth and telemedicine have emerged. It is now not necessary for the patients and the practitioners to be in the same geographical space for diagnosis and treatment to take place (Hendricks, 2021). Bauer and Brown (2001) state that changes have been made even in the electronic management of records, making it possible for oral health practitioners to have electronic access to patient records and administrative information. Thus, technology has not only impacted the way oral health is practised but also the entire medical value chain including record keeping, operations and patient care management.

When defining the process of digital transformation, it is imperative not to look at it narrowly in terms of technological changes, but to focus on all the facets of oral health practice that have been impacted by changing technology from diagnosis, treatment, patient care and administration, not only of the patients but also of the health institution (Daniel et al., 2018). Thus, digital transformation can be further defined as a process that entails the application of the latest technologies, methodologies, and processes to deliver sustainable value to patients, healthcare professionals, and healthcare organisations (Hermes et al., 2020). According to Belliger and Krieger (2018), digital transformation involves adopting and using the latest available technologies and innovative ways to maximise benefits not only to the patients but to the practitioners,

the hospitals and the entire medical value chain. At the heart of the digital transformation is the need to improve an entity by changing its characteristics by combining information, computing, communication, and connectivity technologies (Hermes et al., 2020) .

2.3.1 Digital transformation imperatives in the health sector

The World Economic Forum (2016) and Taylor et al., (2020) opine that for health institutions there is a need to focus on four broad themes which are:

- **Smart care** – whose main aim is the improvement of patient outcomes and lowering the cost of healthcare using precision medicine, robotics, artificial intelligence (AI) and medical printing. Schork (2023) believes that with AI it is possible to develop medicines that are personalised at all relevant phases of clinical development. AI can also enable medical practitioners to find suitable targets for intervention as well as test them for their utility. Similarly, technologies such as 3D printing are becoming increasingly important because of their application in the rapid production of anatomical models that are patient-specific and personalised. 3D printing has applications in surgical instruments orthoses and exoskeletons which are used in patient rehabilitation (Rojek, Mikołajewski, Dostatni & Kopowski. 2023).
- **Care anywhere** – whose main deliverable is bringing healthcare closer to the home, using connected home and virtual care, which helps widen access to healthcare. In a 2016 survey, PwC (2016) found out that two-thirds of respondents in the survey had healthcare, wellness, or fitness apps on their devices and that they were willing to explore new ways of delivering healthcare which would entail them not visiting a healthcare facility. This means that with technology people can get access to healthcare including practitioners online obviating the need to physically visit healthcare facilities.
- **Empowered care** – in which the general citizen is at the centre of managing their well-being and healthcare. This can be achieved through the digitisation of records making them available seamlessly while making sure that the right

to privacy is respected. According to Socha-Dietrich (2020) with digital transformation, all the role players in health provision will have access to the right information making it possible to improve the safety, effectiveness, and efficiency of care. With digital transformation, it becomes possible to be proactive as opposed to reactive provision of healthcare. This benefits the health workers in the sense that the mundane and repetitive tasks will be dispensed with giving the healthcare workers sufficient time to interact with patients. In the same vein the ordinary person will become an o-manager of their health due to being more engaged, improved self-care skills, and more effective coproduction of health.

- **Intelligent health enterprises** – that capable of providing data-driven solutions that aim at maximising efficiencies and making it possible to monitor patient health in real-time. With digital transformation hospitals and healthcare providers will be able to collect data on patient experiences which will facilitate continuous improvement in care delivery and patient-related processes. The health-care providers will be able to implement transparent, end-to-end business processes that are patient-focused. With digital transformation comes improved patient experience, better patient outcomes, and working smartly and efficiently while making data-driven decisions (SAP, 2020).

While this is the ideal scenario of digital transformation, many obstacles have to be navigated and these are discussed next.

2.4 Barriers to digital transformation

There is a general acceptance that there is a need to digitally transform the health sector, yet several challenges have been faced which have slowed down the pace of digital transformation and in some cases stalled it altogether. Wilson and Mergel (2022) argue that digital transformations fail because some institutions find it difficult to integrate the new digital technologies into the IT systems that the enterprise will be using at the time. This barrier arises because of the need to transition to new IT solutions or software products. They argue that the inability to integrate old systems

with new ones is a local barrier and arises from the need to partially modernise systems and infrastructure as well as replace equipment for integration with the implemented digital technologies. Gleiss and Lewandowski (2022) add their voice and posit that there it is sometimes impossible to introduce new systems because of compatibility issues. Since digital transformation entails intertwining systems across the entire value chain there might be issues with compatibility where supplier systems might not be compatible with customer systems and vice-versa. They further argue that in some instances the level of complexity depends on the level of integration that is necessary. In some instances, integration might involve semantics and syntactic available APIs, and workflow alignment, which often must be seamlessly integrated with existing systems.

One of the biggest barriers to digital transformation, as reported in a survey by Walker (2020) is that some businesses cannot experiment quickly. In the survey, 53% of executives interviewed maintained that the inability to quickly experiment impeded the success of digital transformation initiatives. The problem of failure to quickly experiment is compounded by the rate of technological changes which has overtaken the ability of companies to cope. Consequently, businesses and institutions must be highly adaptable and react quickly to the changing technological landscape. For digital transformation to succeed executives and digital transformation project leaders must be willing to try new things and to quickly embrace innovations. In developing countries, the institutions might not have the luxury of experimenting given that they are already lagging institutions in developed countries.

It is the assertion of Walsh and Rumsfeld (2017) that at a strategic level, some businesses do not have leadership that can successfully transform the organisation. This does not mean that business leaders do not know that digital transformation is imperative for their institutions but that they lack the necessary skills to plan and envision the entire process. For digital transformation to succeed requires vision and long-term planning with the organization always having clear sight of the end goal of the transformation process. Louw and Venter (2011) argue that many senior managers are of the view that focusing on core business is more important for continued survival

than embracing new technologies. Senior managers who have a clear vision and do not see digital transformation as an ad-hoc need are likely to succeed in their digital transformation endeavor (Walsh & Rumsfeld, 2017).

Gleiss and Lewandowski (2022) argue that there could be organisational barriers to digital transformation that emanate from processes and structures at the level of the organisation. Graetz (2020) suggests that there could be barriers that emanate from workflow deficiencies which have an impact on the decision-making process. In the end, the deficiencies lead to the exclusion of user groups or stakeholders that have an interest in the success of the digital transformation process (Graetz, 2020). Graetz (2020) further suggests that digital transformation requires system thinking and viewing the institution as one system but with many sub-systems, in some instance, there will be a silo mentality in the organisation which leads to doctors and physicians for example not taking an interest in hospital issues that do not concern patients. Gleiss and Lewandowski (2022) point out that in some instances top-management support might be lacking, while in some instances the management lacks the knowledge and the experience to deal with change and change management challenges like lack of cooperation. Gleiss and Lewandowski (2022) suggest that some managers do not delineate tasks correctly leading to a lack of role clarity which results in duplicated efforts and employees stepping on each other's toes. Gleiss and Lewandowski (2022) further suggest that some organisations are culturally bureaucratic and have high levels of resistance to change which hamper quick decision making leading to poor implementation and adoption of digital innovations.

Manny et al. (2021) believe that the health sector has many legal hurdles to navigate for digital transformation to take root, for example, the adoption of technology should not compromise the rights of patients to privacy. With the increase in the number of doctors and hospitals being sued for medical malpractice, it is incumbent on hospital managers to make sure that whatever digital innovations are introduced do not fall on the wrong side of the law. Hendricks (2021) argues that decisions on technology adoption in health institutions are a matter of life and death hence the need to be very cautious which leads to delays in adoption and implementation.

Wilson and Mergel (2022) state that many stakeholders in the healthcare sector include government, teaching institutions, patients, communities, and investors among others who must be consulted and whose buy-in is necessary before digital transformation can take place. This presents a challenge because the stakeholders do not have the same goals, and some might become too political as they try to advance their agendas which might be contrary to the digital transformation imperatives (Wilson & Mergel, 2022).

The above section discusses the various barriers to digital transformation suggested in the literature. Although the barriers have been highlighted sequentially, they are intertwined and for digital transformation to succeed there is a need to understand the barriers and to also see the connections and unravel them to gain a better understanding of the issues at play.

The hypothesis that is derived from this section is stated as:

2.5 The extent to which the barriers are impacting digital transformation.

Manny et al. (2021) concluded that legal and institutional considerations are one of the main barriers to digital transformation and this is critical in the health sector where there is a legal imperative to protect patients' rights. Jercich (2021) states that in 2021 in the United States of America, as many as 40 million patient records were compromised. A study by the Florida Healthy Kids Corporation showed that as early as 2013 the system showed "significant vulnerabilities" that could have led to the exposure of information which includes Social Security numbers, dates of birth, names, addresses and financial information. In the same year, Eskenazi Health an Indiana-based health system was hacked by criminals who released the data they gleaned on the dark web. These examples may explain why organisations become sceptical when innovations come onto the market. There is no perfect system and systems are susceptible to hacking and being compromised, which opens up healthcare institutions to potential lawsuits.

Yılmaz and Kılıçoğlu (2013) posit that when people have worked for an organisation for a long time, they become accustomed to doing things a certain way and when innovations are introduced there may be resistance. The resistance may emanate from a fear of change, or some people might feel that their importance in the organisation might be diminished. In some cases, people are afraid to lose their jobs to the new technology. Indeed, some jobs have become redundant like typists and office orderlies (Damawan & Azizah, 2020). Louw and Venter (2011) opine that when employees do not buy into the concept of digital transformation, they are likely to work against efforts to implement the technologies. This is also exacerbated where there is no change champion and support is lacking from the top management. This is a major challenge in organisations that go through the process of change (Damawan & Azizah, 2020).

Related to the above issue is the issue of stakeholder buy-in. The stakeholders are people who have a direct or indirect interest in the continued success of the institution (McGrath & Whitty, 2017). The stakeholders do not necessarily have the same goals and this lack of goal congruency can delay the implementation of digital transformation projects to a large extent. The stakeholder consultation process is both time-consuming and a fine balancing act (Louw & Venter, 2011).

2.6 Strategies to deal with barriers to digital transformation.

Louw and Venter (2011) state that before an institution embarks on digital transformation it must put in place mechanisms to deal with the issues that might work against the successful implementation of the innovations. There must be ways to deal with resistance to change. The digital transformation process requires appointing a change champion with enough power to deal with change management issues as they arise. Yılmaz and Kılıçoğlu (2013) propose six approaches which include:

Education and communication – the employees and the stakeholders need to be taught and informed about the need for change. They should also be told the benefits

of the change process and the implications of the same on every one of the employees and stakeholders.

Participation and involvement – before implementation the management should make a conscious effort to allow people to take part in the planning, design process and implementation of the proposed changes. This gives the employees and the other stakeholders ownership of the programme and the process. This approach is advisable where the transformation is being done in the absence of all the necessary information.

Facilitation and support – This involve giving both emotional and material support to those stakeholders and employees who might be having challenges with dealing with the change process. This strategy is particularly useful when stakeholders are irritated by work constraints and are struggling to adapt to the new technologies.

Negotiation and agreement – Where possible management should use a system of rewards and punishment to reward those that agree and push for the changes and punish those that will be resisting. In any change initiatives, there should be trade-offs.

Explicit and implicit coercion – In some cases where time might be of the essence it may be necessary to use the force of authority to foster acceptance of the change by people in the organization. There can be overt or covert threats of dismissal or some negative repercussions for those who resist the change process.

Manipulation and co-optation – This might involve finding the agitators and the opinion leaders and working to bring them to the side of change. Once they have been manipulated and co-opted, they can then mobilise those that will still be resisting (Damawan & Azizah, 2020).

In organisations where digital transformation is being considered it may be prudent for higher hospital leaders who are pro-change to address legal and institutional issues by making sure that sufficient stakeholder engagement takes place. It might also be necessary to bring in lawyers and other experts to help with navigating legal issues (Damawan & Azizah, 2020). Stakeholder engagement is important as it helps all the

stakeholders to articulate their issues and concerns. In carrying out stakeholder engagement it may be necessary to follow the five-step stakeholder engagement process proposed by Taylor et al. (2019) that involves:

1. **Engagement Strategy:** this step involves coming up with the vision and the level of desire for engagement in the future. In this phase, it might be necessary to review what worked and what did not work with past engagements.
2. **Stakeholder Mapping:** This step entails defining the criteria that will be used to identify and prioritise stakeholders, as well as choosing the mechanism for engagement.
3. **Preparation:** This involves coming up with an engagement plan that is focused on long-term goals and the logistics of the whole engagement thrust.
4. **Engagement:** This is when the engagement gets into gear and is conducted. The key to the success of this phase is in making sure that all the stakeholders are equitably represented and heard. During this phase, there might be a need to deal with tensions that will emanate from the different stakeholders' goals.
5. **Action Plan:** Identify opportunities from feedback and determine actions, revisit goals, and plan the next steps for follow-up and future engagement.

2.7 Analytical Framework

This section focuses on two aspects namely the theoretical framework and the conceptual framework. The theoretical framework is made up of two theories namely the stakeholder theory and the status quo bias theory while the conceptual framework is derived from the main concepts in this study and is conceptualised by the author. Digital transformation can be thought of as change management and there is a plethora of theories that can be used to explain the process. The first theory is one that was propounded by Kurt Lewin which sees change as comprising three steps: unfreezing, changing, and refreezing. That is to say, the process of change entails creating the perception that a change is needed, then moving toward the new, desired

level of behaviour and, finally, solidifying that new behaviour as the norm (Cummings, Bridgman & Brown, 2016).

The second model is the Concerns-based Adoption Model (CBAM) whose main tenet is that it is important to consider the human since it is essential for the successful change process. People's responses to change are different because each individual looks at it change from their own perspective and in light of past experiences. They also implement changes (e.g., the use of new tools, practices, and resources) differently (Ohio Leadership Advisory Council, 2020).

According to Ohio Leadership Advisory Council (2020), there are three issues that impact change the process and these are innovation configurations, stages of concern, and levels of use. Innovation Configurations give participants a roadmap to successful programme implementation by presenting a model of what fully realised execution looks like. Stages of concern help leaders directly support staff depending on their readiness for change. Levels of use measures allow leaders to determine how thoroughly staff members engage with a new practice or initiative. The theory is diagrammatically summarised below (Figure 2.1).

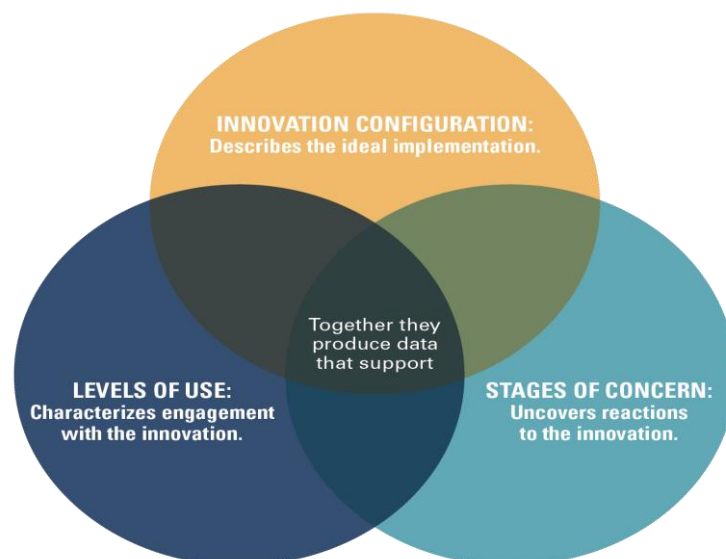


Figure 2.1: *The Three Key Ideas in The Concerns-Based Adoption Model* Source: Adapted from American Institutes for Research (2015)

A third model of change is one that was proposed by Kotter (2014) which has the below listed stages.

- Create a sense of urgency around a big opportunity.
- Build and evolve a guiding coalition.
- Form a strategic vision and initiatives.
- Enlist a volunteer army.
- Enable action by removing barriers.
- Generate (and celebrate) short-term wins.
- Sustain acceleration.
- Institute change. (Kotter, 2014)

For this study, the stakeholder theory as well as the status quo bias were chosen and are discussed in the section below.

2.7.1 Stakeholder theory

da Costa Filho et al., (2021) define stakeholders as people or groups that have vested interests in the results of a project and may ultimately, through their power have an impact on the results of the project. Stakeholders are classified into two categories namely internal and external. External stakeholders include customers, government, quasi-government organisations and suppliers. Internal stakeholders on the other hand include human resources, and management as well as shareholders (Mainardes et al., 2012). There is a narrow view of stakeholders which holds that a stakeholder should be only those people or groups that are necessary for the survival and continued success of the organisation. On the other hand, the wider view of stakeholders says that anyone affected by or affects the business directly or indirectly

is a stakeholder (Godam et al., 2019). Figure 2.2 shows the different stakeholders that an organisation has.

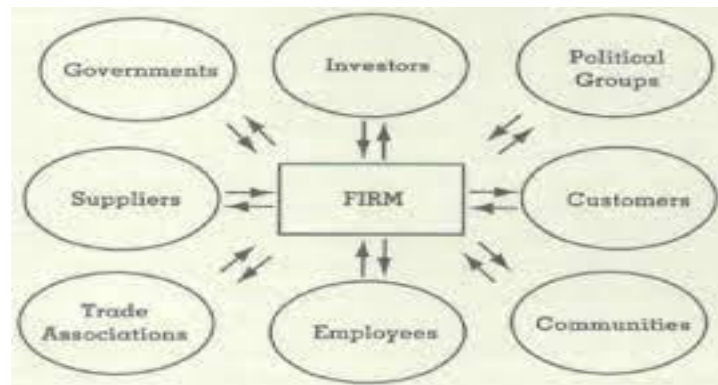


Figure 2.2: Stakeholder model (Donaldson & Preston, 1995)

The stakeholder theory was first propounded by Edward Freeman in 1984 who theorised that in a profit-seeking business, shareholders are just one of the many stakeholders of the business. At the heart of the stakeholder theory is the notion that if a business or project is to succeed it should create value for all the stakeholders. As a manager in an organisation, it is not prudent to look at the various interests that the stakeholders have in your organisation in isolation (Mainardes et al., 2012). The interests must be looked at together and given the same prominence to finding areas where the goals of the various stakeholders are aligned (Goel & Ramanathan, 2014). Although the theory has been widely used in corporate governance, it has found relevance across disciplines like public relations, project management and health care (Godam et al., 2019).

Parmar et al., (2010) opine that using stakeholder theory it is possible to analyse the relationships between an organisation and the groups and individuals who are either affected by or can affect the business. They argue that doing that makes it possible to deal with the challenges that bedevil businesses. The stakeholders include customers, suppliers, employees, stockholders, bondholders, banks, communities, and managers. If one were to comprehensively understand how businesses function, understanding the relationship between the business and its stakeholders would be a good starting point. Senior management has to manage and mould these

relationships to create as much value as possible for stakeholders and to value is equitably distributed. Conflict is an inevitability of relationships, and managers are duty-bound to find efficacious solutions to the conflict that leave all the parties happy, even if it might mean satisficing in certain instances (Harrison et al., 2010).

According to Ambler and Wilson (1995), one of the weaknesses of the stakeholder theory is that it is lacking in rigour because it does not exactly capture what happens in organisations. The argument is that putting all the stakeholders at the same level dilutes the importance of shareholders who have more to lose should the institution fail. The shareholders have legal title to the company and as such should be given more prominence (Ambler & Wilson, 1995; Antonacopoulou & Méric, 2005).

2.7.2 Why do stakeholders resist change?

It is critical to have a proper understanding of why at times the stakeholders resist change. To that end several theories have been propounded, one of which is the status quo bias theory. Kim and Kankanhalli (2009) define status quo bias as a preference that people have for wanting things to stay the same because they are used to the prevailing situation. Kim and Kankanhalli (2009) summarized some of the work that has been done on status quo bias and the constructs.

Mani and Chauk (2016), in a study, found out that some of the reasons why people resist innovations and technology include: the supposed uselessness of the technology, price, intrusive nature of the technology, perceived uniqueness and self-efficacy. An understanding of the reasons for resisting change helps management to craft strategies to deal with said reasons. When studying why there is resistance to changing IT systems, Bhattacharjee and Hikmet (2007), propose the following model which has been incorporated into this study **Figure 2.3**. The model shown in **Figure 2.3** aptly captures the essence of the two theories that were used as a lens for this study. Understanding the barriers and the rationale behind the barriers helps to identify whether the digital transformation initiative will succeed and to also come up with strategies that can be used to deal with resistance to change.

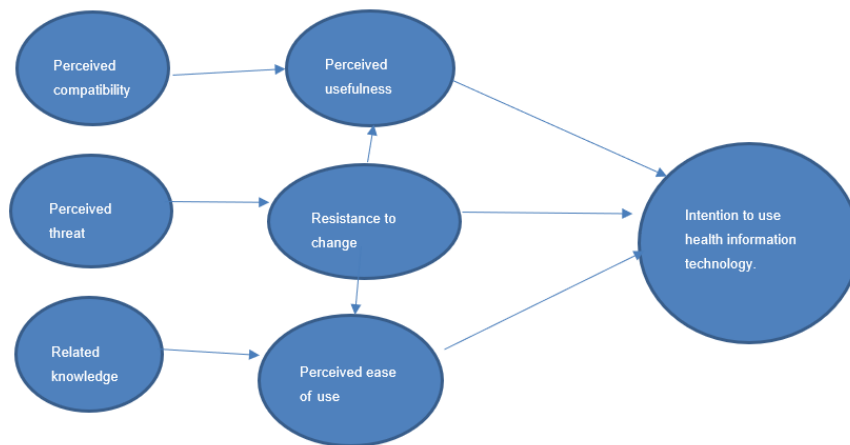


Figure 2.3: *Model to understand why there is resistance to adopting health information technology. Adapted from Bhattacharjee & Hikmet (2007)*

Bhattacharjee and Hikmet (2007) posit that the intention to use health information technology is a function of several factors which include related knowledge, perceived threat, perceived compatibility, perceived ease of use, resistance to change and perceived usefulness.

Ochara et al. (2016) propose a dual perspective of ICT adoption in which they state that there are enablers which are perceived ease of use and perceived usefulness. There are also inhibitors which fall under the umbrella term of resistance to change but are subdivided into two viz: resistance enablers and resistance inhibitors. The main factors that contribute to resistance are perceived threats, object of resistance, subject of resistance, initial behaviours and resistance behaviour. Ochara et al. (2016) conceptualisation is shown in **Figure 2.4** below. There is a lot of overlap between the works of Kim & Kankanhalli (2009), Ochara et al. (2016) and Bhattacharjee & Hikmet (2007).

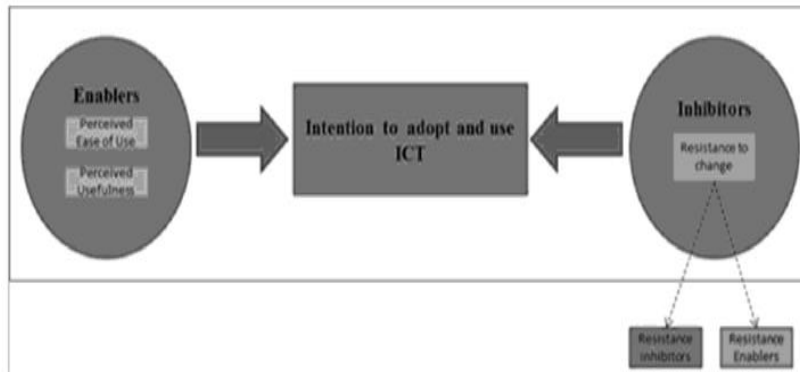


Figure 2.4: *A dual perspective of ICT adoption* (Ochara et al., 2016)

The following hypotheses arise from the theoretical framework:

Hypothesis 1: Digital transformation is likely to succeed when barriers to digital transformation are identified.

Hypothesis 2: There is a direct correlation between identifying the relative importance of barriers and the success of the digital transformation.

2.7.3 Conceptual Framework

The study was guided by the stakeholder theory. The study aimed to identify the barriers and the extent to which the barriers are impeding digital transformation at WSOHS, intending to come up with ways to reduce the barriers. The study, therefore, seeks to identify the stakeholders and their interests in the digital transformation of WSOHS to determine whether the competing stakeholder interests are mediating or moderating. In the end, the study intended to find ways to reduce or eliminate the barriers.

2.8 Conclusion

The chapter discussed the literature on digital transformation in general and particularly in the health sector. The barriers to digital transformation are discussed. The barriers are broadly classified as systemic, resistance to change and many stakeholders who have competing interests. The chapter also focused on the extent

to which the barriers are impacting digital transformation and solutions to reduce or eliminate the barriers. The theoretical framework was outlined and its suitability for the study was justified. Lastly, the conceptual framework was outlined. The main proposition of the study is that there are barriers to digital transformation in the health sector and if these barriers are identified using a stakeholder theory lens, then it would be possible to reduce or eliminate these barriers to digital transformation. The next chapter discusses the methodology that is employed in this study.

CHAPTER 3. RESEARCH METHODOLOGY

This chapter dealt with the methodology that the research used to address the research questions. The chapter starts by discussing quantitative research methodology before moving on to the case study research design. Focus then shifts to the data collection method, data collection instruments and the sampling method. The data analysis method is outlined before the possible limitations of the study are discussed. Finally, focus shifts to the ethical issues that are taken into consideration in the conduct of the research.

3.1 Research approach

Research is guided by paradigms which can be defined as a set of assumptions and perceptual orientations that are common among researchers. A paradigm is important because it influences how researchers look at both the phenomena in their field of study and the research methodologies that they employ when studying phenomena (Given, 2008). There are four important aspects that underpin all research paradigms which are epistemology, axiology, ontology, and methodology. Ontology can be defined as the 'study of being'. Ontology is concerned with what exists in the world about which humans can acquire knowledge. The effect of ontology is that it aids researchers to realise the degree of certainty that possess about both the nature and existence of phenomena under study. Axiology on the other hand deals with the role and place of values that the researcher has and how these influence the research process. Axiology, therefore, looks at the impact of values on the relationship between paradigm, methodology, and methods (Zaidi & Larsen, 2018). Kivunja and Kuyini (2017) define epistemology as being concerned with the foundation of what counts as knowledge in terms of its nature, and forms and how people acquire and communicate knowledge.

The research is quantitative meaning that it falls under the positivist paradigm. The positivist paradigm assumes that there is an objective reality that does not need mediation by senses and is subject to laws. When research is carried out using the

positivist approach the aim is to understand social situations as if they are natural phenomena. Positivism is therefore objective and is not value laden. Positivists opine that social there are laws governing social phenomena, and because of the application of scientific methods, it is feasible to formulate these laws and present them through factual statements.

Wegner (2010) defines quantitative research as a type of research that deals with quantitative variables. Quantitative research deals with quantifying and analysing variables to get results. Quantitative research uses numerical data to research questions that range from who, how much, what, where, when, how many, and how and involves the collection of numerical data that is followed by mathematical or statistical analysis of the same data (Apuke, 2017). The quantitative research approach is based on the positivist paradigm hence it is an approach that is rooted in statistical inference that encompasses strategies like inferential statistics, testing of hypothesis, mathematical explanation, experimental and quasi-experimental design which follows laid out procedures (Ryan, 2018). Questionnaires that contain closed questions are often used when collecting data. When using quantitative research, it follows that the research objectives should be measurable and that separating the variables and hypothesis is impossible. Variables by definition can assume different values, while hypotheses are yet to test propositions of relationships that possibly exist between variables (Daniel, 2016).

Quantitative research is premised on the assumption that there is an objective reality and that it is possible for that reality to be studied in a manner that is independent of the researcher. This means that if two or more researchers study the same phenomenon it should be possible to get the same results. Quantitative research is based on logic and theories that are deductive meaning that it is possible to test hypotheses for cause and effect. It is possible to generalise the results of quantitative research, thus contributing to the development of theories (California State University, 2007). Quantitative research was therefore chosen because it is the appropriate research method for this study (Daniel, 2016).

3.2 Research design

The research uses a case study design which according to Zainal (2007) is useful when the purpose of the research is to explore and understand issues that are complex. The type of case study that is used is a critical instance case study which entails choosing a site to examine a phenomenon of unique interest. There is no interest in generalising the findings. The aim is to answer cause-and-effect questions (Starman, 2013). The case study design is particularly appropriate when the purpose is to carry out holistic and in-depth research. (Yin, 2014) believes that case studies are useful when the researcher is seeking to analyse a real-world problem that is observable. The case study design has been chosen as a research design because it allows the barriers to digital transformation to be studied in detail, in a way that allows the researcher to describe, understand and predict (Krusenvik, 2016).

According to Krusenvik (2016), the case study design offers the advantage that it allows the researcher to delve into real-life situations and test views directly with a phenomenon as it unfolds in practice. The data will be contextually rich and will consist of multiple variables, which results in high internal validity. It is possible that when conducting research using a case study approach, the researcher will find information and data that was not anticipated when the research started. When a study is intensive then it ensures detailed and relevant data is collected and, this makes case study research suitable for generating hypotheses that help to structure further research (Yin, 2014).

The researcher is cognisant of the disadvantages of case studies, including inter alia the potential for data collection bias, which may lead to wrong results and conclusions (Zainal, 2007). According to Zainal (2007), another disadvantage of case studies is that it is dependent on the exploration of a single case exploration thus rendering generalisation impossible, and it is difficult to arrive at definitive cause/effect relationships, however, this is counter-balanced by proper parameter establishment and objective setting.

3.3 Data collection methods

This research utilises questionnaires for data collection. Roopa and Rani (2012) define a questionnaire as a sequence of questions asked to research participants so that statistically useful information about a research problem can be obtained. Questionnaires are a very good instrument that can be used to collect information from specific groups or people or entire populations.

The questionnaire was used to collect data from the employees and students studying at WOSHS. The WSOHS has 245 staff members, and 218 students enrolled in various oral health programmes. The questionnaire was designed to focus on the research questions. The first section of the questionnaire focused on identifying the barriers to digital transformation, while the second section dealt with collecting information related to the extent to which the barriers are stifling digital transformation. The third and last section deals with strategies that can be used to reduce or eliminate the barriers.

3.4 Population and sample

3.4.1 Population

The WSOHS has 245 staff members, 218 students enrolled in various oral health programmes, and 8 representatives of supply chain partners or service providers and this is the population that is used in this study. The institution is in Johannesburg and operates both as a teaching school and a hospital.

3.4.2 Sample and sampling method

Stratified random sampling was used in this study. Stratified random sampling was chosen because there are two distinct population groups, namely students and employees. There are 245 employees and 218 students and 8 service providers giving a total of 461. Given that the total population is relatively small questionnaires will be sent to all of them. The aim was to have a high response rate. The acceptable

response rate will be about 200 at a 5% margin of error (Graglia, n.d). The formula used to calculate the sample size is:

$$sample\ size = \frac{StdDev * (1 - StdDev)(z - score)^2}{(confidence\ interval)^2}$$

The aim was to have a sample size of 200 with the employees accounting for 53% while the student component will account for 47% of the sample. The two population sets were numbered, and then random numbers were generated. After that the respondents were emailed to alert them to the research so that they could consent to taking part in the research.

The questionnaire was distributed via Qualtrics. Also, the researcher sent an email to members of the staff and the students alerting them to the study and the purpose of the research and providing a link to the questionnaire. The respondents were given a reasonable time to respond to the questionnaire after which follow-ups were made. The responses were then accessed from Qualtrics and then analysed using IBM SPSS.

3.5 The research instrument

A questionnaire was used to collect data. The questionnaire has an introduction which introduces the research and the researcher. The purpose of the research and the fact that the research is for academic purposes only is clearly stated. Issues of anonymity, confidentiality and the rights of the respondents are also highlighted in the introduction. The questionnaire will be distributed to the stakeholders so that they can give their input.

The questionnaire had questions on demographic information which include age and gender and whether the respondent is a student or an employee. The participants were also asked to specify the stakeholder category they fall under. The rest of the questionnaire was divided into three sections, with each section focusing on a specific research question. The first section dealt with identifying the barriers, while the second

deals with the extent to which the barriers impact digital transformation at WSOHS. The last section focused on some of the interventions that can be used to reduce/eliminate the barriers to digital transformation.

3.6 Procedure for data collection

The researcher had access to a global list of the emails and therefore use that to alert the potential respondents to the research. The provisions of the POPI Act were adhered to. Qualtrics is the platform that was used, and the email containing the link to the survey, see Appendix A (Questionnaire). The respondents were given sufficient time to respond to the questionnaire thereafter a second round of emails was sent out as a reminder.

3.7 Data analysis strategies and interpretation

The data was analysed statistically. The researcher used IBM SPSS tool to analyse the data, see Appendix E (IBM SPSS tool). The data was summarised by way of tables, graphs, pie charts and descriptions. Measures of central tendency which include mean, mode and median was calculated. Some descriptive statistics were calculated. Inferential analysis was also done. The aim was to generalise, so some parameters were calculated. Tests like the Mann Whitney test and Kruskal Wallis test were also carried out. The exploratory principal components analysis (PCA) technique was conducted to investigate the internal structure as well as to determine the smallest number of factors that were used to robustly represent the interrelations among the sets of variables.

3.8 Quality assurance

For research to be useful it must pass the quality assurance tests. The research is quantitative meaning that for it to be deemed acceptable it must have external validity, reliability, internal validity, and objectivity.

3.8.1 External validity

Patino and Ferreira (2018) state that external validity can be defined as the degree to which the results of a study are generalisable to the greater population. In the context of this research, external reliability refers to the extent to which the research findings are applicable to institutions that are like WSOHS. The use of stratified random sampling removes bias and although the respondents are chosen from one case study this makes it possible to compare to other research done on digital transformation, particularly in the health sector. If another researcher uses a similar approach, they should be able to arrive at comparable conclusions. The study used a large sample size and stratified random sampling made it possible to include all the groups and the sample therefore resembles the real-life population.

3.8.2 Internal validity

(Patino & Ferreira, 2018) define internal validity as the extent to which the results that were observed represent the truth in the population that was studied and were not due to methodological errors. Before data collection commenced the research instrument was pre-tested to make sure that it collected the data that the researcher expected. The random choosing of the respondents meant that in each stratum every respondent had an equal chance of being chosen to be part of the research. In so doing the sample that was generated was representative of the population from which it was chosen. To ensure construct validity when developing the questionnaire, the researcher made sure that the indicators and measurements were judiciously developed based on the knowledge that currently exists (Wegner, 2010).

3.8.3 Reliability

According to Heale and Twycross (2015), reliability focuses on the consistency of a measure. This means that when a participant completes a research instrument on a particular topic, they should give approximately the same responses each time the questionnaire is completed. To ensure reliability the research questionnaire contains

some questions that are essentially the same as the answers that are expected but the questions are worded differently. Reliability will be tested using Cronbach's alpha test.

3.9 Ethical considerations

When carrying out research it is important to take ethical considerations into account. The data collection only commenced after ethical clearance was obtained from the university, See Appendix C (Ethics clearance certificate). The researcher sought permission from the Acting CEO and Acting HOS at WSOHS before research commenced and approval of the research topic was issued by the Faculty of Commerce, Law and Management Registrar, see Appendix B (Approval of title confirmation). The respondents agreed to a consent form, Appendix D (Informed consent), which detailed the purpose of the research, how the data will be used and the rights of the participants.

Being cognisant of ethical behaviours, the researcher cared to safeguard the integrity of all the data collected by recording all responses and to ensure an accurate and unbiased record of all the responses. The research does not require that the identities of the participants be disclosed so the anonymity of the participants is guaranteed. The consent forms explicitly stated that participation is voluntary and that participants could withdraw at any stage without penalty. The researcher also desisted from using any tactics to influence participants to unduly participate in the study but instead explained the benefits to be obtained from the study. The researcher avoided academic dishonesty. However, the participants were informed about the consequences of non-confidentiality because some information may be sensitive, thus encroaching on the rights of others who may want their identities concealed (Creswell & Poth, 2016). The participants who elected to take part in the survey were deemed legally and psychologically competent to give consent and they were made aware that they would be at liberty to withdraw from the study at any time (Salkind & Frey, 2021).

3.10 Conclusion

The focus of the chapter was on outlining the research methodology that was applied in this study. The study is quantitative in nature and questionnaires were used to collect. The survey was sent to the respondents via Qualtrics, and the responses were analysed using IBM SPSS software tool. The population was delineated, and the sampling approach was outlined. The ethical considerations were discussed as well.

The next chapter presents the results of the research.

CHAPTER 4. PRESENTATION OF RESULTS

4.1 Introduction

The previous chapter set the scene by discussing the methodology that was employed in the study. The current chapter presents the results that arose from the data collection process. The study being quantitative implies the calculation of various statistics which include measures of central tendency, dispersion, factor analysis, correlation analysis and regression analysis. The results are presented following the hypotheses and the research questions that guided the study. The aim of the study was to identify the barriers to digital transformation as well as suggest possible solutions to reduce or eliminate the barriers so that the digital transformation initiatives at WSOHS can succeed.

4.2 Descriptive profile

The results in this chapter are presented in tables with Tables, pie, and bar charts. Categorical data is presented as frequencies and percentages in the tables. Frequencies or percentages are presented in pie or bar charts. Quantitative data is presented in means and standard deviations for normally distributed data, medians and interquartile ranges for data that are not normally distributed. Similarly, ordinal logistic regression analyses for factors associated with enabling digital transformation as well as the unadjusted and adjusted estimates will be reported on. Odds ratio, the 95% confidence interval, and the p-value are also calculated and reported.

4.2.1 Demographic profile

In this section, the demographic profile and baseline characteristics of the participants will be described. Demographic data was only collected for gender.

The data will be presented in a table with frequencies and percentages as well as a pie chart.

4.2.1.1 Sample response rate

Questionnaires were sent to 245 staff members, 218 students enrolled in various oral health programmes at WSOHS, and 8 recipients representing service providers. Of the 168 respondents, 105(62.5%) were employees, 57(33.93%) were students while service providers accounted for 6(3.57%) of all the respondents.

4.2.1.2 Gender

As shown in percentages, in **Figure 4.1** a total of 168 respondents were part of the study. Females accounted for 121 or 72% of the respondents. 47 of the respondents were male which is equivalent to 28% of the respondents.

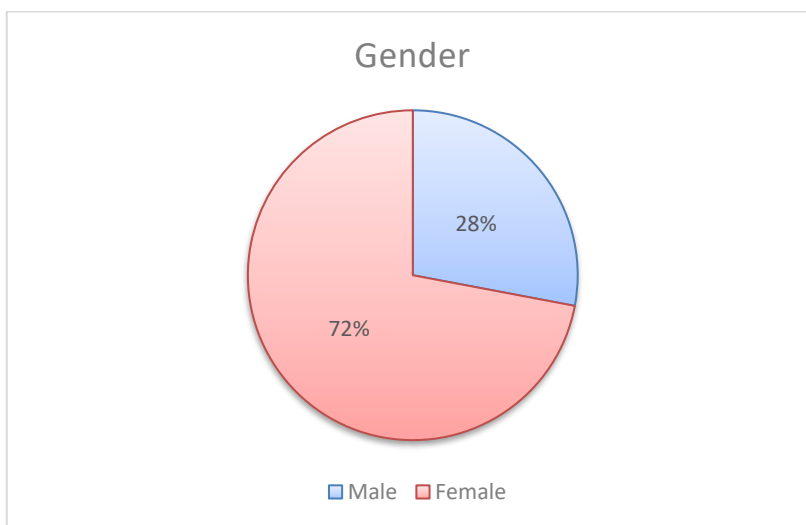


Figure 4.1: *Gender distribution of the respondents*

4.2.1.3 Roles at WSOHS

As shown in **Table 4.2**, of the 168 respondents, 105(62.5%) were employees, 57(33.93%) were students while service providers accounted for 6(3.57%) of all the respondents.

Table 4.1: *Roles at WSOHS*

	N	%
Employee	105	62.5%
Student	57	33.9%
Service Provider	6	3.6%

4.2.1.4 Awareness of the Term “Digital Transformation”

54 of the 168 did not answer the question that asked if the respondents knew of the term ‘digital transformation’ leaving 118 usable responses. Of the 118 respondents 81 which is equivalent to 68.6% responded that they were familiar with the term while 37 equivalent to 31.4% of the respondents said they did not know the meaning of the term ‘digital transformation’ as depicted in **Figure 4.2** below.

Table 4.2: *Awareness of the term “Digital Transformation”*

	N	%
Yes	81	68.6%
No	37	31.4%

4.2.1.5 Stakeholder Categories

As shown in **Table 4.3** below categorising stakeholders, there were 26 government stakeholders, 11 management, 28 students, 35 lecturers, 44 employees and 3 supply chain partners.

Table 4.3: *Stakeholder Categories*

	N	%
Government	26	29.93%
Management	11	7.483%
Student	28	19.05%
Lecturer	35	23.81%
Employee	44	29.93%
Supply Chain Partner	3	2.04%

4.2.1.6 Enabling Digital Transformation

The results as indicated on **Figure 4.2**, show that 35 or 30% of the respondents know that as stakeholders they have a significant and high impact on the success of digital transformation initiatives. In the same vein for the question that wanted respondents to rate their impact on enabling digital transformation, 10(8%) rated no impact and little impact, 39(33%) average impact, 34(29%) rated significant impact, while 25(21%) rated huge impact. The results suggest that 50% of the respondents acknowledge that as stakeholders they have an impact on the success of digital transformation initiatives.

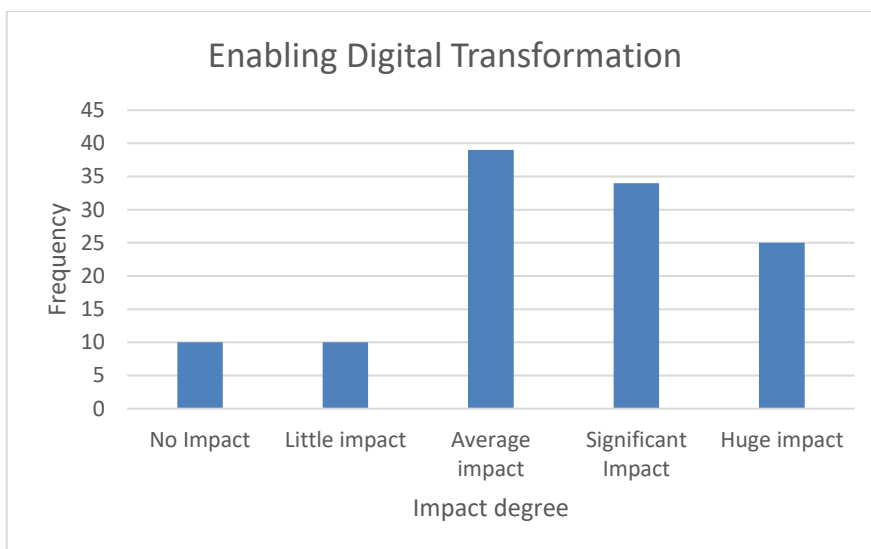


Figure 4.2: *Enabling Digital Transformation*

4.2.1 Impact of Digital Transformation as a stakeholder

Of the 118 participants; 5(4.23%) participants indicate no impact, 2(1.69%) participants indicate little impact was lowest, 14(11.86%) participants indicate average impact, 58(49.15%) participants indicate significant impact was highest and 39(33.05%) participants indicate huge impact to the extent of digital transformation can impact them as a stakeholder (**Figure 4.3**).

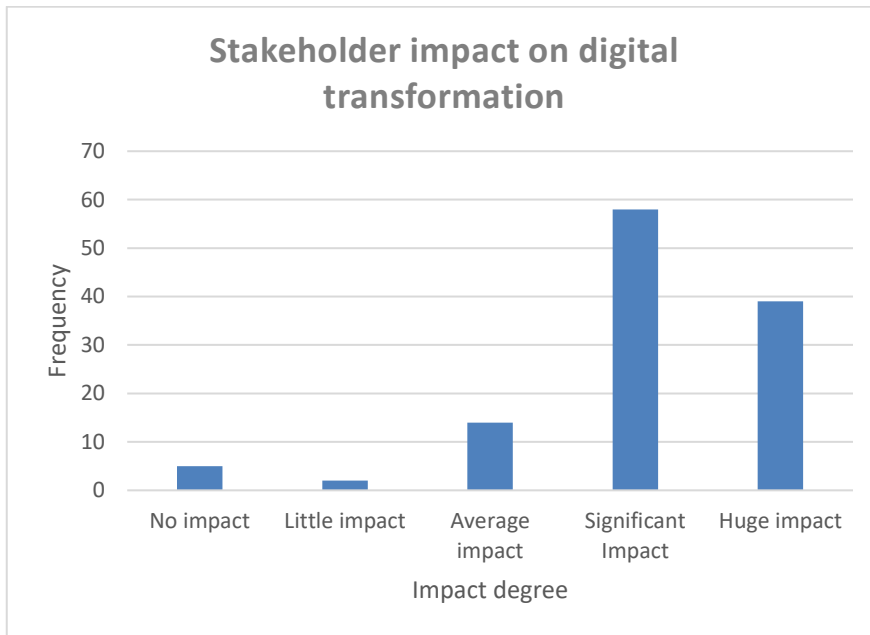


Figure 4.3: *Stakeholder impact on digital transformation*

4.3 Results pertaining to hypothesis 1

4.3.1 Barriers to Digital Transformation

In this section, the participants were asked to identify the barriers to digital transformation from a list of possible reasons that included outdated data, lack of connection between strategy and execution, lack of collaboration across departments, inability to pivot portfolios quickly, legacy system, legal issues that need to be navigated, institutional barriers, and others. As shown in **Table 4.7** the most cited barrier, is lack of collaboration (83), followed by institutional (64), and lack of connection to strategy (61). Among the least cited barriers, legacy

system (27), followed by Inability to pivot portfolios and Legal issues that need to be navigated which tallied with 30 participants on legal issues that need to be navigated (Figure 4.4).

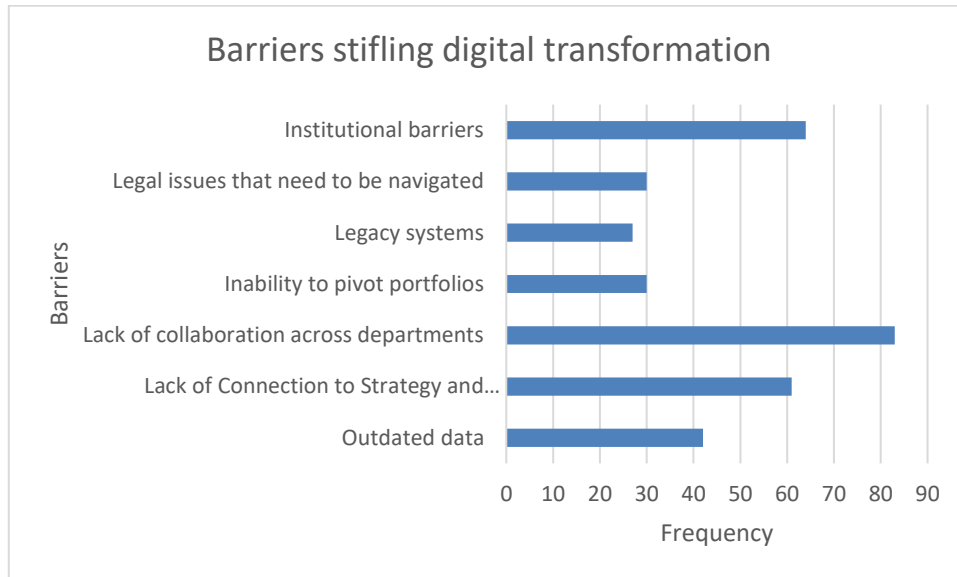


Figure 4.4: *Barriers to Digital Transformation*

4.4 Results pertaining to hypothesis 2

4.4.1 Extent of Impact of Barriers to Digital Transformation

In this section participants were asked about the extent to which the barriers, in the section above, impacted digital transformation. Seven questions on a 5-point Likert scale were asked and 118 participants out of the original 168 participated in this question and 50 participants elected not to answer.

Figure 4.5 shows that for outdated data, participants 3 participants reported no impact, 11 little impact, 32 average impact, 37 significant impact, and 35 huge impact. For lack of connection between strategy, 3 participants reported no impact, 6 little impact, 29 average impact, 41 significant impact, and 39 huge impact. For lack of collaboration across departments, 2 reported no impact, 7 little impact, 19 average impact, 42 significant impact, and 48 huge impact. For inability to pivot portfolios quickly, 6 reported no impact, 5 little impact, 40 average

impact, 39 significant impact, and 28 huge impact. For legacy system, 5 reported no impact, 10 little impact 43 average impact, 34 significant impact, and 26 huge impact. For legal issues that need to be navigated as well as institutional barriers, 7 reported no impact, 12 little impact, 32 average impact, 40 significant impact, and 27 average impact. As shown in **Figure 4.5**, most of the participants, 48 cited a huge impact of lack of collaboration across departments and at least 27, cited that the barriers have a huge impact on digital transformation while at most 7 and at least 2 participants reported that they did not have an impact. Thus, we see that extent of the barriers to impact digital information was significant to huge impact.

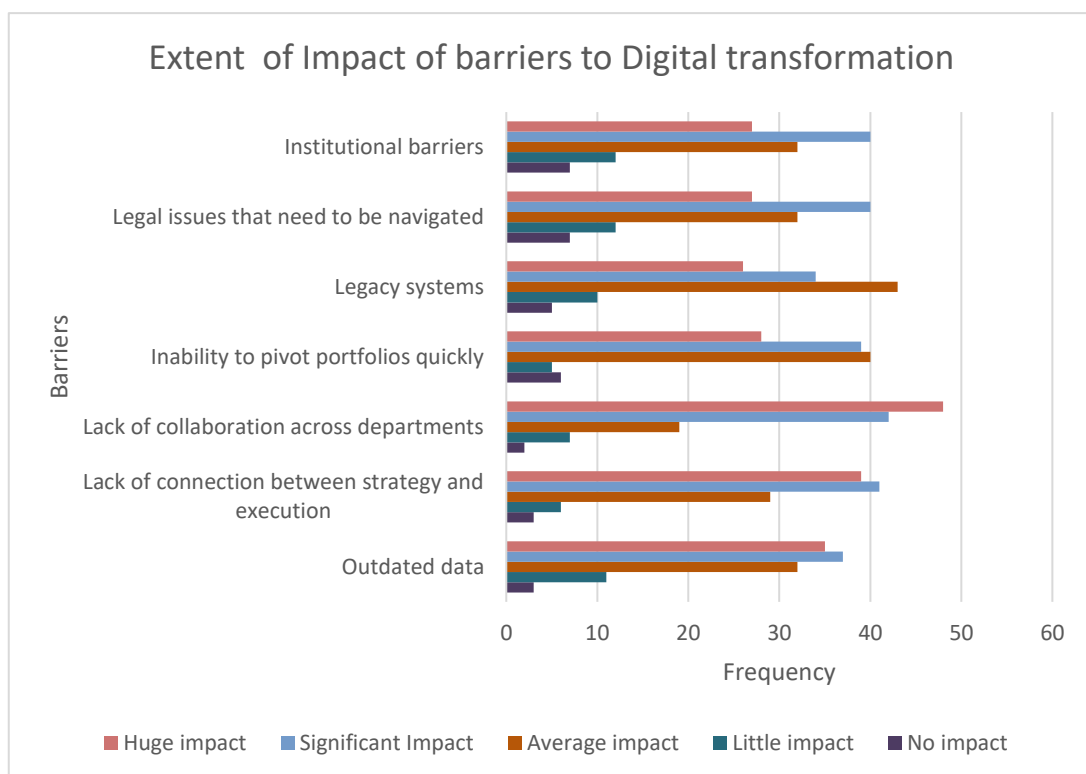


Figure 4.5: *Extent of Impact of barriers on Digital Transformation*

4.2.2 Impact on Intention to use the new system

In this question, participants were asked how, perceived threat, related knowledge, perceived compatibility, perceived usefulness, resistance to change, and perceived ease of use impacted their intentions to use new health information technology.

For perceived threat, 10 participants reported no impact, 12 little impact, 34 average impact, 34 significant impact, and 28 huge impact. For related knowledge, 3 participants reported no impact, 9 little impact, 33 average impact, 49 significant impact, and 24 huge impact. For perceived compatibility, 2 participants reported no impact, 10 little impact, 32 average impact, 52 significant impact, and 22 huge impact. For perceived usefulness, 4 participants reported no impact, 10 little impact, 29 average impact, 47 significant impact, and 28 huge impact. For perceived change, 12 participants reported no impact, 6 little impact, 27 average impact, 32 significant impact, and 41 huge impact. For perceived ease of use, 7 participants reported no impact, 6 little impact, 28 average impact, 45 significant impact, and 32 huge impact. **Figure 4.6** shows that significant impact had the most frequencies, followed by average impact, and then huge impact. At most 10 participants reported no impact. Thus, we see that perceived threat, related knowledge, perceived compatibility, perceived usefulness, resistance to change, and perceived ease of use have a significant impact on the participants' intentions to use new health information technology.

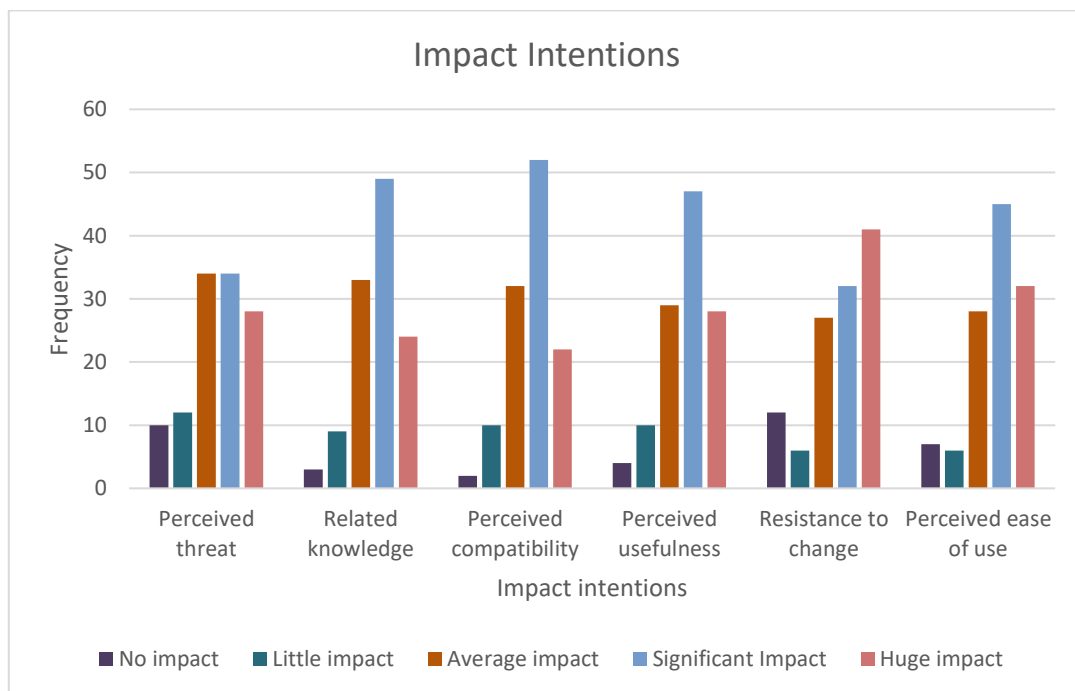


Figure 4.6: *Impact on intentions to use new systems*

Hypothesis 2 sought to examine the determinants of digital transformation (enabling and preventing). The outcome of interest is an ordinal dependent variable: enabling the digital transformation from 1 to 5 (no impact to huge impact). Thus, an ordinal or ordered logistic regression model was used to answer the question.

As shown in **Table 4.4** below the results of the unadjusted ordinal logistic regression on factors associated with digital transformation show that the impact of digital transformation was significantly associated with enabling digital transformation (OR= 3.61, 95% CI 2.35 – 5.56). This means that for every unit increase in the impact of the digital transformation score, the odds of getting a greater rating of digital enabling score increase by 3.61 times. The extent of barriers was significantly associated with enabling digital transformation (OR=0.047, 95% CI 0.62 – 2.35). This means that for every unit increase in the extent of the barriers score, the odds of getting a greater digital enabling score increase by 0.047 times. Intentions impact was significantly associated with enabling digital transformation (OR=1.92, 95% CI 1.23 – 2.98). Gender, role at the university, awareness of digital transformation and applicability of the strategies to reduce and eliminate barriers were all not significant in the unadjusted ordinal logistic regression analysis.

The results of the adjusted ordinal logistic regression on factors associated with enabling digital transformation indicated that impact of digital transformation is associated with digital transformation (OR=3.43, 95% CI, 2.12 – 5.55). This means that for every unit increase in impact of digital transformation score, the odds of getting a higher rating increase by 3.43 times. The regression analysis indicated that gender, role at the university, being aware of the term digital transformation, extent of barriers, intentions impact, and applicability of the strategies to reduce and eliminate barriers were all not significant at the 5% significance level.

Table 4.4: *Unadjusted and adjusted ordinal logistic regression on factors associated with enabling digital transformation among the staff, students, and service providers of the University of the Witwatersrand, school of oral health sciences, 2023 (N=111).*

Variable	Unadjusted OR	P-value	Adjusted OR (95% CI)	P-value
Gender Male Female	1(reference) 0.64(0.31 – 1.34)	0.233	1(reference) 0.61(0.27 – 1.37)	0.232
Role Employee Student Service provider	1(reference) 0.51(0.24 – 1.09) 0.41(0.03 – 4.74)	0.084 0.472	1(reference) 0.47(0.12 – 1.12) 0.49(0.05 – 5.36)	0.089 0.567
Aware of DT Yes No	1(reference) 0.76(0.38 – 1.55)	0.452	1(reference) 1.43(0.66 – 3.11)	0.370
Impact of DT	3.61(0.59 – 3.890)	<0.0001	3.43(2.12 – 5.55)	<0.0001
Extent of barriers	1.59(1.00 – 2.54)	0.047	1.21(0.62 – 2.35)	0.574
Intentions impact	1.92(1.23 – 2.98)	0.004	1.26(0.69 – 2.29)	0.455
Applicability	1.21(0.74 – 1.96)	0.447	0.79(0.46 – 1.35)	0.385

Legend

OR=Odds Ratio; 95% CI= 95% Confidence Interval. DT= Digital Transformation

4.5 Results pertaining to hypothesis 3

4.5.1 Strategies that the institution can use to reduce or eliminate the barriers.

The second section of this part of the research asked the participants to choose the strategies that can be employed to make sure that digital transformation is a success. The choice of strategies included alignment with the why of digital transformation, preparing and dealing with culture change, starting small but strategic, mapping out technology implementation, seeking out partners and expertise, gathering feedback and refining as needed, scale and transform, stakeholder consultation and engagement. Stakeholder engagement was the most cited (76) strategy, followed by preparing and dealing with culture change (77) and starting small but strategic (71). The least cited strategy was scale and transform (41), followed by seeking out partners and expertise (57), then align on the why of digital transformation (63). **Figure 4.7** below summarises the results on the graph.

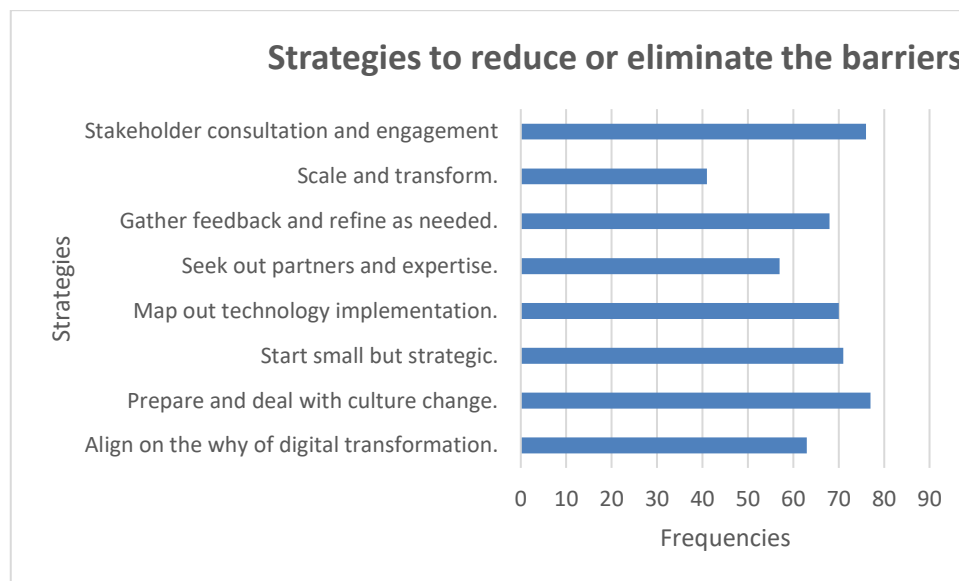


Figure 4.7: *Strategies that can be used to reduce or eliminate the barriers*

4.5.2 Applicability of the strategies to reduce and eliminate barriers

In this question, the participants were asked to rate on a 5-point Likert scale, from strongly disagree to strongly agree on the applicability of the strategies to eliminate barriers to digital transformation. 111 participants reported on this question and 57 did not.

On rating the applicability of strategies to reduce and eliminate barriers to WSHOS: for align on why of the digital transformation strategy, 2 participants reported strongly disagree, 3 disagree, 15 neither agree nor disagree, 45 agree, and 46 strongly agree. For prepare and deal with culture change, 2 participants reported strongly disagree, 1 disagree, 12 neither agree nor disagree, 35 agree, and 61 strongly agree. For start small but strategic, 2 participants reported strongly disagree, 3 disagree, 11 neither agree nor disagree, 43 agree, and 52 strongly agree. For map out technology implementation, 1 participant reported strongly disagree, 2 disagree, 14 neither agree nor disagree, 43 agree, and 51 strongly agree. For Seek out partners and expertise, 4 participants reported strongly disagree, 2 disagree, 17 neither agree nor disagree, 39 agree, and 49 strongly agree. For gather feedback and refine as needed, 3 participants reported strongly disagree, 3 disagree, 13 neither agree nor disagree, 39 agree, and 53 strongly agree. For scale and transform, 1 participant reported strongly disagree, 2 disagree, 26 neither agree nor disagree, 53 agree, and 29 strongly agree. For stakeholder consultation and engagement, 2 participants reported strongly disagree, 1 disagree, 15 neither agree nor disagree, 35 agree, and 58 strongly agree. Table 11 above describes that most participants strongly agree with the applicability of the strategies to eliminate barriers to digital transformation (Figure 4.8).

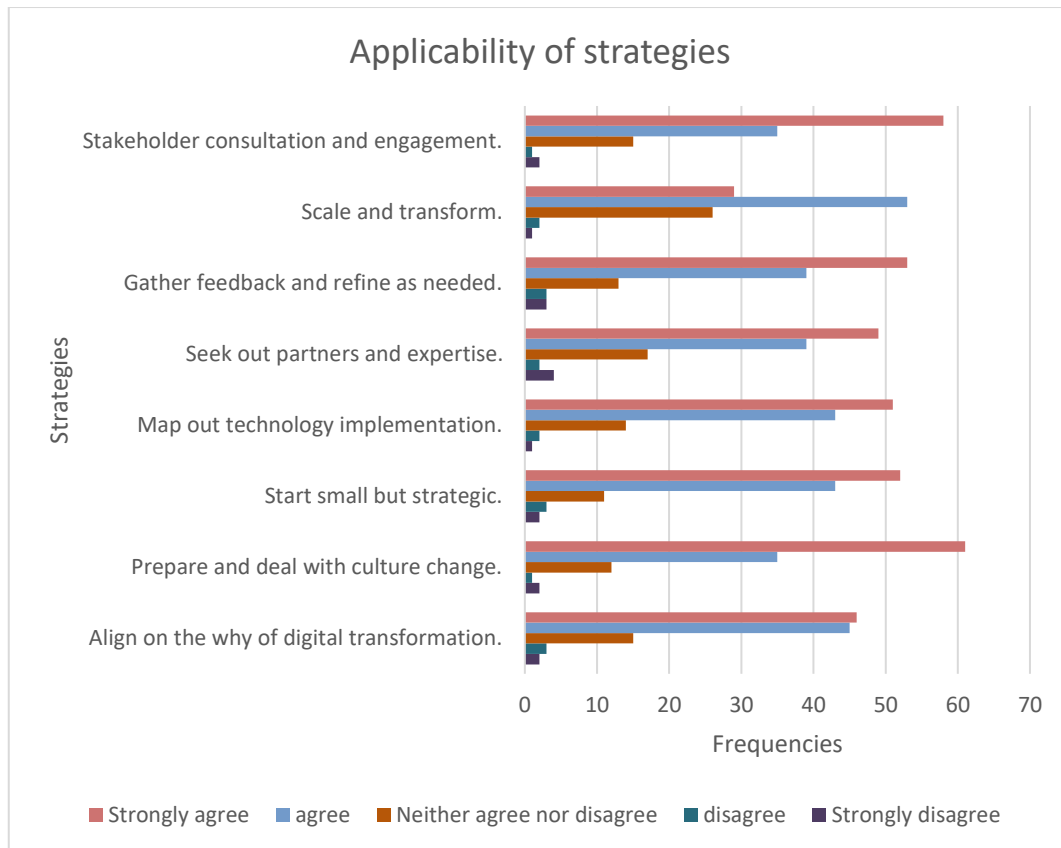


Figure 4.8: *Applicability of the strategies to reduce and eliminate barriers*

4.6 Descriptive Analysis

4.6.1 Reliability Analysis

In this section, the three scales, 1) extent of impact of barriers to digital transformation, 2) impact intentions, and 3) applicability of the strategies to reduce and eliminate barriers to digital transformation will be described considering their reliability. Cronbach's alpha was used for this test and the results are summarised in Table 4.5.

In this question participants were asked about the extent that the barriers, in the section above, impact digital transformation. The extent of barriers to impact digital transformation is a scale with seven items on a 5-point Likert scale: no impact to high impact. 118 participants out of the original 168 participated in this

question and the rest were missing: 50 participants. This scale was shown to have a Cronbach's alpha of 0.8228 (82% reliable).

Participants were asked how, perceived threat, related knowledge, perceived compatibility, perceived usefulness, resistant to change, and perceived ease of use impacted on their intentions to use new health information technology. This scale has six items: six questions on a 5-point Likert scale: from no impact to huge impact. 118 participants participated in this question and 50 did not: were missing. The intentions impact scale was shown to have a Cronbach's alpha of 0.8197 (82% reliable).

Applicability of strategies to eliminate barriers to digital transformation is an 8-item scale on 5-point Likert scale, from strongly disagree to strongly agree on the applicability of the strategies to eliminate barriers to digital transformation. 111 participants reported on this question and 57 did not out of the original 168: were missing. Results of the test for reliability showed that it has a Cronbach's alpha of 0.9165 (92% reliable).

Table 4.5: *Reliability of Scales*

Variables	Cronbach Alpha Scores	No. of items	No. of cases
Extent of impact of barriers	0.8228	7	118
Intentions Impact	0.8197	6	118
Applicability of Strategies	0.9165	8	111

4.6.2 Test of Normality

The three scores, extent of barriers score, intentions impact score, and applicability of strategies score are three continuous variables in the data set. Thus, table 13 describes the data and tests for normality. According to George and Mallery (2010) data that has a skewness of between -2 and 2 and a kurtosis above 3 is regarded as not normally distributed.

Extent of barriers, intentions of impact, and applicability of strategies are regarded as not normally distributed since all their kurtosis is above 3, although their skewness is within the range posited by George and Mallery (2010). However, for an ordinal logistic regression analysis normality is not an assumption. Thus, the data can be used in their continuous form. The results of the test for normality are summarised in **Table 4.6**.

Table 4.6: Quantitative Data Description and Tests of Normality

Variable	Mean	Standard Deviation	Skewness	Kurtosis
Extent	3.9	0.9	-0.6	4.09
Intentions	3.7	0.8	-0.6	3.7
Applicability	4.2	0.7	-1.6	6.7

4.7 Summary of the results

Barriers to digital transformation that were most cited by the respondents were lack of collaboration, institutional barriers, and connection to strategy. The least cited barriers to digital transformation were other-barriers and legacy system. most of the participants, at most 48-and-at least 27, cited that the barriers have huge impact on digital transformation while at most 7 and at least 2 participants reported that they did not have an impact.

The most cited strategies to reduce or eliminate digital transformation were stakeholder engagement, preparing and dealing with culture change, and start small but strategic. The least cited strategies were scale and transform, seek out partners and expertise, and align to the why of digital transformation. Most participants strongly agree with the applicability of the strategies to eliminate barriers to digital transformation while at most 4 participants said that they have no impact.

Results of the unadjusted ordinal logistic regression analysis on factors associated with enabling digital transformation were that students, impact of digital transformation, extent of barriers, and intentions impact were significantly

associated with digital transformation at the 5% significance level. Gender, applicability of the strategies to reduce and eliminate barriers, awareness of the term 'digital transformation' and service providers were not significant at the 5% significance level. The adjusted analysis indicates that only impact of digital transformation was significantly associated with enabling digital transformation at the 5% significance level. Gender, role, awareness of the term 'digital transformation', extent of barriers, intentions impact, and applicability of the strategies to reduce and eliminate barriers were all not significant at the 5% significance level.

4.8 Conclusion

Chapter 4 presented the results of the research by giving the various descriptive statistics. The data was presented by way of tables and summarised in text format to give context to the research hypotheses. The results show that the most significant barriers to successful digital transformation are lack of collaboration, institutional barriers, and lack of connection to strategy. The main strategies that the school can adopt if digital transformation is to succeed include stakeholder engagement, preparing and dealing with culture change, and start small but being strategic.

The next chapter discusses the results in terms of literature and the research questions.

CHAPTER 5. DISCUSSION OF THE RESULTS

5.1 Introduction

Chapter 4 presented the results of the research using various statistics and it is the purpose of this chapter to discuss the results as presented in chapter 4 above. The results are discussed within the context of the research hypotheses and the research questions. The results are also discussed within the context of literature which either supports or disagrees with the results obtained in this research.

5.2 Demographic profile of respondents

In order to make the study representative and to provide different views, different stakeholders took part in the study. The views of students, employees, and service providers were sought and there were more employees (105) followed by students (57) and service providers provided the least number of participants who took part in the research (6). There were more females than males who took part in the study. A total of 168 people took part in the study of which 47 were male while 121 were female. Although 168 people participated in the research the number of people who answered specific questions was lower and this explains why in some instances the total number of responses per question is lower than the sample of 168.

It was necessary to get the views of different stakeholders because the study used the stakeholder theory as its theoretical framework. da Costa Filho et al., (2021) define stakeholders as people or groups that have vested interests in the results of a project and may ultimately, through their power have an impact on the results of the project. Stakeholders are classified into two categories namely internal and external. External stakeholders include customers, government, quasi-government organisations and suppliers. Internal stakeholders on the other hand include human resources, and management as well as shareholders (Mainardes et al., 2012). In the context of the study, the students and the

employees are the internal stakeholders while the service providers are the external stakeholders.

5.3 Discussion pertaining to hypothesis 1: Digital transformation is likely to succeed when barriers to digital transformation are identified.

68.6% of the respondents pointed out that they knew what the term digital transformation meant while 31.4% of the respondents said that they did not know what digital transformation is and what it entails. This implies that there is a need to educate stakeholders on what digital transformation entails so that there might not be resistance to digital transformation initiatives.

There was a question that asked the respondents to rate the extent to which they could prevent successful digital transformation at WSOHS, and students and employees highlighted by and large that they had a significant to huge impact. In the same vein, the students and the employees highlighted that they had a significant to huge impact in making sure that digital transformation succeeded. The results of the unadjusted odds ordinal logistic regression for factors associated with preventing digital transformation show that in the role at the university variable, students had a significant association compared to employees (OR=0.48, 95% CI 0.23 – 0.99) (Table 4). This means that compared to employees, students had 0.48 times the odds of a greater preventing digital transformation scale. Gender, awareness of the term digital transformation, Impact of digital transformation, extent of barriers, Intentions impact, and applicability of the strategies to reduce and eliminate barriers were all not significant at the 5% significance level. The results indicate that internal stakeholders have a bigger role than external stakeholders in the success or otherwise of digital transformation initiatives.

This tallies with the views of da Costa Filho et al., (2021) who posit that for any project different stakeholders have disparate influence and interests and

consequently different stakeholders have to be treated differently. This is achieved by mapping the stakeholders in terms of their levels of interest and power. The mapping exercise will result in the classification of stakeholders in terms of their levels of interest and the power they have in the success of the project. Stakeholders who wield a lot of power and have interest in the project need to be carefully managed and kept informed on the developments regarding the project. The results show that employees and students being internal stakeholders wield a lot of power and influence and therefore if digital transformation at WSOHS is to succeed more attention should be given to them.

Another significant observation from the results is that 80.2% of all the stakeholders said that they will be significantly or hugely impacted by digital transformation. This tallies with the argument above that says stakeholders have to be mapped and managed because they are directly or indirectly impacted by the success or failure of digital transformation endeavours.

In this section, the participants were also asked to identify the barriers to digital transformation from a list of possible reasons that included outdated data, lack of connection between strategy and execution, lack of collaboration across departments, inability to pivot portfolios quickly, legacy system, legal issues that need to be navigated, institutional barriers, and others. The most cited barrier, is lack of collaboration (83), followed by institutional (64), and lack of connection to strategy (61). Among the least cited barriers, other barriers were the lowest (12), followed by legacy system (27). For the response "other barriers" the participants had to state the barrier because their cited barriers were not part of the listed barriers.

The barriers that the participants chose tally with the findings of Wilson and Mergel (2022) who posited that digital transformations fail because some institutions find it difficult to integrate the new digital technologies into the IT systems that the enterprise will be using at the time. This barrier arises because of the need to transition to new IT solutions or software products. They argue that the inability to integrate old systems with new ones is a local barrier and arises

from the need to partially modernise systems and infrastructure as well as replace equipment for integration with the implemented digital technologies.

Gleiss and Lewandowski (2022) point out that in some instances top-management support might be lacking, while in some instances the management lacks the knowledge and the experience to deal with change and change management challenges like lack of cooperation. Gleiss and Lewandowski (2022) further suggest that some organisations are culturally bureaucratic and have high levels of resistance to change which hamper quick decision making leading to poor implementation and adoption of digital innovations.

Manny et al. (2021) believe that the health sector has many legal hurdles to navigate for digital transformation to take root, for example, the adoption of technology should not compromise the rights of patients to privacy. With the increase in the number of doctors and hospitals being sued for medical malpractice, it is incumbent on hospital managers to make sure that whatever digital innovations are introduced do not fall on the wrong side of the law. Hendricks (2021) argues that decisions on technology adoption in health institutions are a matter of life and death hence the need to be very cautious which leads to delays in adoption and implementation.

Wilson and Mergel (2022) state that many stakeholders in healthcare sector include government, teaching institutions, patients, communities, and investors among others who must be consulted and whose buy-in is necessary before digital transformation can take place. This presents a challenge because the stakeholders do not have the same goals, and some might become too political as they try to advance their agendas which might be contrary to the digital transformation imperatives (Wilson & Mergel, 2022).

There is a general awareness of digital transformation and what it entails to WSHOS and the factors that may work against successful transformation were clearly defined and spelt out giving credence to the H1 which says that digital

transformation is likely to succeed when barriers to digital transformation are identified.

5.4 Discussion pertaining to hypothesis 2: There is a direct correlation between identifying the relative importance of barriers and the success of the digital transformation.

Wilson and Mergel (2022) posit that the barriers to digital transformation are intertwined and for digital transformation to succeed there is a need to understand the barriers and to also see the connections and unravel them to gain a better understanding of the issues at play.

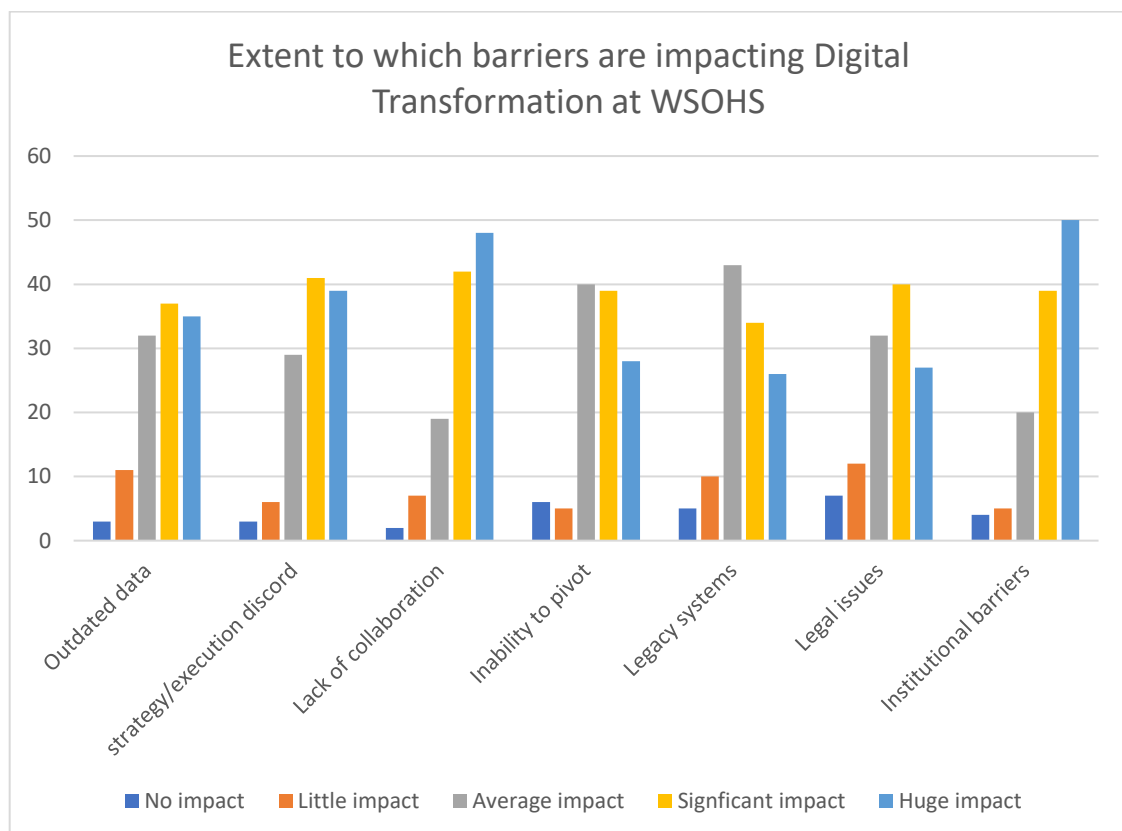


Figure 5.1: *The extent to which barriers are impacting digital transformation at WSOHS*

As shown in **Figure 5.1** above the participants rated the impact of the reasons why digital transformation fails. The results indicate that the participants viewed all the reasons as important because the majority across all the seven reasons pointed out that the reasons either had a significant or huge on the success of the digital transformation initiative. This shows that all the possible causes of failure should be looked at by the team that will be spearheading the digital transformation process. If we add the respondents who said the causes had an average impact, then the conclusion is that most of the respondents agreed that these were the possible causes that would lead to the failure of digital transformation.

The above observations tally with the findings of Manny et al. (2021) who concluded that legal and institutional considerations are one of the main barriers to digital transformation and this is critical in the health sector where there is a legal imperative to protect the patients' rights. Jercich (2021) states that in 2021 in the United States of America, as many as 40 million patient records were compromised. A study by the Florida Healthy Kids Corporation showed that as early as 2013 the system showed "significant vulnerabilities" that could have led to the exposure of information which includes Social Security numbers, dates of birth, names, addresses and financial information. In the same year, Eskenazi Health an Indiana-based health system was hacked by criminals who released the data they gleaned on the dark web.

Louw and Venter (2011) opine that when employees do not buy into the concept of digital transformation, they are likely to work against efforts to implement the technologies. This is also exacerbated where there is no change champion and support is lacking from the top management. This is a major challenge in organisations that go through the process of change (Damawan & Azizah, 2020).

Related to the above issue is the issue of stakeholder buy-in. This is a huge barrier in institutions like WSOHS which have multiple stakeholders. The stakeholders are people who have a direct or indirect interest in the continued success of the institution (McGrath & Whitty, 2017). The stakeholders do not

necessarily have the same goals and this lack of goal congruency can delay the implementation of digital transformation projects to a large extent. The stakeholder consultation process is both time-consuming and a fine balancing act (Louw & Venter, 2011).

According to the National Planning Commission (2020), if digital transformations projects are to succeed there is a need to make sure that the people who are part of the process are properly capacitated in terms of education and training so that they can be more accepting because they will not be afraid to lose their jobs.

In one of the questions, the respondents were asked to rate how factors like perceived threat, related knowledge, perceived compatibility, and perceived usefulness among others would impact intention to use new health information technology. The responses that were given by the participants varied as shown in **Table 5.1** (below).

Table 5.1: *Intention to use new health information technology.*

	No impact	Little impact	Average impact	Significant Impact	Huge impact
Perceived threat	10	12	34	34	28
Related Knowledge	3	9	33	49	24
Perceived compatibility	2	10	32	52	22
Perceived usefulness	4	10	29	47	28
Resistance to change	12	6	27	32	41
Ease of use	7	6	28	45	31

The results show that the potential users of the new health information systems feel threatened by the new system and are likely to not use the system unless the issues highlighted in **Table 5.1** are addressed. According to the stakeholder theory if a business or project is to succeed it should create value for all the stakeholders. As a manager in an organisation, it is not prudent to look at the various interests that the stakeholders have in your organisation in isolation (Mainardes et al., 2012). The interests must be looked at together and given the

same prominence to finding areas where the goals of the various stakeholders are aligned (Goel & Ramanathan, 2014). Therefore, the leadership at WSOHS should address the factors mentioned above that impact the intention to use the new system.

While the results did not rank the barriers, the proposition that there is a direct correlation between identifying the relative importance of barriers and success of digital transformation holds. It is not feasible for a digital transformation project to succeed without the organisation having a nuanced understanding of the factors that might work against the success of said project.

5.5 Discussion pertaining to hypothesis 3: The choice of the right strategy to deal with barriers to digital transformation is directly correlated to the success of the transformation process.

It is the contention of Louw and Venter (2011) that before an institution embarks on digital transformation it must put in place mechanisms to deal with the issues that might work against the successful implementation of the innovations. There must be ways to deal with resistance to change. The digital transformation process requires appointing a change champion with enough power to deal with change management issues as they arise.

The participants were asked to choose from a list of possible strategies that the institution can use to ensure the success of digital transformation and the results showed that the least chosen strategy was scaling and transforming which was chosen by 41 of the participants, followed by seeking for partners and expertise (57). More than 70 of the participants chose strategies like preparing and dealing with change (77), starting small and then scaling (71) as well as stakeholder consultation and engagement (76). The results are summarised in Table 5.2 below.

Table 5.2: *Strategies to ensure successful digital transformation.*

Strategy	Frequency
Align on the why of digital transformation	63
Prepare and deal with culture change	77
Start small but strategic	71
Map out technology implementation	70
Seek out partners and expertise	57
Gather feedback and refine as needed	68
Scale and transform	41
Stakeholder consultation and engagement	76

In the same vein the participants were asked to rate the strategies given in **Table 5.2** and the results are summarised in Table 5.3 below.

Table 5.3: *Participants ratings of strategies (%)*

Strategies	Strongly disagree	disagree	Neither agree nor disagree	agree	Strongly agree
Align on the why of digital transformation	1.8	2.7	13.5	40.5	41.4
Prepare and deal with culture change	1.8	0.9	10.8	31.5	55
Start small but strategic	1.8	2.7	9.9	38.7	46.8
Map out technology implementation	0.9	1.8	12.6	38.7	45.9
Seek out partners and expertise	3.6	1.8	15.3	35.1	44.1
Gather feedback and refine as needed	2.7	2.7	11.7	35.1	47.7
Scale and transform	0.9	1.8	23.4	47.7	26.1
Stakeholder consultation and engagement	1.8	0.9	13.5	31.5	52.3

The results in **Table 5.3** show that for digital transformation to succeed it is important for management to manage a plethora of factors and not just focus on one. In the same vein, management should employ multiple strategies so that the digital transformation can succeed. All the strategies highlighted in **Table 5.3** have to be addressed since most of the participants either agree or strongly agree that the strategies have to be used.

The choice of strategies included alignment with the why of digital transformation, preparing and dealing with culture change, starting small but strategic, mapping out technology implementation, seeking out partners and expertise, gathering feedback and refining as needed, scale and transform, stakeholder consultation and engagement. Stakeholder engagement was the most cited (76) strategy, followed by preparing and dealing with culture change (77) and starting small but strategic (71). The least cited strategy was scale and transform (41), followed by seek out partners and expertise (57), then align to the why of digital transformation (63).

Considering the above, in organisations where digital transformation is being considered it may be prudent for higher education hospital leaders who are pro-change to address legal and institutional issues by making sure that sufficient stakeholder engagement takes place. It might also be necessary to bring in lawyers and other experts to help with navigating the legal issues (Damawan & Azizah, 2020). Stakeholder engagement is important as it helps all the stakeholders to articulate their issues and concerns (Taylor et al., 2019). It might also be prudent to implement a change management process to navigate the factors that might derail digital transformation. Bhattacharjee and Hikmet (2007) posit that the intention to use health information technology is a function of several factors which include related knowledge, perceived threat, perceived compatibility, perceived ease of use, resistance to change and perceived usefulness.

Ochara et al. (2016) propose a dual perspective of ICT adoption in which they state that there are enablers which are perceived ease of use and perceived

usefulness. There are also inhibitors which fall under the umbrella term of resistance to change but are subdivided into two viz: resistance enablers and resistance inhibitors. The main factors that contribute to resistance are perceived threats, object of resistance, subject of resistance, initial behaviours, and resistance behaviour. And without addressing them then digital transformation endeavours will likely fail.

In conclusion, management cannot rely on only one strategy but to use several strategies. However, the proposition that, the choice of the right strategy to deal with barriers to digital transformation is directly correlated to the success of the transformation process, remains valid.

5.6 Conclusion

The chapter discussed the results of the research that were presented in Chapter 4. The results show that there is a general awareness of digital transformation among the participants that took part in the research. The participants identified factors that might work against the success of the digital transformation process. For digital transformation to succeed it is then necessary to come up with strategies that management can use to deal with the impediments. It is not possible to use one strategy, instead, management should use multiple strategies. The results confirmed the three hypotheses that guided this study.

CHAPTER 6. CONCLUSIONS & RECOMMENDATIONS

6.1 Introduction

The previous two chapters focused on presenting the results (Chapter 4) and discussing them (Chapter 5). It is therefore the purpose of this chapter to summarise the key findings of the research as well as give the conclusions and recommendations that arose from this research. The research which is quantitative in nature looked at the barriers to digital transformation and possible strategies that could be used to deal with the factors that work against the success of digital transformation. The objectives of the research are restated below.

The main research objective was:

- To establish the determinants (barriers, enablers) of digital transformation in the context of a healthcare institution.

The secondary research objectives are:

- To identify the barriers to digital transformation at WSOHS.
- To establish the extent to which the barriers are impacting digital transformation at WSOHS.
- To suggest solutions to circumvent these barriers to digital transformation at WSOHS.

6.2 The barriers to digital transformation

There are many barriers to digital transformation and the respondents were able to pinpoint the major ones. 83% of the respondents who were sampled from both external and internal stakeholders of WSOHS highlighted that they could influence the success of the digital transformation. 33% of the respondents

responded that they had an average impact, 29 % said that they had a significant impact while 21% suggested that they had a huge impact. This directly ties with the stakeholder theory whose main premise is that stakeholders are important in the success or failure of change initiatives (Mainardes et al., 2012). The consensus among the respondents was that the main factors that can aid the success or failure of DT were outdated data, lack of connection to strategy and execution, institutional barriers, and lack of collaboration across departments. The other three possible barriers to DT are the Inability to pivot portfolios, legacy systems and the various legal issues that need to be navigated. The least chosen barriers were on average each chosen by around 8% of the respondents. This tallies and aligns with the first hypothesis which was that digital transformation is likely to succeed when barriers to digital transformation are identified.

6.3 The extent to which the barriers are impacting digital transformation at WSOHS.

The first part of the research entailed identifying the barriers to DT and the second research objective sought to find the relative impact that each barrier had on the process of digital transformation. As shown in the extract below (**Table 6.1**) the responses showed that it is very difficult to rank the barriers to digital transformation as all the barriers seemed to have roughly the same frequencies when responses ranging from to huge impact were added.

Table 6.1: *Ranking of extent of impact of barriers on DT*

Average impact	32	29	19	40	43	32	32
Significant Impact	37	41	42	39	34	40	40
Huge impact	35	39	48	28	26	27	27
TOTAL	104	109	109	107	103	99	99

The conclusion that can be drawn is that it is very difficult to rank the barriers in their order of importance. This stems from the fact that different stakeholders have different interests in the success of the DT process. The interests of the different stakeholders in the success of the change process are different and are

not necessarily aligned so different stakeholders in this study would have highlighted the barriers that most impact them (Wang & Sun 2012). It probably would have been possible to rank the importance of the barriers if the research was qualitative because the researcher would have been able to probe for further clarity by asking questions like why a particular barrier is deemed important while another one is deemed to be less important.

6.4 Circumventing the barriers to digital transformation at WSOHS

As shown in **Table 6.2** (below) the participants' responses on the possible ways of circumventing the barriers to digital transformation are not definitive.

Table 6.2: *Participants' ratings of strategies (%)*

Strategy	Strongly disagree	disagree	Neither agree nor disagree	agree	Strongly agree
Align with the why	1.8	2.7	13.5	40.5	41.4
Prepare and deal with culture change	1.8	0.9	10.8	31.5	55
Start small but strategic	1.8	2.7	9.9	38.7	46.8
Map out technology implementation	0.9	1.8	12.6	38.7	45.9
Seek out partners and expertise	3.6	1.8	15.3	35.1	44.1
Gather feedback and refine as needed	2.7	2.7	11.7	35.1	47.7
Scale and transform	0.9	1.8	23.4	47.7	26.1
Stakeholder consultation and engagement	1.8	0.9	13.5	31.5	52.3

Most of the participants either agreed or strongly agreed with the proposed strategies. The responses show that in most cases more than 75% of participants agreed or strongly agreed that the strategies as suggested would work. This goes to show that to ensure the success of digital transformation endeavours multiple strategies must be devised and implemented. As mentioned earlier the participants in the research were from different stakeholder categories and therefore the vested interests that they have in the success of DT are different and as such they cannot be dealt with uniformly. What is also clear from the results is that dealing with different stakeholders is a delicate balancing act that requires tact, education, consultation and making sure that the interests of the different stakeholders are taken into consideration. The management of WSOHS need to be deliberate and focused when going through the process of digital transformation.

6.5 Recommendations

The results of the study suggest that before embarking on DT it is important to identify all the stakeholders, both internal and external. After identifying the stakeholders, it is important to get an understanding of their interests in the DT project as well as the extent to which they identify with the project. In so doing it becomes possible to identify the possible barriers to DT. To the extent that the management may rank the barriers to DT in order to identify the ones that are most important and the ones that can be less important. The important ones have the potential to derail the DT process and should be attended to with haste. In some cases, coming up with an urgency-importance matrix which is also called the Eisenhower Matrix helps to find those tasks and issues that need to be urgently dealt with and those that can be ignored **(Figure 6.1)**.

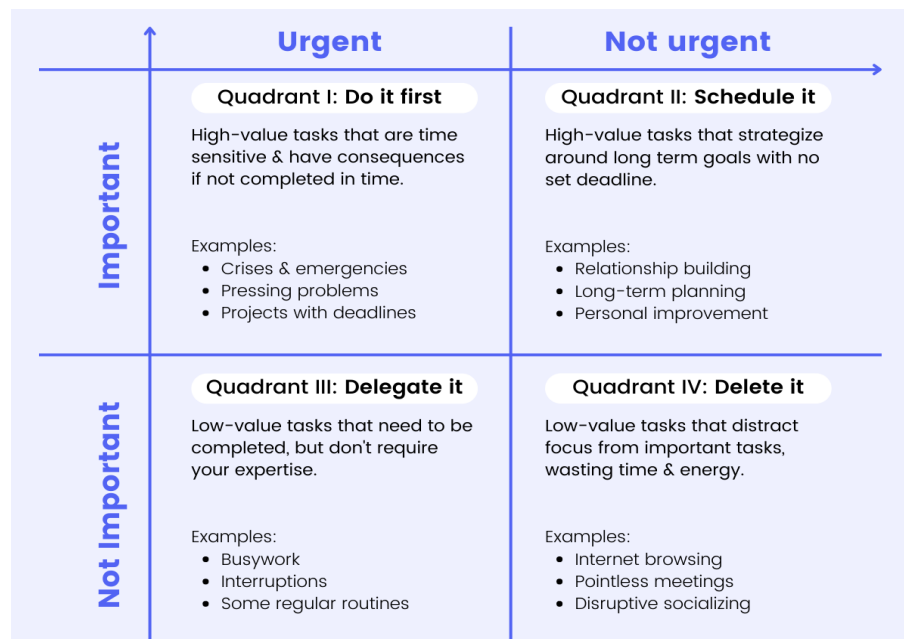


Figure 6.1: Eisenhower matrix (University of Central Florida, 2020)

In coming up with strategies to make sure that the DT process succeeds it is important to not rely on one strategy but to use a multi-pronged approach that enables the management of WSOHS to deal with the competing interests of the different stakeholders.

6.6 Suggestions for further research

This research focused on only one institution (WSOHS) and it might be prudent to increase the number of institutions so that the results can be more representative of what is obtained in South Africa and beyond. A good starting point would be to look at the various universities that offer medical qualifications and the hospitals that they are aligned with.

It is also possible to carry out comparative research that focuses on public and private institutions. In the same vein carrying out qualitative research or mixed methods research would help with answering the “why and how” questions (Creswell & Poth, 2016). The main shortcoming of quantitative research is that it

generally focuses on “what” questions which do not delve into the intricacies of why people behave the way they behave.

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Appendix A (Ethics clearance certificate)

Graduate School of Business Administration
University of the Witwatersrand, Johannesburg



Wits Business School Ethics Committee
Constituted under the University Human Research Ethics Committee (Non-Medical)

Ethics Clearance Certificate

Ethics protocol number: WBS/DB1575166/294

This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below).

This certificate is only valid if accompanied by formal permission from the relevant stakeholder(s).

Project title The barriers to digital transformation in the Wits School of Oral Health Sciences

Investigator / Researcher Mr Donald Dandawa

Nature of Project MM (Digital Business)

Decision of the Committee Approved, provided stakeholders and participants are guaranteed anonymity and confidentiality.

Issue Date of Certificate 2023-01-19

Expiry date Date of submission of the project / research report

Chairperson Prof Anthony Stacey
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Declaration by Researcher

One copy must be signed by the Researcher and returned to the Chairperson of the Wits Business School Ethics Committee.

I fully understand the conditions under which I am authorized to carry out the abovementioned research and I guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I undertake to resubmit the protocol to the Committee.

Signature

19 January 2023

Date:

Appendix B (Approval of title confirmation)



Private Bag 3 Wits, 2050
Fax:
Tel:

Reference: Ms Jennifer Mgolodela
E-mail: jennifer.mgolodela@wits.ac.za

13 August 2022
Person No: 1575166
PAG

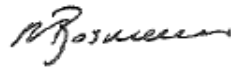
Mr D Dandawa
42 Southern Klipriviersberg Road
The Hill
2197
South Africa

Dear Mr Donald Dandawa

Master of Management: Approval of Title

We have pleasure in advising that your proposal entitled *The barriers to digital transformation in the Wits School of Oral Health Sciences* has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely



Mrs Marike Bosman
Faculty Registrar
Faculty of Commerce, Law and Management



Appendix C (Informed consent)



Consent INFORMED CONSENT FOR THE RESEARCH PROJECT

The following information is provided to inform you about the research project and your participation in it.

My name is Donald Dandawa, and I am studying Master of Management in Digital Business at the University of the Witwatersrand, Johannesburg. As part of my studies, I have to undertake a research project, and I am investigating on **"The barriers to digital transformation in the Wits School of Oral Health Sciences"** under the supervision of Professor Nixon Ochara. The aim of this research project is to assess the barriers to digital transformation at the Witwatersrand School of Oral Health Sciences (WSOHS). As part of this project, I would like to invite you to take part in answering a questionnaire. This will take around 15 minutes.

Please take note of the following information regarding your participation in this research study:

- Participation is completely voluntary.
- Data from the survey will only be used for research purposes, and no information will be disclosed to third parties.
- You will not receive any compensation for participating in this study.
- Responses are anonymous and confidential, and all study data will be destroyed after the completion of the study.

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Supervisor: Professor Nixon Ochara | Nixon.Ochara@wits.ac.za | 011 717 3543

STATEMENT BY PERSON AGREEING TO PARTICIPATE IN THIS STUDY.

I have read the informed consent document and understand each part of the document, and I freely and voluntarily choose to participate in this study.

Yes, I agree	
No, I disagree	

Appendix D (Questionnaire)

Section A: Demographic data

1. Gender:

Male	
Female	
Prefer not to say	

2. Role at WSOHS

Employee	
Student	
Service Provider	

Section B: Digital transformation at WSOHS

3. Are you aware of the definition of the term “Digital transformation”?

Yes	
No	

4. Please indicate by way of a tick the category of stakeholder that best describes you and please indicate your role(s) in WSOHS.

Government	
Management	
Student	
Lecturer	
Employee	
Supply chain partner	

- 5. Enabling Digital Transformation: Please rate on a scale of 1 to 5 (where 1 is no impact at all and 5 is huge impact) the extent to which you can enable digital transformation at WSOHS.**

No impact	Little impact	Average impact	Significant Impact	Huge impact

- 6. Impact of Digital Transformation on you as a stakeholder: Please rate on a scale of 1 to 5 (where 1 is no impact at all and 5 is huge impact) the extent to which digital transformation at WSOHS can impact you as a stakeholder.**

No impact	Little impact	Average impact	Significant Impact	Huge impact

- 7. What are some of the barriers that you think are stifling digital transformation (tick all that apply)?**

Outdated data	
Lack of connection between strategy and execution	
Lack of collaboration across departments	
Inability to pivot portfolios quickly	
Legacy systems	
Legal issues that need to be navigated	
Institutional barriers	

8. Please rate on a scale of 1 to 5 (where 1 is no impact at all and 5 is huge impact) the extent to which the below listed barriers are impacting digital transformation at WSOHS.

Barriers	No impact	Little impact	Average impact	Significant Impact	Huge impact
Outdated data					
Lack of connection between strategy and execution					
Lack of collaboration across departments					
Inability to pivot portfolios quickly					
Legacy systems					
Legal issues that need to be navigated					
Institutional barriers					

9. Please rate on a scale of 1 to 5 (where 1 is no impact at all and 5 is huge impact) how the following impact your intention to use new health information technology.

Factors	No impact	Little impact	Average impact	Significant Impact	Huge impact
Perceived threat					
Related knowledge					
Perceived compatibility					
Perceived usefulness					
Resistance to change					
Perceived ease of use					

Section C: Strategies to reduce/eliminate the barriers

10. From the list below choose the strategies that the institution can use to reduce or eliminate the barriers to digital transformation (Tick as appropriate).

Align on the why of digital transformation.	
Prepare and deal with culture change.	
Start small but strategic.	
Map out technology implementation.	
Seek out partners and expertise.	
Gather feedback and refine as needed.	
Scale and transform.	
Stakeholder consultation and engagement	

11. Rate the applicability of the strategies to reduce and eliminate barriers to WSOHS.

Strategy	Strongly disagree	disagree	Neither agree nor disagree	Agree	Strongly Disagree
Align on the why of digital transformation.					
Prepare and deal with culture change.					
Start small but strategic.					
Map out technology implementation.					
Seek out partners and expertise.					
Gather feedback and refine as needed.					
Scale and transform.					
Stakeholder consultation and engagement					

Thank you very much for taking part in the research. Your effort in answering the questions is appreciated.

Donald Dandawa

Appendix E (IBM SPSS tool)

Research_Data.sav [DataSet1] - IBM SPSS Statistics Data Editor

FileEditViewDataTransformAnalyzeGraphsUtilitiesExtensionsWindowHelp



1



Visible: 47 of 47 Variables

	Gender	Roles	DT_A_war	Stakeholder_1	Stakeholder_2	Stakeholder_3	Stakeholder_4	Stakeholder_5	Stakeholder_6	Stakeholder_7	Stakeholder_8	Stakeholder_9	Stakeholder_10	Stakeholder_11	Stakeholder_12	Stakeholder_13	Stakeholder_14	Stakeholder_15	Stakeholder_16	Stakeholder_17	Stakeholder_18	Stakeholder_19	Stakeholder_20	Stakeholder_21	Stakeholder_22	Stakeholder_23	Stakeholder_24	Stakeholder_25	Stakeholder_26	Stakeholder_27	Stakeholder_28	Stakeholder_29	Stakeholder_30	Stakeholder_31	Stakeholder_32	Stakeholder_33	Stakeholder_34	Stakeholder_35	Stakeholder_36	Stakeholder_37	Stakeholder_38	Stakeholder_39	
1	2	2	1	.	.	1	.	.	.	.	.	.	.	4	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2	2	2	2	.	.	1	.	.	.	.	.	.	.	2	4	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3	1	1	1	.	.	.	.	1	.	.	.	.	.	3	5	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
4	2	1	1	.	1	.	.	.	.	.	.	.	.	4	4	.	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
5	2	1	1	1	.	.	1	1	.	.	.	.	.	1	5	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
6	2	2	2	.	.	1	.	.	.	.	.	.	.	2	5	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
7	2	1	1	1	.	.	.	.	.	.	.	.	.	5	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
8	1	2	1	.	.	1	.	.	.	.	.	.	.	4	5	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		
9	2	1	2	.	.	.	.	.	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
10	2	2	1	.	.	1	.	.	.	.	.	.	.	3	4	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		
11	1	1	1	.	.	.	.	.	1	.	.	.	.	4	4	.	.	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		
12	2	1	1	1	.	.	.	.	.	.	.	.	.	4	4	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		
13	2	1	2	.	.	.	.	.	1	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
14	2	1	1	.	.	.	.	1	.	.	.	.	.	4	4	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		
15	1	1	2	.	.	.	.	.	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
16	2	1	1	.	.	.	.	.	1	.	.	.	.	3	4	1	.	1	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		
17	1	1	1	.	1	.	.	.	.	.	.	.	.	3	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
18	2	1	1	.	.	.	.	.	1	.	.	.	.	5	4	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
19	1	1	1	.	.	.	.	.	1	.	.	.	.	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
20	2	1	2	.	.	.	.	1	.	.	.	.	.	3	4	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
21	2	1	1	.	.	.	.	.	1	.	.	.	.	5	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
22	1	1	1	1	.	.	.	.	1	.	.	.	.	4	4	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
23	1	1	1	1	.	.	.	.	.	.	.	.	.	5	5	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
24	2	1	1	.	.	.	.	1	.	.	.	.	.	4	5	1	1	1	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		
25	1	1	2	1	.	.	.	1	1	.	.	.	.	5	5	.	.	1	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
26	2	1	1	1	.	.	.	.	.	.	.	.	.	4	4	.	1	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		
27	2	1	2	1	.	.	.	.	1	.	.	.	.	4	5	.	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
28	2	1	2	1	.	.	.	.	1	.	.	.	.	5	5	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
29	2	1	1	1	.	.	.	.	.	.	.	.	.	4	3	.	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		
30	1	2	1	.	.	1	.	.	.	.	.	.	.	3	4	.	1	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		
31	2	1	1	.	1	.	.	.	.	.	.	.	.	3	4	.	1	1	1	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		
32	1	3	1	.	.	.	.	.	1	.	.	.	.	5	5	.	.	1	1	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		
33	1	1	1	.	.	.	.	1	.	.	.	.	.	4	4	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
34	1	1	1	.	1	.	.	1	1	.	.	.	.	4	4	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
35	2	1	2	.	.	.	.	1	.	.	.	.	.	1	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
36	2	1	2	.	.	.	.	.	1	.	.	.	.	3	5	1	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		
37	2	1	1	1	.	.	.	.	.	.	.	.	.	4	4	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		
38	1	1	1	.	.	.	.	1	.	.	.	.	.	3	4	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		
39	1	3	1	.	.	.	.	.	1	.	.	.	.	3	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	

Data View

Variable View

IBM SPSS Statistics Processor is readyUnicode:ON Classic