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The Role of Digital Transformation in the South African Telecommunication Companies

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The Role of Digital Transformation in the South African Telecommunication Companies

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A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business

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ABSTRACT

The study explored the role of digital transformation on the business model, organizational capabilities, and development of new innovative service offerings for telecommunication organisations in the South African context in the telecommunication sector.

The study used a qualitative approach and the data was collected through semi-structured interviews with twelve participants who work for four telecommunication companies in South Africa. Using purposive sampling, data was collected and analyzed using thematic analysis, forming a pattern recognition of themes that emerged from interviews and the literature.

The study found that digital transformation has a significant role in the changing of business models and the development of new organisational capabilities. Furthermore, the study found that digital transformation has changed the way organizations develop their service offerings to meet ever-changing demands of customers. The findings of this study show that the digital transformation has opened up competition for service providers outside the telecom industry that offer innovative services that challenge the traditional services of telcos.

The findings of the study are consistent with the empirical literature and the theoretical framework of digital transformation and its role on the development of organisational capability, new business models, and innovative digital services in the telco industry. Further studies are recommended to explore the role of digital transformation on other parts of the telco organisations such as operations, customer services, employee performance, and productivity.

KEYWORDS

Digital transformation, dynamic capability theory, digital business model, digital service offerings, telecommunication industry.

DECLARATION

I, _ Meshack Mlungisi Majola_____, 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: Meshack Mlungsi Majola Signature:

Signed at …Midrand……

On the ……12…….. day of ……June…… 2023..

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LIST OF ACRONYMS

AI – Artificial Intelligence

DT – Digital Transformation

OTT – Over the top

IOT – Internet of Things

1 G – first generation of network technology

2G – second generation of network technology

3.G – third generation of network technology

4G – fourth generation of network technology

5G – fifth generation of network technology

CHAPTER 1. INTRODUCTION

1.1 Statement of purpose

This qualitative study aimed to explore the role of digital transformation in the telecommunication industry in South Africa. The emphasis of the study was on the role of digital transformation and influence on the organisational capabilities, new innovative business model, and digital services. The outcome of the study gives an understanding of the current state of digital transformation in telecommunication organisations in South Africa and how they are are transitioning digitally to the new state.

1.2 Background of the study

Traditional telecommunication services, such as voice and short messages, have matured and saturated over time and are now facing a decline (Stork et al., 2017). Since the dawn of digital technologies and digital communication platforms such as over the top (OTT) services i.e. WhatsApp, Facebook Messenger, chat messaging on social media, consumers are switching to interact and engage one another (McKinsey, 2017). The telecommunication industry has gone through many technological changes. The fixed-line telephone is being replaced by wireless mobile cell phones. Subsequently, wireless underwent a series of unique and fundamental changes from 1G to 4G and is now transitioning to 5G (Gooderham et al., 2022).

Lehr et al. (2021) argue that since the advent of 4G and the embrace of smart phones in 2010, internet connectivity had become a source of income for telecommunication service providers. From that period there has been a steady decline of voice and messaging usage. Lehr et al. (2021) further contend that network operators had transformed from being providers of telecommunication service into providers of a broadband platform. The 4G technology provided the opportunity to internet service providers like Skype, Facebook Messenger, and

WeChat to develop digital services that are a new mobile version of their voices and messaging and offer them for free (OECD, 2015).

Financial Times (2019) stated that Internet service providers led by giant Google, Apple, and Facebook leveraged on the telecommunication infrastructure owned by telecommunication companies to take a big share of digital service market and dominated the telecommunication market. During the early stage of the 4G era, network operators were disastrous to seize opportunity to monetise connectivity other than just marketing best connectivity (Brekke, 2020). The failure of network operators to monetise 4G technology due to the lack of innovation in the development of digital services. Network operators acquired infrastructure equipment from Original Equipment Manufacturers (OEM) that were embedded with voice, messaging, and internet services (Elter et al., 2020). Their focus was on the managing the hardware physical components and fell short of skill, knowledge and innovation for developing digital services.

The advent of 5G as part of the world moving to an era of smart connectivity, with the developments of disruptive technology, is said to be a major driver for economic growth in the near future (Dam, 2020). Network operators need to position themselves to take this golden opportunity to blend 5G with digital technology to create new business models. This combination provides a basis to provide for new ground-breaking opportunities in every industry, from manufacturing, textile, and airline services. (Dam, 2020).

According to the study by BCG (2021), only 22% of telecom organisations have successfully implemented a digital transformation project. This figure presents real risks of declining revenue growth and disruption by digital players and is significantly lower than the industry average of 35%. Tight regulations, including pressure to lower prices, are faced by telecom providers, which must also increase infrastructure investment to keep up with growing demand. Telecommunication companies must innovate more quickly and hasten the digital transformation of their own operations if they are to remain competitive in this environment.

1.3 Research problem

The emergence of digital technologies and digital services pose a challenge and threat to traditional business models for telco companies in South Africa and African continent (Stork, 2017). Managers and business leaders are faced with a plethora of digital possibilities and digital transformation imperatives that challenge the current business models and services provided by Telco companies (Venkatesh et al., 2019). Alsafadi (2018) asserts that there is a growing number of younger generations using digital services as an instrument of communication, such as Snapchat and Facebook massaging. Middle-tier customers who were accustomed to using traditional voice and massage as means of communication are now transitioning to the use of OTT services such as Skype, WhatsApp, Apple's FaceTime, Google Hangouts and Tencent's WeChat. OTT digital services are threatening the survival of Telcos and pushing them to the margins of voice and data provision.

Telcos are not only facing competition amongst themselves, but also face an increasing competition from OTT players who are able to offer these digital services at a much lower prices than traditional telcos are able to offer. The digitalisation trend and digital services including digital transformation are challenging the traditional telco companies and the existing business models (Alsafadi, 2018). The new OTT entrants and Internet giants such as Google, Microsoft, and Amazon are also entering the telco terrain and are cannibalizing the Telco value chain and offering innovative digital services (Stork et al., 2017). This study aimed to investigate the role of digital transformation brought about by digital technologies on organisational capabilities, business models, and innovative digital services in the Telco companies.

1.4 Research objectives

The primary objective of this study was to investigate the role of digital transformation in the telecommunication companies in South Africa. From this primary objective, the following sub-objectives were explored:

i. Sub-objective 1: Evaluate organisational dynamic capabilities to drive digital transformation.

Ii. Sub-objective 2: Examine the influence of digital transformation on business models.

iii. Sub-objective 3: Explore how digital transformation changes service offerings.

1.5 Rationale

The need for constant innovation makes digital transformation essential for creating differentiation mechanism and innovative business (Jahanmir et al., 2020). Digital transformation is a multidisciplinary theme that encompasses changes in several spheres of the organisation, such as strategy, business model, technology, and organisational structure (Verhoef et al., 2022). The study aims to make contribution to academic knowledge by considering the role of digital technology and digital transformation in some or all of the functions of telecommunication companies. The study also contributes to academic knowledge by exploring the role of digital transformation in the business model. The study also contributes to the Telco industry in South Africa on the opportunities and benefits of digital transformation in organisational strategy and operations. It also provides invaluable insights of the perceived impact of digital transformation. However, it is limited to the role of the digital transformation and the influence it has on the organisational capabilities, business models, and service offerings for Telco companies.

1.6 Delimitations of the study

The study focuses on the role of digital transformation in organisational capabilities and changes in business models and innovative digital services. The study is limited to telecommunication organisations in South Africa. Only senior management and decision makers participated in interviews. The study excluded the impact of digital transformation on organisational culture, employee performance, and customer satisfaction.

1.7 Definition of terms

Table 1. Defination of terms

TERM	DEFINITION
Digital Transformation	DT is a process through which companies converge multiple new digital technologies to enhance greater performance and competitive advantage through changing a number of business functions such as business models (Ismail, 2017).
Business Model	The business model is the blueprint of how an organisation does business and is concerned with creating, capturing value, visualising, understanding, communicating, and sharing the business logic (Osterwalder, 2005).
Digital Organisational capabilities	Organisation's capacity to adjust and adapt resources and competencies into new services and manage the innovation ecosystem (Kim et al. 2017).
Innovative Digital Services	Development of new services by means of digital technologies (Opazo-Basáez, 2022).
Telecommunication Service Provider	Organisation that provides its subscribers with internet and telecommunication services such as voice and massaging over a wireless microwave and fixed infrastructure (Williams, 2010).

1.8 Assumptions

I. The first assumption is that Telco companies need to implement Digital Transformation and are in the process of implementing Digital Transformation in some parts of their functions.
II. Other internet service providers already offer digital services on the Telco network infrastructure.
III. The participants fully understand the complexity of Digital Transformation and will share their experiences in navigating the organisational change brought by DT.

1.9 Chapter Outline

Table 2. Chapter Outline

Chapter 1: Study Overview	Chapter 1 outlines the study's purpose, objectives, research problem, and rationale behind the study.
Chapter 2: Literature review	Chapter 2 outlines the literature review of the research, and it provides a detailed concept and definition of DT, business models, innovative technologies and services
Chapter 3: Research Methodology	It outlined the research methodology that was used in the study. It indicated the research design, research methods, population size, and sampling. It also covered the validity and reliability of the study, data

	collection, limitations and ethical considerations.
Chapter 4: Presentation of Findings	This chapter presents the data gathered in a way that allows for analysis and corresponds to the various propositions stated.
Chapter 5: Analysis of Results and Discussions	The data is analysed and the appropriate analytical tools are used to draw conclusions.
Chapter 6: Conclusions and Recommendations	This chapter presents a final findings on whether research proposals are accepted or rejected. Recommendations are offered to other researchers for future future research projects.

CHAPTER 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

This chapter reviews previous studies on digital transformation, organisational capabilities, business models, and innovative digital services. The first section provides definitions of topics, while the second part details theoretical framework from the literature for digital transformation, organisational capabilities, business model, and digital innovative services.

2.2 Definition of topic or background discussion

2.2.1 Digital transformation.

In the era of the fourth industrial revolution, digital transformation has become popular in academics and businesses, with so many differing definitions and meanings for different industries (Verina & Titko, 2019). Remane et al. (2017) argued that DT is a radical alteration of the existing and creation of new business models in response to the diffusion of digital technologies such as cloud computing, mobile internet, social media, and big data. Ismail, Khater, and Zaki (2017) defined digital transformation as 'a process through which companies converge multiple new digital technologies, enhanced with ubiquitous connectivity, to reach superior performance and sustained competitive advantage, by transforming multiple business dimensions, including the business model, the customer experience (comprising digitally enabled products and services) and operations (comprising processes and decision making), and simultaneously impacting people (including skills talent and culture) and networks (including the entire value system)' (p. 6).

According to Hess et al. (2016), digital transformation deals with the application of digital technologies which consequently changes the organisation's business model. The outcome of the changes influences the enhancement of the products

by incorporating automation in processes and production. These changes trigger growing demand for digital solutions and result in the modification of business models. Based on the definitions provided by the various authors, the definition of Ismail, Khater, and Zaki (2017) aligns well with how digital transformation affects the telecommunication organisations and value chain and was applied to investigate how digital technologies and transformation change business models and various functions of the organisation.

Digital transformation is based on the construct of the use of technologies and changes in value creation. Analytics, big data, the cloud, social media, mobile platforms, and intelligent solutions are some of the digital technologies driving innovations that are changing business models and reinvesting the way businesses conduct business operations (Westerman et al., 2014).

Changes and transformations that are fuelled and supported by digital technologies are referred to as "digital transformations." Digital transformation is characterized as a structural move to big data, analytics, cloud, mobile, and social media platforms. Organisations are constantly changing and evolving to adapt to the evolving business environment, but digital transformation is the evolution built on top of digital technologies that brings about distinctive changes in business operations, business processes, and value generation (Libert et al., 2016). Libert et al. (2016) made a distinction between digital transformation, which happens when digital technologies are utilised to alter overall business operations, value creation fundamentally and in some cases new digital product offerings, and digital enhancement, which involves using digital technologies to make a company's business processes more effective and efficient.

Organisations can engage customers with cutting-edge digital innovations through digital transformation, which also allows them to incorporate digital technologies into many aspects of their operations (Aral & Weill, 2007). Westerman et al. (2014) viewed companies that have effectively implemented digital transformation as better at using their current resources to generate income and can use the widespread digital connections and communications amongst key partners within the value chain.

Verina and Titko (2019) explored the theoretical framework for digital transformation and provided a deep understanding and insight which can be applied by any organisation taking a journey of the digital transformation. Their work revealed many areas that are affected by digital transformation, including business models, processes, technologies, data analytics, customer engagement, and employee skills. This theory is used in the study to understand how organisations can successfully implement digital transformation to create new value and gain competitive advantage and the impact it has on other functions of the organisation.

Digital transformation is a buzzword in the world of academics and business, and in almost every industry there are initiatives taken to digitally transform their operations in the era of the fourth industrial revolution (Verina & Titko, 2019). Digital transformation brings changes in the mode of delivery of services and in the same new forms of direct interactions with customers (Mergel et al., 2019). Digital transformation changes how service providers create value, outline the perspective of traditional industry experts, and enable a new strategic configuration (Kohtamaki et al., 2018). Digital transformation has a profound implication for every enterprise, including internal resources and external stakeholders (Schallmo et al., 2017). According to Kaltum et al. (2016), digital transformation speeds up an organisation's actions, procedures, capabilities, and standards to take advantage of the alterations and prospects in innovative technologies and effect on the market. Digital transformation covers all interactions of innovative structure and exploit on every aspect linked to digital (Kaltum, 2016; Bican and Brem, 2020).

According to Chen et al. (2019), digital transformation triggers major changes in organisational characteristics and the reconstruction of organisational structure, operating system, and value creation using digital technologies. Krause et al. (2021) suggest that Digital Transformation practices require introducing digital solutions that bring changes in how people work, changing organisational processes and roles to business model. The implementation of digital transformation is dependent on the degree to which various stakeholders such as employees, customers, and suppliers accept the changes after the process

improvement and innovation or development of new products (Verhoef et al., 2021). Gupta et al. (2020) elaborated that adoption of digital transformation is similar to change where clients used to interact face-to-face with service providers but now use chatbots and artificial intelligence in an online channel. Digital transformation requires the application of digital technology to build new business models, processes, software and systems that lead to more profitable revenues, greater competitive advantage, and higher efficiency in delivering the services or developing new products (Schwertener, 2017). Digital transformation utilises digital technologies that enable the interaction between suppliers, customers, and complementors, thereby transforming organisations to attain competitive advantage by leveraging new digital competences (Singh & Hess, 2017; Liu et al., 2011). Berente (2020) argues that this shift requires a significant unique method to digital transformation and revolution. Scott (2007) argues that organisations are crafting digital transformation to respond to competitive pressure, build digital capabilities, and develop new business models such as e-business to improve profit margins. Adopting digital transformation and using data analytics technologies enables organisations to tailor-make services and products for individual customers they serve (Kiyiklik et al., 2022).

People are connected through the use of telecommunication services. In the past, telecommunications organisations mainly provided network infrastructure to support information flow between people and businesses (Guo et al., 2022). However, they are pursuing platform-based services in modern times and going beyond conventional connectivity (Alsafadi, 2018). These new products are crucial parts of extensive ecosystems that provide a wide range of value-added services. Essentially, telecommunication companies are becoming technology companies (techcos) that provide not only bandwidth but also platforms and applications that use it (Tekic & Koroteev, 2019). To overcome the challenges the telecommunication industry is facing, telcos must speedily adopt and implement digital transformation (Kraus et al., 2021).

The telecommunication industry has been disrupted by digitalisation and digital technologies. Telecommunication organisations face a serious challenge to accelerate digital transformation to remain competitive in the ever-changing

environment and relevant to the new generation of customers who need customized services (McKinsey, 2017). Wiesböck and Hess (2018) proposed that to deliver innovative digital services requires new organisational capabilities, and traditional telecommucation organisations do not have these digital and innovative skills. Over-the-top (OTT) platforms like Netflix and Disney Plus are in greater demand, compelled telecom providers to adopt a more adaptable business strategy, collaborate with new operators, and allocate income to new partnerships. For telecom service providers, it can be difficult to seamlessly integrate these components into the current model (Stork et al., 2017).

There are numerous benefits in switching from traditional to digital technologies, such as lessening friction, streamlining business operations, and greatly improving services. Most organisations prioritize cost, as there is a shortage of skilled people and human capital is becoming increasingly valuable (Kraus et al., 2021). Through the use of digital technologies such as chatbots, omnichannel customer care, and social media interactions, digital transformation can help telecommunication service providers improve the customer experience (Gupta et al., 2020). Organisations and industries that have implemented digital transformation have seen exponential growth in revenues and profits, improved operational efficiency, and enhanced customer experience (McKinsey, 2017). With the speed at which new developments in mobile devices, smartphone technologies, and internet penetration and spectrum are released, business markets are changing (Odendaal, 2019). The advent of the fourth industrial revolution promises to change the competitive landscape, customer expectations, and delivery of new products and services (Petrucci & Rivera, 2018).

Organisations that use a business model-led digital transformation plan can successfully transition, provided strong leadership is shown from the top, particularly with employee empowerment, overcoming inertia, articulating new vision and offering assistance in potential crises (Tekic & Koroteev, 2019).

2.2.2 Organisational Capabilities

Digital innovation entails developing digital capabilities in sync with innovative digital offerings (Lanzolla et al., 2021). Wiesböck (2018) describes digital capabilities as an organisation's ability to implement digital services that are delivered through digital technologies. This means that organisations need to create and run digital solutions by using and managing digital technologies. Teece et al. (2016) further argued that capability involves identifying and responding speedily to unanticipated adjustments and prospects.

Digital capabilities involve the ability to innovate, adapt to change, and create change that is favourable to end users and disadvantageous to other players in the industry (Teece et al., 2016). By integrating the organisation's innovation attitude, position, and strategy into its processes and operations, an organisation can innovate and create new products, services, and markets.(Wang & Ahmed, 2007). There are exploratory or exploitative capabilities for innovation within organisations. Explorative refers to the development of new skills, competencies, and new knowledge, whereas exploitative refers to the utilization of existing abilities, competencies, and knowledge. (Atuahene-Gima, 2005).

The study of Atuahene-Gima examined a number of capabilities the organisation can have, which are:

1. *Exploitative capabilities* allow an organisation to improve upon and expand current skills, knowledge, and competencies (Atuahene-Gima, 2005).

2. *Explorative capabilities* are those capabilities that make it possible for an organisation to acquire new competencies, knowledge, and skills (Atuahene-Gima, 2005).

Digital transformation provides means for organisations to advance methods and ability for new business model and enhanced customisation, effectiveness, and useful productive assets configuration (Ardolino et al., 2018). Digital capability is the ability to invent, adjust to different environments, and make changes that favour the market but restrict other industry participants (Teece et al., 2016).

Digital capabilities are viewed as the organisation's capacity to bring new digital tools and strategically incorporate, diffuse, and use digital technology and innovation (Kim et al., 2017). Wang et al. (2013) argue that organisations must attract and train digital talents to manage innovation ecosystems. Wiesböck (2018) suggests an additional transverse dimension that characterises an organisation's digital innovation capability as the ability to foster IT business partnerships. Organisation's digitalisation and digital transformation require that organisations carefully support the need, prerequisites, and systems of IT departments and all other business departments to cooperate (Bharadwaj, 2013). Wiesböck and Hess (2018) argue that innovative capability is critical when transforming the organisation from a traditional to digital state and must comprehend the effect of digital technology. Digital expertise is profoundly implanted in most parts of organisational practices and outcomes; therefore, capabilities must incorporate means to exploit rising prospects whilst at the same time mitigating potential risks (Rigby, 2014; Sebastian et al., 2017).

2.2.3 Digital Business Model

A business model is described as the organisational and financial architecture in which an organisation converts resources and capabilities into economic value (Teece, 2010). Kohtamaki et al. (2019) argued that digital transformation facilitates the development of new digital business models and influences the entire organisation and its entire value chain. A business logic based on digital technologies is made possible by digital transformation and thus allows for the experimentation and implementation of innovative business models, also known as digital business models for creating and capturing value (Verhoef & Bijmolt, 2019).

Therefore, the Digital business model is the transition toward smart product-service-software systems that enable value creation and capture through monitoring, control, optimization, and autonomous function (Frank et al., 2019). Veit et al. (2014) contend that digital technologies cause a significant change in how an organisation creates and captures value. Telcos are currently providing traditional voice and short massages as a service. However, with the

advancement of digital technologies, DT presents opportunities for telcos to develop new business models and diversify streams of revenue (Gizelis et al., 2022). The introduction of new business models such as product/platforms-as-a-service, digital platforms, fintech platforms for transaction, and applications as a service presents a new opportunity for Telco to evolve from traditional voice and sms services to digital services (Verhoef et al., 2021).

2.2.4 Innovative Digital Technologies

The development of new digital technologies has advanced since the discovery of transistors. Greater performance is the result of the fusion of smart technology, mobile devices, and internet services (Tekic & Koroteev, 2019). Iansiti and Lakhani (2014) contend that at the end of the 21st century, technologies such as artificial intelligence, machine learning, big data analytics, internet of things, and social media have emerged and are the key drivers of digital business. The degree of application of digital technology significantly impacts the development of a new business model. Digital technologies make repeatability and scalability for novelty possible by transforming current physical parts to a digital source (Massa & Tucci, 2013).

2.2.5 Organisational Digital Capabilities

The research done by Mithas et al. (2011) shows that information management directly influences firm capabilities, such as customer management, process management, and performance management. They defined customer management capability as the ability of the organisation to determine the requirements, expectations, and preferences of its customers and markets. In terms of performance management capability, they defined it as an organisation's ability to achieve flexibility, speed, and cost savings through the design and management of:

i. New product design, manufacturing, and delivery processes;

ii. Business growth processes incorporating innovation, research and development, supply chain, global expansion, and

iii. Support processes like finance, facility management, and human resource management.

Therefore, IT strategy must be crafted to invest in Information Management and digital capabilities to develop new digital capabilities to achieve organisational digital transformation and business excellence. The selection of digital capabilities function is critical in the successful implementation of digital transformation and developing new digital services, and enabling the Telcos to transition from traditional voice and SMS services to digital services. To maximise and leverage the digital infrastructure, develop new digital competencies and skills to develop innovative digital services and achieve digital strategic objectives skillfully.

Proposition 1

Organisational capabilities are the assets and competencies that skilfully gather customer requirements, innovate, create, and deliver value to customers.

2.2.6 Digital Business Strategy

The study excludes digital business strategy; however, the implementation of digital transformation depends on the successful crafting of business strategy, and this section highlights its meaning and importance. Digital business strategy is developed and implemented by organisational resources to deliver a unique value underpinned by speed and extent to produce and deliver customers' needs and expectations (Bharadwaj et al., 2013). Tekic and Koroteev (2019) argued that digital business strategy changes the customer's positioning in the existing market by changing how the service is produced and presented to customers. The change is more interconnected with ICT infrastructure, smart technology, and value chain, which requires high-level decision making (Bharadwaj et al., 2013; El Sawy et al., 2010). Berente (2020) argues that this shift requires a significant unique method to digital transformation and revolution. Digital expertise is profoundly implanted in most part of organisational practices and outcomes, therefore, strategy must incorporate means to exploit rising prospects whilst at the same time mitigating potential risks (Rigby, 2014; Sebastian et al.,

2017). The digital transformation strategy is a prerequisite for the successful implementation of digital transformation. The formulation of clear, effective, and sound digital transformation has become a key priority for traditional industries to transition to the new digital world and remain competitive (Chanias et al., 2019).

Scott (2007) argues that organisations are crafting digital transformation to respond to competitive pressure, build digital capabilities, and develop new business models such as e-business to improve profit margins. Adopting digital transformation and using data analytics technologies enables organisations to tailor services and products for the individual customers they serve (Kiyiklik et al., 2022). Ismail et al. (2017) further proposed that an organisational strategy sets the direction on how digital transformation must be designed and implemented to allow an organisation to integrate the prospects of competencies with customer requirements and needs to create value.

2.2.7 Digital Business Model

The digital business model sits on top of the agenda for most firms and has garnered a strong interest in management literature (Foss & Saebi, 2018). The business model describes how an organisation creates, delivers, and captures value (Teece, 2010). Value capture refers to securing profits from value creation among participating actors (Dyer et al., 2018). Foss and Saebi (2018) contend that an innovative digital business model embodies a designed, novel, non-trivial changes to the key elements of the organisation's business model and architecture linking these elements. The organisational business model is understood as a system of interconnected and interdependent activities that determines how the organisation does business with its customers, partners, and vendors (Amit & Zott, 2012). Schallmo et al. (2017) stated that business models identify the value proposition of the organisation, the value chain, the cost and revenue sources, and other key differentiators. A business model is said to be digital if there are vital changes on how products and service offerings are delivered, income is made, and resources optimised using digital technologies (Veit et al., 2014).

Weill and Woerner (2013) argued that most organisations in various sectors are changing at distinct pace moving towards a smart technology environment where the focus is more on intangible, service-based and customer experience-centric. Yoo (2013) suggested that the move opens a world of possibilities without constraints where data can be reused, transformed, and shared. The advancement of digital technologies and the adoption of digital transformation are modifying how business is done and pushing long-existing organisations to alter radically (Christensen et al., 2015). DT presents new challenges to incumbent firms as they search and implement innovation of business models for digital transformation. They are faced with conflicts and trade-offs between existing and new ways of doing business and DT adoption seems to threaten existing business model becomes obsolete (Christensen et al., 2016). Li et al. (2018) propose that the implementation of DT and digital technologies lead to fundamental changes to existing business model, routine and capabilities, and allow service providers to enter new markets and exit the current markets. Morris et al. (2005) and Osterwalder et al. (2005) stated that business models link organisational strategy and its business processes by clarifying the logic of value creation and the effective coordination of business resources.

Proposition 2

The current literature states that digital transformation, which is technology-induced, facilitates the experiment and development of novel business models to create and capture value. Therefore, digital transformation plays a significant role in the design and introduction of a new digital business model.

2.2.8 Digital Innovation and Innovative Services

Hund et al. (2021) defined digital innovation as the creation and leverage of a limitless novel product or service which add value through the use of digital technology. Yoo et al. (2010) suggest that digital innovation is achieved by applying digital technology on products and service offerings. Tilson et al. (2010) state that using digital technologies in all parts of the organisation results in merging different areas of expertise and create new form of product offering and competitive pressure. The acquisition of Skype by Microsoft enabled Microsoft to

enter a new terrain and directly compete with telecommunication companies by offering new digital communication services (Yoo et al., 2010). Kohli and Melville (2018) state that the organisation strategically decides to alter its business model and become innovative in creating enhanced products and new services.

The subject of innovative service offering is being followed by many researchers and business leaders across multiple disciplines and has garnered great interest for further investigative studies (Konya-Baumbach et al., 2019). Digital innovation is defined as a new combination of software and hardware parts creating new offerings (Yoo et al., 2010). Brynjolfsson and McAfee (2011) argue that digital innovations are characterised by radical changes. Their disruptive nature gives edge to overcome barriers and enter new previously closed markets. Digital innovation is viewed as a new model which feasibly creates new streams of revenue by using digital information that is market ready to successfully transform inventions into the digital world (Bican & Brem, 2020). Digital innovation results in the dismantling of existing restrictions regarding products, services, organisations, and industries and combining different resources to recognize other avenues of opportunities (Yoo et al., 2010). Henfridsson et al. (2018) state that dismantling barriers amongst the market participants allows users to determine what they need and reconfigure the components of the services based on what and how they need it to be delivered. Pershina et al. (2019) suggest that merging organisational procedures, resources, and assets beyond industry borders enables several knowledge and competencies to create new form of competition.

According to Magistretti (2019), the use and embrace of digital technology and digitised practices shape organisational activities and lead to innovative service offerings. Zott et al. (2011) contend that digital transformation is directly linked to modifying business models, which drives innovation.

Proposition 3

The literature has revealed that digital transformation enables the integration of data and physical components to produce a new innovative digital service.

Therefore, the literature concludes that digital transformation plays a major role in the development and introduction of new innovative digital service offerings.

2.3 Digital transformation an overview of empirical literature

2.3.1 Digital transformation in the other industries

The study by Schiavone et al. (2021) in the Italian healthcare industry was to better understand how digital platforms enable the creation of value between various stakeholders of the ecosystem. The findings offered empirical evidence for three broad themes: central mediator as a relationship enhancer, digital business model, and transportation services in the healthcare ecosystem, and value co-creation in the multi-stakeholder environment. The findings regarding the digital business model showed that healthcare organizations can provide complete support to patients throughout their health journey. The platform for the sharing economy broadens the services available to healthcare organizations in health logistics networks and supports the actions of each participant. The platform enables the allocation of spaces that would be a real cost to the business by enabling each player to maintain the track of the service and the motor vehicle. After placing an order for services, the patient receives a link that connects them to a live dynamic map.

Kraus et al. (2021) also found that the development of digital technologies has given patients more power. As a result, they are taking an active role in making decisions about their medical care. They investigated how value creation, value chain and value networks, which are center-edge models, add value to the provider-patient relationship in healthcare. The self-service and feedback cycles are the fundamental characteristics of this relationship. The conclusions of their qualitative empirical investigations demonstrate that the health care sector is one that is best positioned for a profound center-edge transition to a digital business model and customised service offerings.

Zenisek et al. (2021) conducted a study in Austria on Smart Manufacturing Technologies. Their findings reveal that the use of technologies such as additive

manufacturing, laser metal deposition, machine learning, and artificial intelligence are changing the traditional way of production to a more flexible, efficient and great performance. The investigation conducted by Corallo et al. (2022) shows that Big Data Analytics is becoming more and more relevant for gathering usable information in smart production lines made up of machines with sufficient sensors. This information can propose actions to be taken and can be continuously monitored to determine how well processes are working and how well product quality is turning out.

Fairooz and Wickramasinghe (2019) in their study conducted in Sri Lanka discovered that there has been an increasing usage of Big Data, IoT, robotics, cyber security, artificial intelligence and blockchain technologies in the financial sector. DT allows the majority of financial services providers to be capable of creating tailored, clever, adaptable, and cost-effective financial products and services and are making efforts to achieve higher degrees of customer centricity. They noted that the banking model underwent drastically different adjustments to the system's core fundamental operations, enabling banks to offer the necessary financial services at a lower cost.

2.3.2 Digital transformation in the telecommunication industry

Kastouni and Lahcen (2022) conducted a study on the digital transformation and application of big data technologies in the telecommunication industry in Saudi Arabia. Their investigation shows that the use and application of big data analytics technologies has completely transformed the telecommunication industry. Telcos now have new opportunities to learn from previously untapped data sets thanks to the Hadoop ecosystem, streaming analytics tools, and machine learning tools. However, to fully profit from big data analytics solutions, it is essential to first identify the techniques that will best control the project and the data. The next thing is to choose an architecture that will consider all the peculiarities and demands of the telco industry. This includes handling batch and streaming data processing and having the capacity to offer insights in the moment. Finally, ensure the confidentiality and security of data. They further concluded that adopting data analytics in the mobile ecosystem brought a

paradigm shift since the introduction of fourth-generation mobile networks. It enables telecommunications providers to have new insights on network performance and user behavior, which helped open up new revenue streams, improve the customer experience, and increase customer retention.

In the study conducted by Balmer et al. (2020) in Europe and the USA, they interviewed senior executives responsible for the planning and implementation of digital transformation in the telecommunication sector. The study's conclusions demonstrate that technology-enabled assets, such as operational systems and processes supporting operational efficiency and a digital services platform enabling rapid innovation, are crucial for a digital transformation. The suggestions for DT include (i) developing a digital strategy; (ii) taking immediate action to invest in an operational backbone; (iii) constructing a platform for digital services; (iv) creating a platform for digital services; and (v) establishing a service culture.

The study aims to investigate the role of digital transformation in the telecommunication companies in South Africa. The study is significant to provide valuable insights of the role of digital transformation on the business model, new organisational capabilities and new digital innovative service offering. As far as the research could determine, there have been few studies available that investigated the role of digital transformation specifically in the telecommunication companies in South Africa. The study elaborates on the concepts of digital transformation, digital business model, digital organisational capabilities, and innovative digital service offerings.

The organization's ability to make the transition from its existing state to the intended new state is a key factor in the success of the digital transformation. The above-mentioned theories do not address how prepared organizations are digitally for this transformation. To fit digital transformation, activities related to digital transition must be modified. Implementing digital technologies, developing digital business models or mastering digital transformation are all impossible without digital readiness and capability (Bican & Brem 2020). Based on the literature studied, key gaps of the current state of telecommunication companies, digital readiness and organisational capability were identified that led to the

development of framework for digital business model, new digital capabilities and innovative digital services

2.3.3 Organisational Capabilities

In Malaysia, Khin (2018) performed research on the relationship between organizational success and the impact of digital capacity on innovation. He emphasized the value of the technological resources, talents, and competencies needed for the innovation process. According to his argument, a company must build a variety of talents in a wide range of domains, each of which must be tailored to the organization's particular needs. According to his research, digital transformation involves integrating digital technologies that meet the demands of both organizations and consumers, enabling them to provide digital solutions that would alter business models and produce new customer experiences. By participating in outsourcing, training, or forming alliances or joint ventures with more powerful entities, Telco must focus its efforts on maximizing its innate competence. Digital innovation and the creation of new digital services are fueled by digital capability, which is built with the skills, abilities, knowledge, and experience related to the management of digital technologies.

The study carried out in Shanghai by Wang & Li(2023) demonstrates that the synergy of digital capabilities and technological capabilities can effectively promote digital innovation, indicating that businesses should recognize the importance and development of the synergy of digital capabilities and technological capabilities. In the age of the digital economy, increasing technological innovation capacity is a necessary condition for the creation of high-quality services and a positive customer experience. Enterprises can acquire more resources quickly and affordably with the use of digital capabilities

2.3.4 Digital Business Model

A study by Palmie et al. (2022) in Sweden on online retailers reveals that the relationship between service providers and clients has undergone a significant transformation. Customers can choose between in person interactions at real

businesses and online purchases depending on their interests. To serve all clients and provide value, service providers must build their business models to combine online and in-person buying. To provide services and necessities, the internet retail business model depends on third parties working together and being reliable. Companies set themselves apart from rivals by developing close relationships with clients, customizing services, and providing those services. The study comes to the conclusion that to understand consumer wants and create business models that add value, physical and digital engagement with clients, partners, and suppliers must be improved.

A study of digital business models in several industries was carried out in Germany by Härting et al. (2018). The study discovered the following four characteristics that affect the digital business model:

i) *Key performance indicators* - Greater performance can be achieved by new business models, processes, and the usage of digital technologies. Artificial Intelligence (AI) also opens up new approaches to reduce labor expenses, although conserving resources, increasing productivity, and reducing transaction costs through digital technologies are some of the key drivers to perform better.

ii) *Individualization* – New opportunities for tailored goods and services are created by digitization, including those related to flexible pricing, product options, and delivery methods.

iii) *Efficiency* – Digital business models enable organizations to be more innovative and agile, resulting in more efficient business processes.

iv) *Communication* – Digital business models and processes enhance a company's internal and external communication..

According to the research, digital business models result in lower transaction costs, better large-data management, lower labour costs due to the use of

artificial intelligence to replace repetitive human work, better customer support, and more customized products.

2.3.5 Innovative Digital Service Offerings

According to Alsafadi (2018) research, OTT players and digital disruptors are threatening traditional correspondence earnings, and telecommunications are looking for opportunities to advance up the digital stack to the services layer. With a large customer base, responsibility for the foundation, and strong innovation skills, telcos must work to compete against the role of digital services providers, frequently emerging as disruptors to diverse businesses.

By modifying their operational procedures, telcos must modify their business model. Not only those with the best systems, but also those who quickly embrace digitalization over all aspects of customer encounter, internal association, and development, will find the largest pools of substantial worth. The telco must develop digital services that meet the demand for a growing number of younger generations who use digital services as an instrument of communication, such as Snapchat and Facebook massaging. Middle-tier customers who were accustomed to using traditional voice and massage as means of communication are now transitioning to the use of OTT services such as Skype, WhatsApp, Apple’s FaceTime, Google Hangouts.

2.4 THEORETICAL FRAMEWORK

The study is underpinned by digital maturity model theory and dynamic capability theory.

2.4.1 Digital Maturity Models and Framework

The level of an organization's digital maturity indicates how well it can adapt to and accomplish intended strategic and operational organizational results in the face of significant technological change. It serves as a measure of an organization's progress toward digital transformation (Remane et al. 2017, Thordsen et al. 2020).

Digital capabilities and leadership competencies are the two characteristics used to assess digital maturity, according to Westerman et al. (2014). Strong leadership is necessary to achieve synergies between freeing investments, people management, and cultural adaptation, while strong digital technology and capabilities facilitate digital efforts and reduce risks (Westerman et al., 2014). Westermann et al. (2014) suggest that digital maturity should be assessed based on two dimensions of digital and management skills, arranged in a four-quadrant classification: beginners, fashionistas, conservatives, and digital masters.

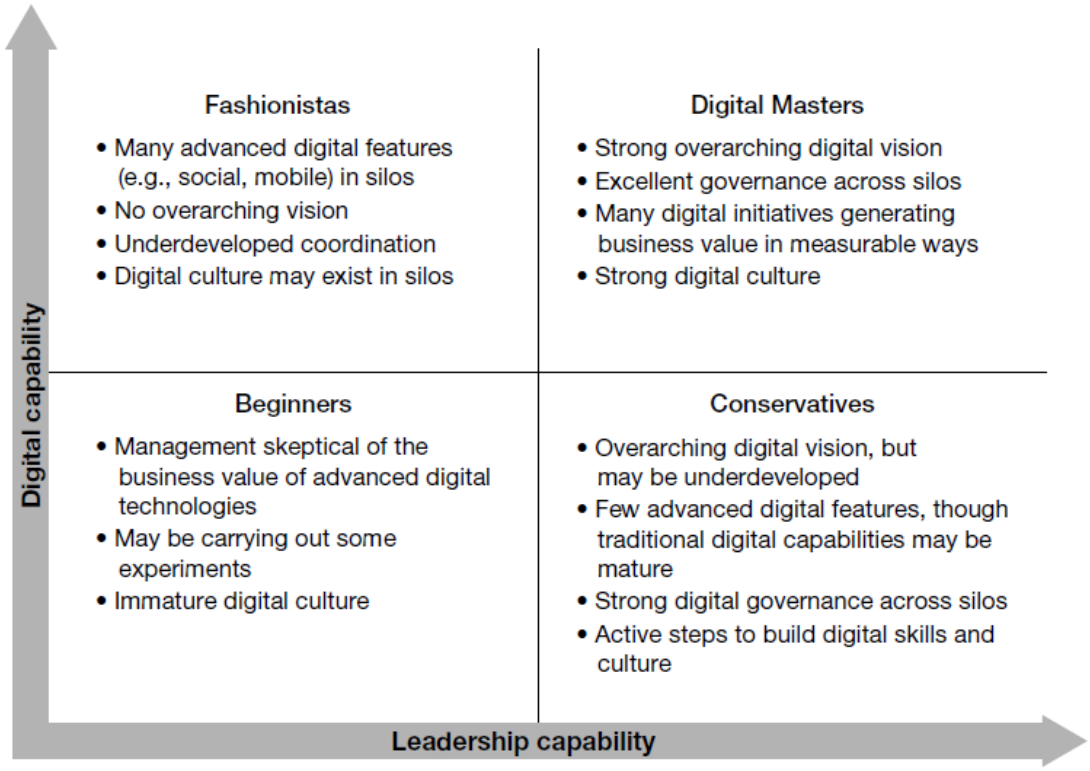


Figure 1: Digital Maturity Model by Westermann (2014)

Beginners (shown in Figure 1 bottom left corner) are often classified as organizations with rather limited digital resources and capabilities; they are self-starters, unaware of their potential to grow their business, and often lack an effective strategy or vision for change (Westerman et al., 2014). Digital fashionistas experts (shown in Figure 1 top left corner) strive to be empowered by the best and highest digital technologies and change, but lack the synergy of

deep digital vision and transformation strategy and often lack the knowledge to create business advantages (Westerman et al., 2014). Conservatives (shown in Figure 1 bottom right) favor more foresight and governance; they have a strong unifying vision at the forefront with a corporate culture to manage investments well. They are often skeptical and cautious (Westerman et al., 2014).

The archetype of a digital master (shown in Figure 1 upper right corner) is the ultimate champion that businesses should aim for. These organizations have an in-depth understanding of digital vision, digital value potential, and how to create value through digital transformation. Digital vision, digital cultures, and constant advancement of their digital competitive advantage are how digital masters are created (Westerman et al., 2014). The maturity model developed by Westerman et al. (2014) is one of the most widely used frameworks for measuring digital maturity and was shown to be a practical model for assessing any organization across all industries. Digital leadership means everything an organization needs, such as innovation, value orientation, potential for disruption and conflict, flexibility in the matter, but also decision-making, advanced social skills, and a lot of courage (Westerman et al., 2014). Westermann et al. (2014) link a firm's digital maturity to better firm performance, as measured by indicators such as revenue per employee, earnings before interest and taxes, and product margins.

2.4.2 Dynamic Capability Theory

The idea of dynamic capability was developed as a result of pointing out the flaws in the resource-based viewpoint. The resource-based perspective is grounded in the knowledge that differing resource endowments provide company an edge in one performance area or another, resulting in varying levels of performance across the sector. (Barney, 1991; Wernerfelt, 1984). The main characteristic that sets these resources apart is that the firm uses them strategically, which means that they are employed to create a long-term competitive advantage. (Barney, 1991). According to this perspective, the firm's resources serve as a source of its competitive advantage, since they are valuable and provide value to customers. Resources must be VRIN, i.e. Valuable, Rare, Inimitable, and Non-Substitutable to be appraised as valuable but difficult to obtain. (Barney, 1991).

Dynamic capability theory has been used in many organisations to assess how they should respond and adapt to the changing environment by building new capabilities to achieve competitive advantage. By deploying, configuring, and redeploying organisational resources, dynamic capabilities enable the organisation to change its regular capabilities in response to environmental dynamism. These capabilities also provide new approaches to problem solving (Katkalo et al., 2010). Through the ability to update organisational competencies and respond creatively to environmental changes, dynamic capabilities allow the company to gain a competitive advantage (Katkalo et al., 2010).

The capacity of an organisation to adapt to external changes depends on its capacity to innovate, recognize and integrate market information, and restructure internal processes to exploit new market prospects. Wang and Ahmed (2004) consider these the qualities that make up dynamic capabilities as innovative and adaptive capabilities.

Innovative Capabilities

Bringing a new invention to market and raising its level of competition are examples of innovation (Gaubinger et al., 2015). Innovation is defined as an organisation's inclination to launch novel goods and procedures, tap into untapped markets, and change its business model (Wang & Ahmed, 2004). The firm's innovative capabilities include its capacity to create novel goods and procedures, tap into untapped markets, create fresh business perspectives, and coordinate its operations with its overall strategy (Wang & Ahmed, 2004).

As a concept, innovation can be divided into two categories: market innovation, which refers to new strategies for entering and exploiting targeted markets, product and process innovation, which refers to the new products of firm, and strategic innovation, which refers to novel business models (Wang & Ahmed, 2004). A business can innovate by creating new products and processes, a new business model, or a new marketing strategy in response to market developments. Innovative competence is the capacity to mobilize organisational resources to develop novel value propositions for both emerging and established markets, whether they be for markets, products, or business strategies (Wang &

Ahmed, 2004). Whatever the characteristics of innovation, its characteristics can range from the continuum of gradual improvement to radical innovations (Gaubinger et al., 2015; Goffin & Mitchell, 2016).

These characteristics demonstrate that an organisation's readiness to stick with the tried and known or to try new, riskier methods of doing things that require giving up preconceived notions and accepting the possibility of failure, regardless of where it stands on the innovativeness continuum, drives innovation in that organisation. This effectively indicates that the predisposition to either exploit current competencies or explore new methods of doing things is what drives the inventive capacities (Atuahene-Gima, 2005).

Exploitative and explorative capabilities must coexist in the development of innovative capabilities in order for the organisation to be competitive in the short- and long-term. Additionally, new competencies must be developed to keep up with changing market conditions (Atuahene-Gima, 2005).

Adaptive Capabilities

An organisation's capacity to react to recognized market opportunities is known as its adaptive capability (Wang & Ahmed, 2007). Therefore, seizing a moment and taking steps that create consumer insight and acting creatively in response to that information leads to the development of adaptive capabilities. This theory is applicable to the study to investigate the role of digital transformation in telecommunications companies. New competencies and capabilities are critical for organisations to create and deliver value; therefore, it was further used to understand how new capabilities are developed and deployed in organisations to align with the digital transformation strategy and implementation.

2.5 Conclusion of Literature Review

Digital transformation is a change in part or an entire organisation driven by digital technology. Digital transformation is a strategic imperative in which organisations adopt technology to create and deliver customer value. External and internal factors trigger the implementation of digital transformation, such as changing

customer behaviour, changing competitive landscape, and internal operations, and operating cost. Hund et al. (2021) asserted that digital innovation derives its roots from the adoption of digital transformation and application of digital technologies, enabling generative mechanisms and encouraging the identity of innovative processes and implementation. Christensen et al. (2015) proposed that the development of digital technologies and adoption of digital transformation change the rules of doing business and drive long existing organisations to alter current value creation radically. The ability to design and develop new digital business models and innovative digital services requires new capabilities. Therefore, implementing digital transformations triggers the development of new organisational capabilities and competencies to successfully leverage and achieve competitive advantage.

CHAPTER 3. RESEARCH METHODOLOGY

3.1 Research approach

The research methodology for this study is qualitative because the study aims to explore the role of digital transformation in telecommunication companies, the role it plays in the development of the digital business model, innovative digital capabilities, and innovative digital service offerings. The study, which aims to explore the role of the digital transformation in telcos on digital business models, was conducted using an interpretivist worldview and paradigm. The interpretivist worldview is predicated on attempting to understand the world, i.e., constructing or interpreting it in light of the participants' perceptions of it (Creswell, 2018). With qualitative research, a theory might develop from the data. It provides in-depth, contextualized, and thorough information that enables the development of new research questions that will direct the collecting of more data from study participants.(Creswell, 2018). The research method was also applied to evaluate participants' experience and acceptance of digital transformation in their respective organisations.

This undertaking requires the use of qualitative techniques to comprehend how the digital transformation affects the development of new digital business models and innovative organisational capabilities, which, in turn, delivers new digital service offerings.

3.2 Research design

Given that this study aims to explore the role of digital transformation and the influence it has on the development of business model, digital innovative capabilities, and digital service offerings, the most suitable instrument for the research design was a multi-case method because it can confirm or disapprove patterns of the phenomena under investigation. Multiple-cases approach was chosen because it can provide a strong support for creating propositions that characterise the phenomena if all or most of the cases have similar outcomes (Yin, 2009). A thorough examination of the case enables understanding of the

problems from several angles (Creswell, 2018), and is a beneficial technique for learning about particular phenomena (Eisenhardt & Graebner, 2007).

The outcomes and conclusions drawn from the data depend greatly on the research methodology used (Ritchie, Lewis, Nicholls, & Ormston, 2013). For the purposes of this study, a descriptive case study approach was used in conjunction with a qualitative research methodology. The current state of the phenomenon under examination is described in a descriptive case study. Participants' experiences and the digital journeys of telco companies were thought to be crucial to understanding patterns and gaining insights into the stage of digital transformation. The studies were conducted in Vodacom, MTN, Telkom, and Cell C telecommunication service providers because they have been in the industry for several years and have a nearly 100% combined customer base.

The case study question deals with the unique scenario in which there may be many more factors of interest than data points. The facts must converge into a single theme to support one conclusion by numerous sources of evidence, while another result is enhanced by the use of previously developed theoretical propositions to direct the collection and analysis of data. The use of structured or semi-structured case study protocols assists in enhancing reliability (Yin, 1994). Case studies are used because they provide a greater understanding of context-specific elements that may contribute to the full understanding of digital transformation and the development of digital business models and digital innovative capabilities and services. The focus was on the telco companies because, as far as I understand, few or limited studies have yet been conducted to investigate the role of digital transformation in the telco industry.

3.3 Data collection methods

Data were gathered through in-depth interviews using video conferencing with the participants. The semi-structured interview questions were designed to elicit information on the participants' opinions and perspectives on the role of digital transformation and its role on business model, organisational capabilities, and innovative service offerings. To help ensure consistency in data collection and recording, Creswell (2018) recommends the creation of an interview procedure.

To ensure consistency in the way interview questions were asked and for the purpose of documenting data, interview guidelines were developed. The interviews were recorded with the consent of the participants to make transcription easier later.

The interviews were used as a data collection instrument for the primary data and video conferencing appointments were arranged in advance with the interviewees. Digital recordings allowed the researcher to ask probing questions and pay full attention during the interview process. For the interview to serve as an active research instrument, an interviewer should be free from note taking and be able to focus on the areas/topics to be researched throughout the interview (Gillham, 2000). The video conferences to capture the proceedings were labeled and coded with the initials of the participants and the date of the interview. Semi-structured and open-ended questions were prepared beforehand.

According to Creswell (2018), a qualitative study must have the following characteristics: It must be conducted in a natural environment, the researcher must personally gather the research data from various sources, and the data must be analysed using both inductive and deductive methods to elicit the participants' views, opinions, and understanding of the phenomenon being studied. The researcher conducted interviews with the participants and conducted the study in the real world where the digital transformation and business model take place. The participants, through open-ended questions, provided insights and practical evidence of their experience in planning and implementing digital transformation. Furthermore, interviews provide the researcher with more opportunity to explore for more information, ask follow-up questions, and return to important issues later in the interview to produce a rich knowledge of the topic, motivations, and drivers (Vogl, 2013). The drawback of the interview is that processing the data for a meaningful analysis can be time consuming and expensive (Adhabi & Anozie, 2017). The impact and change observed indicate how digital transformation alters how organisations design and deliver digital services. Creswell (2018) contends that the primary goal of qualitative research is to gain a deeper understanding of the problem from the perspective of participants and to address the research in order to achieve that

information, the data gathered contribute to the dynamics and progression of the study.

3.4 Population and sample

3.4.1 Population

The population for this study is made up of four cellular network companies participating in a case study. The study specifically explores the roleof digital transformation and how it influences the business model and the development of innovative digital capabilities of organisations and digital service offerings. Since digital transformation is driven by digital technologies, the case study explored the relationship between digital transformation and the digital business model and the effect on organisational capabilities and service offerings.

3.4.2 Sample and sampling method

The selection of the samples was based on four organisations in the telco industry offering mobile voice, data, and Internet services as a central offering to their customers. Purposive sampling helps identify key informants whose context-specific knowledge and expertise regarding the issues relevant to the research are significant and information-rich (Patton, 1990). Twelve participants were selected from four telecommunication organisations occupying middle to senior managerial positions who have insights into their respective organisations' direction and future. Creswell (2018) recommended a sample size for each narrative case study of 3 to 10 individuals. The organisations in the case were expected to offer comprehensive and varied data because this was not a statistical sampling (Creswell, 2018).

3.5 The research instrument

The study used semi-structured and open-ended questions to administer interviews. Participants were selected purposively based on their industry experience, roles and seniority positions in their respective organisations, and

level of education. The interviews were scheduled based on the availability of the participants and an interview guide was sent prior to the scheduled interview to allow participants to familiarize themselves with the questions. To maintain consistency, themes were developed based on the phenomena and research questions being investigated. The themes are as follows:

Table 3. Research themes

RESEARCH QUESTION	**THEMES**
Organisational Capability	Network technology evolution and development
	Network Sharing and partnership
	Digital Technology investment and deployment
	Development of digital skills and competency
	Organisational performance and overall acceptance of DT
Business Model	Organisational strategy
	Value creation and Delivery
	New Opportunities
	Customers consumption trend
	Innovative services offerings and demand

Digital Innovative Service offering	New Market Competition

3.6 Procedure for data collection

The primary data collection for this study was carried out using interviews as an instrument and virtual meetings with interviewees were arranged in advance. The interviews with participants' permission were recorded for ease of transcription at a later stage.

The process that was followed:

i. The researcher phoned the selected individuals to introduce them to the study,
ii. The researcher invited the participants to participate in the study,
iii. The interview questions were sent in advance to participants to allow them to familiarise with interview questions and that they feel confident and comfortable to answer them.
iv. Consent forms were also sent to participants and
v. Participants were asked to refer the researcher to other participants recommended for the study.

3.7 Data analysis strategies and interpretation

In qualitative studies, analysis typically occurs concurrently with data collection; therefore, the data analysis process began as soon as the first data were obtained (Creswell, 2018). The data were then combined into themes that emerged as the analysis progressed.

To maximize efficiency and free up the researcher to focus on the interviews, an electronic transcription tool was arranged. The ATLAS Ti software, a qualitative analysis program, was used to assist in data analysis. Furthermore, ATLAS Ti software helps in managing huge volumes of data and allowed researchers to carry out surveys, report on survey results, and offer feedback.

Thematic analysis was used to analyze the data, which is a technique to find patterns in themes that appear in interviews and other pertinent materials and is then applied to analysis (Clarke & Braun, 2015). Since this study is primarily concerned with understanding the role of digital transformation in the creation of new digital business models, the thematic analysis was more suitable for it than the content analysis.

The researcher performed data analysis plans as follows:

i. The researcher transcribed interviews and scanned material and notes and arranged data into different types.
ii. The interview transcripts were examined line by line and the interpreters of the informants were coded to aggregate themes that share common characteristics,
iii. Generated description of themes according to their categories,
iv. The themes were analysed for each individual case and across different cases,
v. Discuss several themes in detail by drawing information from the participants.

3.8 Quality Assurance

3.8.1 Transferability

Transferability refers to the extent to which the results of the qualitative study can be transferred to other contexts and settings with different participants (Korstjens & Moser, 2018). The use of the same questions as an instrument during the interviews ensured that the collected data is consistent and similar with all participants. This process ensured transferability in the study.

3.8.2 Credibility

Korstjens and Moser (2018) defined credibility as the level of confidence that can be in the truth of the research finding. Creswell (2018) stated that sharing information with others on the specifics of the research along with the study

design is crucial so that the readers can assess the credibility of the findings for themselves. The study used triangulation to maintain credibility by gathering data from research participants who occupy high-level positions in their respective organisations and also analyse organisations' documents and website information that are made available to the general public. The participants are believed to be knowledgeable and provide rich information. Furthermore, the findings were compared against prior studies to ascertain if they converge to the same conclusions. The findings of the study were also shared with participants who requested it.

3.8.3 Dependability

Dependability in qualitative research refers to the consistency and dependence of the process of deriving findings and interpretations, as reliability in quantitative research does (Lincoln & Guba, 2013). Dependability was attained by keeping an assessment trail, in which the researcher preserved a self-critical account of the study process, including internal and external conversations (Tobin & Begley, 2004). According to Korstjens and Moser (2018), dependability refers to the consistency of the findings where the same surveys were repeated and yielded similar results. The multi-case studies of four telco organisations and participants in similar positions ensured that research findings are dependable. Furthermore, a table for the themes as they emerged from the interviews was developed to maintain consistency.

3.9 Ethical considerations

According to the Wits University ethical norm, which the university subscribes to, the same standards were followed in this research study. Over the course of the research, the researcher operated with integrity, was truthful, open, responsible for all elements of the study, fair to others, and demonstrated effective leadership.

The researcher further pledges to act in a manner that strictly upholds his obligations as a researcher as specified in the Wits University ethics and integrity standard to:

- Ensure the reliability of the research data and outcomes and conduct himself with the utmost integrity.
- Systematically gather and evaluate research findings to draw conclusions that are supported by evidence and based on the most relevant research methodologies.
- For ease of replication of research by others, maintain a thorough and accurate record of the study.
- Acknowledge the contributions made by individuals who contributed significantly to the research as well as the work of other researchers who were used in this study.
- Prior to the scheduled interview, participants received consent forms that they were asked to complete, sign and return in writing.
- The researcher always operated honestly and disclosed any conflicts of interest that would jeopardize the objectivity of the study or cause harm to a third party.
- All efforts were made to protect the privacy of the research participants, who were required to participate in the study in strict anonymity. Only those who gave their express consent allowed their direct quotations to be used in the study. The university keeps the research data in a secure location with limited access.

CHAPTER 4: PRESENTATION OF FINDINGS AND RESULTS

4.1 INTRODUCTION

The research aims to explore the role of digital transformation in developing innovative capabilities, the new business model, and innovative digital service offerings, specifically in telco organisations in South Africa. Twelve (12) semi-structured interviews were conducted with the four (4) telcos in the telecommunication industry in South Africa. The findings are presented in this chapter concerning propositions specified in Chapter 3. The demographic profile of the participants is presented at the beginning of the chapter, which is then followed by an explanation of the findings and a conclusion. Thematic analysis was used to present and summarize the data. Data are presented through quotes that are interpreted individually or collectively to support the themes that emerged during the interviews.

Over the course of four weeks, data were gathered via semi-structured interviews. Twelve participants in the telecommunication companies were interviewed. The interviews were held on the MSTeams platform, recorded using the same MSTeams recording feature, and later transcription was performed. The average interview lasted 45 minutes, while the transcription process took 4 hours for every hour of interviewing.

The participants were chosen purposively based on their employment in South Africa's telecommunication sector. Participants were chosen based on their comprehensive knowledge of the telecommunications industry and the type of interview questions. This was done so that they would provide the information and perspective essential to draw the conclusions needed by the interview questions.

The twelve participants are made up of three or four participants from each of the four telecommunication organisations, namely, Vodacom, MTN, CellC, and Telkom, who were the majority (n = 9) at senior management positions and

participants (n = 3) were at the executive level. Table 4 shows the details of the demographics of the participant.

Table 4. Participants' Background and Experience

Participants	**Highest Qualification**	**Years of experience in telecommunication Industry**	**Position**	**Business Unit**
1	Master Degree	15 +	Snr Manager	Technical
2	Honours Degree	15+	Snr Manager	Technical
3	Master Degree	15 +	Snr Manager	Technical
4	Master Degree	15 +	Snr Manager	Technical
5	Master Degree	15 +	Snr Manager	Technical
6	Honours Degree	15 +	Snr Manager	Product Development & Sales
7	Master Degree	15 +	Snr Manager	Technical
8	PhD	5+	Executive	Strategic
9	Post Grad Diploma	15+	Senior Manager	Technical
10	Honours Dgree	15+	Senior Manager	Sales & Marketing

Participants	Highest Qualification	Years of experience in telecommunication Industry	Position	Business Unit
11	Post Grad Diploma	11 - 15	Senior Manager	Digital Platforms Operations
12	Honours Degree	11 - 15	Senior Operation Manager	Technical and Operations

4.2 DEVELOPMENT OF THEMES

The deductive technique was used to create themes from the raw interview data generated from the interview questions to answer key study propositions. This was done in order to address the main research propositions. The research interviews were recorded using an MSTeams platform and then transcribed by the researcher. The researcher next classified the interview material that had been transcribed into codes, which were then further combined into themes. Creswell (2018) elaborates on the coding procedure and the method used to generate themes. He describes how the interviews' transcripts were read through numerous times before being coded sequentially to generate themes. To be as accurate as possible with the data gathered, this method of developing themes is used. A total of thirteen (13) themes emerged from the research findings related to the propositions.

4.2.1 Pseudonyms Application

The following companies are referred to using pseudonyms in order to protect the privacy of the companies participating in the study:

- *Company W is* a telecommunication company that provides wireless voice, data, and internet services to the general public and businesses. Their target market is the younger generation.
- *Company X* is a telco company that provides telecommunication and Internet services to the public and to corporate organisations through mobile networks. Their customers are general public and corporate clients.
- *Company Y* is also a telecommunication company that provides fixed and mobile telecommunication services to public and corporate customers.
- *Company Z* is a wireless and fixed telecommunication service provider that provides fixed and mobile network services.

4.3 FINDINGS PERTAINING TO RESEARCH PROPOSITION 1

This section presents findings of the first proposition, Digital transformation's role in developing new organisational capabilities and competency. The following themes were developed deductively:

- Network technology evolution and development
- network sharing and partnership
- digital technology investment and deployment
- development of digital skills and competency
- orgnistaional performance
- overall acceptance of DT and leadership

4.3.1 Network technology evolution and development

The telecommunication network had gone through various stages of technological developments and deployment of upgrades as critical assets to deliver communication services. With the advancement of latest digital

technologies such as 5G, AI, IoT,, telcos can build capacity to deliver services beyond voice and SMS to internet and content services.

> *“The last past 5 years we have seen the introduction of LTE, the introduction of fibre, the introduction of IoT, including the integration of phones whereby you use fiber-to-the-home. We have seen smart homes and smart cities, we have seen more and more connections, even now devices are connected more than the number of people in South Africa. '* – ***Participant 2***

> *“10 years ago, we were talking about 4G. So now we are talking about 5G, but the 5G doesn't just come with new technology, it is actually changing how the businesses operate. With 5G, it is opening up to other industries. So, a telco used to be quite in a silo type of operation where people came to buy the product, and they used it. But with 5G and the newer technologies, now you are looking at a full ecosystem. It is no longer just the technology that is driving, but it is the lifestyle and usage and business processes that are changing.”* ***- Participant 7***

> *'We have moved into a more hybrid situation whereby data is driving the industry. Now it is a data-centric industry where data is king and voice is playing a secondary role for the first time in the past few years. Recently, for the first time, data is contributing more revenue to the telco providers. The OTT and other financial services play a crucial role in diversifying revenue streams.”* – ***Participant 12***

4.3.2 Network sharing and partnership

There has been a trend that existing telcos and new entrants can expand their coverage and service offerings to new geographical areas without building their own physical infrastructure, and telecommunication policy and regulation have facilitated the infrastructure sharing among industry participants.

> *“You will know now that the new agreement that Telkom has, to roam on the MTN network, and vice versa. You also know that we cannot operate*

everywhere, hence, we piggy bag whoever has infrastructure in the specific area, whether is a better service for our clients or not; obviously we know that competitors will always prioritise their own customers. I think that is how the market works now. Sharing is the way forward. ' - ***Participant 2***

'So, two operators do not have to go and build competing networks, one can build and the other can just come in lease on top of that. It actually reduces the Capex investment where the major cost of any mobile network is around the physical building of sites. If you can share, then you have a lower capex and then speed to market is a bit faster." – ***Participant 7***

"Some new competitors in the market end up going on to common network providers such as MTN to roam on their network; as a result, they do not have to build their own telecommunication networks. So, in essence, where there is less infrastructure or no infrastructure, competitors would utilize existing players to carry their traffic for a fee." – ***Participant 12***

4.3.3 Digital technology investment and deployment

Digital transformation is enabled by the deployment of digital technologies and it requires investment and reconfiguration of the business processes to deliver value.

"Always in telecoms, you will have such technology as RPA, and now we are trying to launch a chatbot. We are trying to introduce kiosks in every mall, especially high traffic stores, Telkom stores, whereby we want to implement a smart queuing system that will allow customers to queue digitally rather than queue in person. This system is convenient and saves time as a result, customers will be notified by an SMS alerting them that they are next in line. It allows customers the flexibility to still carry on with their lives and allows us not to have irritable customers within your stores." ***- Participant 2***

"Some of the internal digital technologies we are using are technologies where we, in real time we can stream network data, meaning, we can see what is happening on the network. We open our architecture via APIs to third parties and we can see in real time that customers are trying to purchase, and I have a payment gateway that is available for them to just open the card, put it in, authenticate, and buy whatever product that they wanted." - ***Participant 7***

"We invest in more and more in 5G services and data-centric type technologies like 4 IR innovation and all these things, in such a way that we keep up to speed and continue meeting the customer expectation; otherwise we run the risk of being obsolete." – ***Participant 12***

4.3.4 Development of digital skills and competence.

New competencies and capabilities are critical for organisations to create and deliver value; therefore, it is important to understand how new digital capabilities are developed and deployed in the organisations to align to the implementation of digital transformation.

"Given that we cannot develop ourselves quickly enough to match the changing digital requirements of our customers. Hence, the acquisition and the partnering as the way of seeking new skills. Then we are able to look back at the existing skill that I have and match with the skills already acquired then we are able to transfer this newly acquired skill onto other resources and departments. If you sit and wait to train your current resources to the new requirements, it will be very slow." - ***Participant 5***

"If you look at organisational capabilities, it actually exposes that there is quite a big skills gap, and there is a need to retrain and rethink how we do business. For instance, AI and machine learning are niche type of technologies that were not part of the telco toolkit. It's new things that we need to focus on now and how do we transition because capabilities ultimately, it is about people, as the asset is the one that has those capabilities." ***Participant 7***

"We utilize big data analytics to actually determine the best sites for the company. Our planners do not have to go out looking for sites; however, they can utilize that big data analytics to locate new sites and optimizing the network." - ***Participant 12***

4.3.5 Organisational performance

Organisations that embrace digital transformation and be early movers in adopting new technologies achieve agility and greater performances in most business metrics, whether financial, operational, customer satisfaction, or retention, etc.

"We are exactly peaking at the right time, today on our social platform Aoba, we've got a lot of millions of consumers, we are sitting with millions of consumers on our mobile money platform." – ***Participant 4***

"If you notice there are few Company Y's vehicles on the road driven by technicians doing network maintenance, because DT improved the process and can predict what needs to be maintained and when." ***Participant 2***

"Through the use of online approval, online signatures, online payments, there is quite a bit more efficiency in operations, whereby the ultimate goal is obviously to go paperless in the office, because you have advanced in this digital technology. Our operations are seamlessly and the approval process is improved. The approval of purchase request, invoices, does not need somebody to print a piece of paper and walk around looking for signatures. So, that is the improvement from an operation that I see. Then, the other side is around the product and almost close to the market and delivery of products that are required by customers." ***Participant 7***

4.3.6 Overall acceptance of DT and Leadership

The majority of the participants viewed the implementation of DT as a success and well received by all stakeholders; however, participants 9 and 11 felt that some departments within organisations are reluctant to adopt because of concerns of new change and resources required to bring the change. There is also resistance noted by some organisational employees because they fear losing their jobs and being replaced by technology.

> *"Because the message was very uniform from the top management, we are able to get a buy-in from the entire organisation, even from the middle management going down. The culture enables it within the whole organisation to permeate particularly throughout the organisation. With regards to our suppliers, they had to adapt to new ways of how we do things."* – ***Participant 12***

> *"There are a number of platforms internally for engagement. So there are a number of consultative committees that exist and then with that, it makes it easier for people to be receptive to change. So about 80% in terms of adoption rate, with a higher level of confidence. These people are happy and confident in the new way of doing things. In fact, most or all stakeholders are taken into account when these new changes are being implemented or put out."* - ***Participant 1***

> *"From the organisation perspective is not fully adopted by all stakeholders, because we find that maybe stakeholders from an IT perspective are fairly acceptive. However, stakeholders from finance and other areas see as additional financial cost to the business, therefore, the less likely to approve such big investments. And then you find stakeholders from marketing and sales that will embrace because it will then mean that better digital channels have been developed to offer products and services to customers. So it is still a bit of a mixed bag."* – ***Participant 9***

4.4 FINDINGS PERTAINING TO RESEARCH PROPOSION 2

This section presents findings from the second proposition on the influence of digital transformation in the design and development of a new digital business model. The following themes will be discussed:

- Digital organisation strategy
- Value Creation and Delivery
- New opportunities

4.4.1 Digital Organisational Strategy

A digital organisational strategy is about the position of the customer in existing and new markets by changing how services are produced and presented to customers. Formulating a clear, effective, and sound digital transformation strategy has become a key priority to transition to a new digital era.

> *"DT has forced one to look at it in terms of the overall organisational strategy, it's no longer just being a telco. It is almost adapting to become a techno, which is a technology-enabled company. Still doing telco, but with technology driving it, so this digital technology is what is now transitioning us."* – ***Participant 7***

> *"A telco can now go to a manufacturer and say, I can offer you industry 4.0 fully automated robotics, running your network, and doing manufacturing. All connected through our network, you will get the AI reports, and in real time monitor what is happening in your factory."* – ***Participant 7***

> *"The company's 2025 strategy is to embrace technology. So, our current motto is to move from a Telco to a Techno, which is embracing everything that utilizes technology. We are in an intermediate phase in achieving our techno 2025 strategy, which involves finding efficiencies in the business of today. Also, leveraging on the 4IR technology to diversify in how we deliver on our targets, which would be utilizing Big Data, AI, machine learning."* – ***Participant 4***

4.4.2 Value creation and Delivery

Organisations are at varying stages of the implementation of digital transformation. Some are starting out and catching up with the trend to migrate to new ways of doing things. Others are well in advanced stages and start realising the benefits of DT's implementation in their entire processes and value chain. Digital transformation was viewed as the catalyst for organisations to change their business model and how services are created and delivered to customers using digital technologies. All participants indicated a significant shift of business models for telcos beyond delivering data and voice services to move to technology companies where they provide services to all industries with applications, sensors, and plant monitoring systems.

> "*We kick started digital transformation a while ago. But it has been start and stop because of different ideologies. We always carry the mentality of a startup. And because you can never say with digital transformation, you have arrived, because there are new and emerging technologies that when you look at whatever strategy you have put in place, you might find that they are no longer relevant in the market. I think we are at an early stage overall, because of the start and stop. When you look at the strategy that you planned in five years' time, and you find that technology has moved so much."* – ***Participant 11***
>
> *"Based on my own observation, we have really adopted digitization, looking at some of the applications that we are using to improve our customer experience, whether it is for our own internal usage or for improving base stations for providing a better service to our customers. We have definitely adopted and we continue to invest in ensuring that we are transforming our environment."* – ***Participant 10***
>
> *"On the business unit from a product development perspective, I think early entrant from customer service, we were early entrant there as well. I think we could improve where we adopted it late. From a predictive perspective, we were lacking there, and in a reporting perspective there are a lot of legacy systems that are still at play and still being used. We*

now talk of omni-channel, but it is not there, so there is still a lot of work to be done." – **Participant 6**

"There is new term that we are now to move from Telco to a Techno, which is driven by this digital transformation where you are saying your operational model, as a telco cannot remain the same. It is no longer about selling minutes and selling data. It is about creating value. We are in that mode of value share, where if you can show your value to the consumer, it makes more sense. Hence, you need to now engage the consumer through Apps, based on their lifestyle and usage, you start enticing them through offers that you have a third party association with." – ***Participant 7***

4.4.3 New Opportunities

Digital transformation provides telcos with new business opportunities for revenue generation by maximising available resources they already acquired, such as monetising big data and also to venture into other industries.

"I think it's mainly content and monetizing that content because we are sitting on huge volume of data in terms of what the users are doing. Voice traditional is no longer the big revenue generator, it is the data and the content that sit on top of that data that you need to monetize. ' – ***Participant 7***

"There are areas within telemedicine for a country like ours where we don't have fixed services, I think mobile players are going to have to come into play in services like telemedicine, where 5G will be the technology that will be largely driving that aspect of that space whereby you want low latency. Very high reliability of these networks, because now we are talking about people being operated on utilizing the 5g services and technology." - ***Participant 12***

"If you look at, for instance, the verticalization approach, which most companies are actually adopting now, in the old days, we'll find it will only

offer you data and airtime. But nowadays, if you look at loadshedding, for instance, now that we are able as an as an industry to offer you, your inverters, for instance, to make sure that you can limit load shedding, for instance, we can offer stuff that is not part of the traditional telco service offering. So, it has actually prompted us to do that. But also, we've got even insurance services that we offer. When you buy a cell phone with us, we can provide you with insurance. And if we look at insurance in its traditional sense, that sits outside of the telcos. But now, we have actually through digital transformation, we have been able to now incorporate some of those adjacent services." – ***Participant 8***

4.5 FINDINGS PERTAINING TO RESEARCH PROPOSION 3

This section presents findings from the third research proposition, exploring the role of digital transformation in the development and introduction of new digital innovative service offerings. The following three themes will be discussed:

- Customer consumption trends
- Innovative services offerings
- New Market Competition and differentiation

4.5.1 Customers consumption trends

Customers' consumption pattern and demand reinforce DT to bring changes on how services are created, packaged, and delivered. With the use of digital technologies such as AI, service providers can collect intelligence on customer needs and usage of services and enable them to develop customised services for different customers. The trend and shift in consumption patterns also trigger network traffic optimization to ensure delivery of quality services.

"Through the evolution of telecommunications, people purchase airtime and convert it into internet bundle or social bundles for WhatsApp and streaming other content online. These nowadays, people have appropriated the internet and transformed the business realm. As a result, businesses can now meet the needs and consumption demands

of customers by being afforded to purchase internet bundles for as little as R2." - ***Participant 2***

"10 years ago, the main use of the network was voice and services such as SMS, but now users are more going towards data and content. So, if I look at our traffic profile, social media platforms such as YouTube and Netflix are the biggest drivers of traffic on the network, it is no longer voice" – ***Participant 7***

"Customers want a blended service either voice or data-focused service. It's probably going to be just a purely data services where voice is delivered over an IP platform, where it is just seen as a data packet. So, it is going to be a data network, whereby whether you are talking, texting, or downloading, would just be data packets." - ***Participant 12***

4.5.2 Innovative service offerings

Consumer needs and consumption pattern are the main drivers of product development and innovative service offerings. Service providers have to adapt to develop and package services as customers require. The participants also elaborated that even service providers who do not own any network infrastructure can enter the market and develop innovative service offerings that meet the needs of customers and gain market share.

"The product development will be driven by the consumers. If I want the product that fits my need, and with the use of artificial intelligence, network operators should be able to say customer A is this type of user. He buys 10G, and out of that 10G, he uses 5G for WhatsApp, he uses this for so much, and on the date of so and so in a month, so his data have run out. So, you almost have that predictive analytics to build products around it." – ***Participant 7***

"Data is in demand, which enables people to engage in various digital platforms such as TikTok and YouTube. Our responsibility is to respond and meet the demands of customers by offering services. For instance,

we have campaigns during the season of back to school, digital technologies are in demand for online registration." – ***Participant 2***

"Data is a good resource. When you are a service provider, you are collecting these data, and then your digital transmission programs, or transformations always presents you with new opportunities. And so, innovation and you enhancing the existing services, and you are adding up new services. Like I have mentioned earlier in terms of FinTech." – ***Participant 3***

4.5.3 New Market competition and differentiation

DT has allowed new entrants to enter the telco market and offer services over the telco network. This has changed the dynamic of competition, where differentiation is on digital services and no longer on the network infrastructure and geographical coverage. At the same time, DT offered opportunities for telcos to enter new markets such as financial services and mining.

"What we are observing in a telco, the competition is not necessarily the other telco, but the competition is the adjacent industry, where somebody has a different experience using an Uber and Airbnb and runs these services over the telco's network." – ***Participant 7***

"Certainly there is competition, we have the MVNOs these are the guys who don't own any network, they actually buy a bulk of the data from the mobile network operators. And then they are able to resell those data at significantly lower prices, packaging into their main core services. So they make the market and the space very competitive and difficult for you know, your mobile network operators." – ***Participant 10***

"We've seen these OTT's offering voice over Wi Fi, voice over IP so those have come in. Also, the Voice Note service. You know, you don't have to buy an airtime to send the voice note, you can just go to your app and record yourself for the voice. So even some of the device

manufacturers themselves, you can FaceTime. So you can actually make a video without actually paying the telco." – ***Participant 1***

4.6. SUMMARY

The research findings show the necessary and key areas for developing a digital business model and innovative digital services as the intended results. The data further reveal the significance of developing new digital dynamic capabilities as the desired outcome for the improved performance targets of the organisations in the very competitive environment.

CHAPTER 5: ANALYSIS AND DISCUSSION OF RESEARCH FINDINGS

5.1. INTRODUCTION

The primary question the researcher attempted to address was predicated on the reality that the majority of telecommunication organisations have moved toward implementing digital transformation as a means to deliver their mobile service offerings. At the same time, how does digital transformation change the business model and drive the creation of new innovative capabilities?

This chapter starts by concentrating on the research problem as described in Chapter 1. It then carries on to the examination of the research findings from Chapter 4 with the involvement of the research question and its sub-questions, and lastly relates to the theoretical framework.

5.2. Discussion on Objective 1

This section discusses the findings in relation to the first research objective. It seeks to comprehend how dynamic capability is developed to realize digital transformation.

5.2.1. Organisational capability development

It is imperative that businesses create ground-breaking and revolutionary innovations. However, organisations lack the resources to build the dynamic capabilities that are essential for the creation of digital breakthroughs. The literature has demonstrated that constantly changing environment that organisations operate in, contribute to the creation of dynamic capabilities, which provide novel approaches to problem-solving and responding to dynamic environmental to capture market value (Katkalo et al., 2010).

The question then becomes how the organisation can carry on with its operations while promoting the growth of dynamic capabilities. This study explores the

development of organisational capability as an asset to exploit the existing market while exploring new opportunities and new ways of doing business using digital technologies.

5.2.2 Network Technology Evolution and Development

Kastouni and Lahcen (2022), found that adopting data analytics in the mobile ecosystem brought a paradigm shift since the introduction of 4th generation mobile networks. It enables telecommunications providers to have new insights on network performance and user behavior, which helped open up new revenue streams, enhancing the customer experience, and increasing customer retention

The study findings suggest that telcos are progressively deploying technologies such as AI and machine learning in their operations, which were previously not part of their toolkit in recent years. In the era of digital technology, there is a need to focus on how network operators transition because capabilities ultimately involve people as the asset that must be developed and nurtured to successfully take advantage of these new technologies. A balance is needed to ensure that technology and people embrace and complement each other because they are not yet at the stage where they can deploy an AI that will completely replace human resources in organisations. De Cremer, D., & Kasparov, G. (2021) propose that teams made up of both humans and non-humans working together are known as the "new diversity" and will eventually become more common. AI is also the first step toward the intelligent labor of the future. This indicates that the future of work will prioritize employee development and performance in more important jobs while repetitive and mundane tasks are performed by computers and machines.

The researcher is of the view that AI will work side by side with humans. AI is well placed to perform repetitive tasks more efficiently than humans, while humans focus on tasks that require decision making and good judgement. Telcos have already deployed AI technologies in call centres to handle queries and help customers solve simple issues and transfer calls to humans on critical issues faced by customers.

Mithas et al. (2011) argued that information management has a big role in developing a firm's capabilities, such as customer, process, and performance management. Organisation's ability to determine the requirements, expectations, and preferences of its customers and markets is one of the critical management capabilities required for the success of the organisations. The research findings demonstrate how telcos go beyond simply collecting data on existing and future consumers by employing emerging digital technologies, such as artificial intelligence. The development of solutions based on the collected consumer intelligence necessitates the acquisition of new knowledge, skills, and competencies because they involve solutions that do not fall under the current portfolio of goods and services offered by the organisation. The combination of AI technology with data analytics leads to a better understanding of customer's needs and consumption patterns resulting in the development of new products and services. The development of new digital products and services require new set of skills and novel capabilities for the organisations.

A quick transition to the 5G network is required because of the constant increase in data traffic and the fact that the penetration of Fourth Generation (4G) technology has reached its limit (Guo et al., 2022). The study shows that as technology evolves, network operators continue to invest heavily in new technologies such as 5G and 6G to increase the capacity and speed required to deliver digital and content services. However, due to costs associated with deployment of new technologies, telcos opt to coinvest in strategic areas and lease or lease-swap approach to expand their reach and capacity to service their customers.

5.2.3 Network Sharing and Partnership

According to Wiesböck (2018), fostering telco companies partneships is a further transverse factor that defines an organization's capacity for digital innovation. Prices for mobile services decreased as a result of national regulators' increased pressure on MNOs to share their network infrastructures with mobile virtual network operators (MVNOs) (Wireless, 2015).

Storbacka (2010) argued that partnership, co-development, and network infrastructure sharing are needed for the telecom industry to uncover new market opportunities. Everyone in the market has a cellphone, making it a perfect platform for new services, but because they must function across all telecommunication operators, they cannot be developed collaboratively (Storbacka, 2010). The development of partnerships and network sharing agreements allows market expansion for all telocs and MVNOs, and differentiation can be achieved in value-added services (Gooderham, 2022). The study shows that telcos have established partnerships and collaborations to share infrastructure between themselves to enter new markets and provide services in areas where they do not necessarily have their own networks. The national regulator has also facilitated the access and sharing of the network infrastructure to MVNOs. This resulted in an increase in competition and a decrease in prices which benefited customers.

5.2.4 Digital Technology Investment and Deployment

The telecommunication industry is heavily reliant on investments and, even if they fail, the billion-dollar investments already made cannot be reversed (Storbacka, 2010). Nwankpa & Roumani (2022) argue that companies that invest in digital transformation and technologies are better equipped to match digital customer data with cutting-edge processes and investments, improving both customer experience and performance. The research findings show that the telcos continuously invest in the latest technology to keep up with the increasing demand for digital services and the expectations of the customers for high-speed and quality services. Participants cited that the investment and deployment of digital technologies have significantly improved the performance of the network. The deployment of digital technologies facilitated seamless interaction with customers and the delivery of the services and improved customer experience.

5.2.5 Development of Digital Skills and Competency

Atuahene-Gima (2005) stated that exploratory and exploitative methods can be used to increase an organisation's capacity for innovation. This means

exploitatively through exploiting current skills, competences, and knowledge while exploratively, by developing new skills, competences, and new knowledge. The findings of the study corresponded to the findings of Guo et al. (2022), who found that partnerships and ongoing work on standardization are crucial for the success of 5G in heavy industries. To create solutions for 5G that are appropriate for their intended use, a combination of telco providers, industry domain experts, and technology specialists is needed. They further stated that since the advent of 5G, telcos can greatly increase their value as connectivity providers beyond those who make the best effort, in addition to utilizing their local knowledge and orchestrator skills.

Because of the fast-moving pace of technology, telcos are using both approaches to build new capabilities through partnership with other small organisations and industry experts that are already digitally advanced and often end up acquiring them and easily transfer new capabilities and competencies to the rest of the organisation. For long-term goals, telecommunication organisations have partnered with leading universities in South Africa as well as training and skill development service providers like Linkedin, Udemy, etc, to train their employees on digital skills.

The research excluded organisational culture; however, participants mentioned it often that it plays a major role in building capabilities and collaborating with partners. The study by Teichert (2019) found that knowledge transfer, risk tolerance, teamwork, and most crucially the ability to adapt are some of the key cultural traits required for digital transformation. The research findings aligned with the findings of Teichert (2019) show that the relationship between consumer understanding and the growth of innovative capabilities is moderated by organisational culture. The existing culture may foster or hinder the development of dynamic capabilities, depending on the entrepreneurial positioning of the organisation.

5.2.6 Organisational Performance

The investigation conducted by Singh and Hess (2017) and Liu et al. (2011) revealed that the application of digital technologies enables the interaction

between suppliers, customers, employees, and complementors, thereby transforming organisations to attain competitive advantage by leveraging on new digital competences and improves operational efficiency. The convergence of smart technologies together with cell phones and internet services leads to better performance (Tekic & Koroteev, 2019). Iansiti and Lakhani (2014) contend that at the end of the 21st century, technologies such as artificial intelligence, machine learning, big data analytics, internet of things, and social media have emerged and are the key drivers of digital business.

Some internal digital technologies network operators use technologies where they can see and measure data usage and throughput in real time. Collaborating with a third party and sharing network architecture via the Application Programming Interface can integrate into payment gateways. It has become possible to live streaming the data in one pool where analytics and analysis can be done to learn and build better and more customer-focused products. Therefore, this type of technologies also brings in efficiencies and can predictively tell where providers are losing revenue due to drop calls

The study shows that all telecommunications have invested and deployed various technologies ranging from RPA, AI, IoT, Machine Learning, Applications, etc. to engage with customers for queries, orders, and various engagement. They also use these technologies to engage with their suppliers, internal employees, and various stakeholders. These technologies have yielded the following benefits:

i) *Delivering of products and services to customers through online;*
ii) *Customer engagement using chatbot;*
iii) *Automation of business processes and systems.*
iv) *Internal operational efficiency using RPA*
v) *Relieve employees from mundane tasks, enable them to more meaningful role*
vi) *Autonomous management of network,*
vii) *predictive maintenance and quality of network. Network improvement and digitalization of the network.*

5.2.7 Acceptance and leadership role

Organisations that use a business model-led digital transformation plan can successfully transition, provided strong leadership is shown from the top, particularly with employee empowerment, overcoming inertia, articulating new vision and offering assistance in potential crises (Tekic & Koroteev, 2019). The findings from research show that DT implementation is not about deploying new technologies in their systems and processes, but also about people that will use it and their buy-in is important. Participants indicated that their leaders have been speaking with one voice and taking everyone on this digital transformation journey. They further put change management committees in place that support employees and lay down fears triggered by DT changes. The leadership demonstrated in many telco organisations had been applauded by many participants, as it has played a major role in promoting and advocating the transition of their respective organisations to digital transformation and supporting staff in this journey, thus lessening resistance for change.

5.3. Discussion on Objective 2

This section analyses the findings in relation to the second research objective which deals with the influence of digital transformation on organisational business model.

5.3.1. Digital Business Strategy

Tekic and Koroteev (2019) proposed that the digital business strategy changes the positioning of the customer in the existing market by changing how the service is produced and presented to customers. The change is more interconnected with ICT infrastructure, smart technology, and the value chain (Bharadwaj et al., 2013; El Sawy et al., 2010). The findings of the study are consistent with the literature showing that digital business strategy is based on two fundamental factors: embracing technological change, deploying those technologies and delivering services to customers.

It is noted that the technological change from Edge to 5G and the way customers prefer to receive services had to a certain extent forced the telcos to change their strategy by investing in the latest technology with high speed and improved quality to remain competitive. Change in devices also had a significant role in optimising and improving the current strategy and the continuous development of new technologies. The participants mentioned that the innovation of the smart device manufacturers also affected their strategy to optimise their network to accommodate high speed data flow. This had a ripple effect on the quality and availability of their network. The findings also show that the digital strategy changed in terms of how the telcos are creating and delivering value to customers. Using AI and data analytics, telcos can segment customers based on the usage of data and services and can package and market new products to specific market segment. Superior services and value delivery to customers necessitated the modification of the entire value chain from suppliers, product development, customer engagement, and ultimately delivering those services through the use of online and application platforms.

5.3.2. Value Creation and Delivery

The advancement of digital technologies and the implementation of digital transformation are modifying how business is done and pushing long-standing organisations to alter radically (Christensen et al., 2015). Furthermore, Veit et al. (2014) stated that business model is considered digital if there are vital changes on how products and service offerings are delivered, income is made, and resources optimised using digital technologies. The research findings align with the literature where NMOs had to alter the delivery of services. In the past, customers used to visit physical stores to purchase devices and sign new contracts for the phones, and they can only choose from limited available colours of the devices. Since the advent of digital transformation, customers can purchase devices online and sign contracts digitally online. Customers can now choose from the entire range of type and colours of devices with no limitations. Service providers must source that specific device and chosen colour from anywhere in the country and deliver to the customer in the shortest possible time.

The introduction of new business models such as product and platforms-as-a-service, digital platforms, fintech platforms for transaction and applications as a service presents a new opportunity for Telco to evolve from traditional voice and sms services to digital services (Verhoef et al., 2021). Telcos have adapted their services by offering flexible data package products and allowing customers to convert streaming data to WhatsApp data or surfing and visa versa and also convert voice bundles into data bundles as their needs change. The value creation and the delivery of services to customers has become a new competition and competitive advantage for the telcos. Participants alluded to this new phenomenon that there is a significant shift where in the past competitive advantage was based on the size and geographical coverage of network infrastructure the telco was owning. In the digital era, new service providers enter the sector without owning any physical network infrastructure, provide superior services and customer experience, and compete directly with the telcos they are leasing the infrastructure from.

For telcos to remain competitive and defend their market share, they developed new business models that include how they engage with customers. This was achieved by implementing kiosks where customers log the service they need and get a ticket and can continue with their daily business and when their time gets closer to go to the counter, they receive an alert on their phones and make their way to the store. All participants indicated that their organisations have developed applications to engage with customers and deliver new services. Digital technologies cause significant changes in how an organisation creates and captures value, DT presents opportunities for telcos to develop new business models and diversify streams of revenue (Veit et al.,2014).

5.3.3 New Opportunities

Nwankpa and Roumani (2022) contend that telcos are creating competitive digital business strategies and are rapidly utilizing a range of opportunities including analytics, big data, cloud, social media, and mobile platforms. They benefit from digital opportunities to create new services, promote innovation, and corporate change. Dam (2020) argued that technologies such as 5G, edge computing, and

artificial intelligence offer telcos grand opportunities to develop much needed alternative source of revenue from manufacturing, to automotive, to healthcare, and agriculture.

In the automotive sector, where cars are expected to function more like mobile data centres rather than receiving udates via wireless connection. Automated real-time traffic coordination requires edge computing and fast communications to vehicles (Gooderham et al., 2022). Gooderham et al. (2022) argued that there is a shift in the use of edge and cloud computing in cars that will have an effect on production, and remote driving. Telcos are presented with opportunities to leverage their network infrastructure to provide connectivity to various industries. With the advancement of AI technologies in automobiles and increased demand for self-driving cars, telcos are posed to benefit significantly if they strategically position themselves by offering real-time connectivity and value-added services to this market. Digital transformation and technologies such as edge computing and data analytics offer telcos with opportunities in manufacturing, agriculture, and mining sectors to provide value added services and diversify their source of revenues.

The introduction of FinTech has provided an opportunity to the telcos to enter financial services and offer various financial services from mobile money, loan to insurance. These opportunities necessitated the change of business models and also take advantage of the customer base that they have to become a one-stop-shop service providers. Telcos no longer depend on selling data and airtime as their source of revenue, but also receive significant diversified income from Fintech and mobile-money services.

5.4. Discussion on Research Objective 3

This section analyses the findings concerning the third objective which explores the changes brought by digital transformation and technology on the service offerings.

5.4.1 Customer Consumption

Data consumption has grown significantly in South Africa driven by content such as Netflix, therefore local peering has become important where telcos provision content data network and cache the content in SA and become like having ownership of content. With the advent of 5G, technologies such as IoT, robotics machines doing work in the mines, presents the variety of service offerings that are new opportunities to explore due to digital transformation.

5.4.2 Innovative Digital Service Offerings

In line with current literature on innovative digital products and services (Tilson et al., 2010), digitally induced technology was prominently identified as a main element that leads to the creation of new digital service offerings by telcos. The research showed that digital technologies lead to a certain extent for telecommunication organisations to encourage the creation of innovative digital products and services and even entered adjacent industries such as financial services. Telcos had embarked on new projects to deploy new digitally induced technologies to facilitate new digital services.

Interestingly, findings showed that telcos who embraced new technologies have transformed significantly from being sellers of airtime and data bundles to become providers of Fintech services and content. Participants in Company Z mentioned that in the early days of digital transformation they deployed Ayoba platform application for their users as messaging services. This platform has been gradually optimised and upgraded with new functionalities and features that offer free music, streaming, high-quality games, a wide range of channels with curated local content, and hundreds of new MicroApps. It is important to note that while some organisations shared their success stories in offering content services, others experienced failures and were forced to abandon their content services offerings.

Application of digital technology leads to the digital innovation, creation, and leverage of a limitless novel products or services which add value to the users (Hund et al.,2021 & Yoo et al.,2010). The findings of the study show that,

effectively, telcos are no longer considering themselves as telco organisations but as techno. There is big drive and initiatives to leverage technologies to offer innovative services to all industries. There is an increase in the participation of telcos in the mining, agriculture, manufacturing industries to offer new innovative, predictive and analytics and real-time monitoring services.

Digital innovation results in the dismantling of existing restrictions concerning products, services, organisations, and industries and combine different resources to recognize other avenues of opportunities and also allow users to determine what they need and reconfigure the components of the services based on what and how they need it to be delivered (Yoo et al., 2010; Henfridsson et al., 2018).

The work conducted by Dam (2020) shows that 5G technologies and smart connectivity present as new ground-breaking opportunities for telcos to provide innovative digital services to all industries. All participants indicated that their organisations are driving the move from telco to techno, and there are initiatives and explorative use cases to participate in providing innovative and smart connectivity to mining, agriculture, telemedicine industries. Company Z had invested significantly in mining-based solutions for the African continent. The participants mentioned that there is increasing collaboration with universities and other education service providers to enable the delivery of education online for the general public, as well as for the empowerment of their employees in the field of digital skills and competencies. Company X has identified opportunities in telemedicine and believes that 5G technologies will enable it to offer innovative services and bridge the gap between patients and medical service providers.

This study brings product and service development to the daily tasks of telcos by incorporating service customization into the consumer experience aspect which encourages this exploration of digital innovations and the development of new products and service offering. The process of developing the customised services starts with the exploiting data analytics, then categorise customer targets based on their needs and usage of various data driven services. This has a major role to play in the development of the new services.

According to Wang and Ahmed (2004), one of the research conclusions is to become innovative by intentionally developing new products, processes, and business models aligned to the needs and demands of customers. However, the researcher believes that being innovative translates to the work that product developers conduct on a daily basis in an organisation: develop and launch the product that will be accepted gradually in the market and reach exponential growth and yield expected returns. This line of thinking is based on study of Weill and Woerner (2013) who argued that most organisations in various sectors are changing at distinct pace moving towards a smart technology environment where the focus is more on intangible, service-based, and customer experience centric.

5.4.3 New Market Competition

Digital transformation has revolutionised the telco industry and removed barriers for new entrants such as the Mobile Virtual Network Operator (MVNO) to enter new markets. The study findings show that DT has facilitated new players to enter the telco industry without necessarily building their infrastructure but using the existing telco network to deliver services and intensify competition. MVNOs can buy bulk of the data, package it into their main core services, and resell those data at significantly lower prices than telcos. OTTs are also offering voice over WiFi, voice over IP, and voice note services almost for free and MNOs are unable to compete and lose market share and revenues. Equally DT has also offered telcos the opportunity to enter other industries such as financial services and offer loans, insurances, mobile money transactions and gain market share, especially for the unbanked population. Other industries like mining, agriculture, and manufacturing are new markets for telcos to provide services.

5.5 Discussion of findings in relation to the theorectical framework

5.5.1. Digital Transformation

Westerman et al. (2014) argued that digital transformation is the adoption of digital technologies like analytics, big data, the cloud, social media, mobile

platforms, and intelligent solutions that increase the value creation through innovations that change business models and reinvention of business operations. Digital transformation brings changes in the delivery mode of services and in the same new forms of direct interactions with customers (Mergel et al., 2019). The adoption of digital transformation is dependent on the degree to which various stakeholders such as employees, customers, and suppliers accept the changes after the process improvement and innovation or development of new products (Verhoef et al., 2021). The research findings reveal that telcos have adopted digital technologies such as data analytics and artificial intelligence in their processes to understand the needs of the individual customer and develop products and service offerings that meet individual needs and deliver value.

5.5.2. Dynamic Capability

By deploying, configuring, and redeploying organisational resources, dynamic capabilities enable the organisation to change its regular capabilities in response to environmental dynamism. These capabilities also provide new approaches to problem solving (Katkalo et al., 2010). Through the ability to update organisational competencies and respond creatively to environmental changes, dynamic capabilities allow the company to gain a competitive advantage (Katkalo et al., 2010). According to this perspective, the firm's resources serve as a source of its competitive advantage, as they are valuable and provide value to customers. Resources must be VRIN, i.e. Valuable, Rare, Inimitable, and Non-Substitutable to be appraised as valuable but difficult to obtain. (Barney, 1991).

The research findings show that although telcos possess network infrastructure and wide coverage, however, these assets no longer give them competitive advantage. They continue to upgrade the network infrastructure with the latest technologies using the coinvestment and co-sharing model. However, OTT competitors continue to exploit the telcos' infrastructure at a minimal cost and offer better services to the customers. Some participants indicated that some telco companies approached regulator requesting protection from this slaughtering competition, but regulator considered the interest of consumers first and urged telcos to be more innovative and competitive in their offerings.

5.5.2.1 Innovative Capability

Innovative competence is the capacity to mobilize organisational resources to develop novel value propositions for both emerging and established markets, whether they be for markets, products, or business strategies (Wang & Ahmed, 2004). Whatever the characteristics of innovation, its traits can range from the continuum of gradual improvement to radical innovations (Gaubinger et al., 2015; Goffin & Mitchell, 2016). The research findings reveal that telcos lack innovation capacity, especially in the development of radical innovations. Participants indicated that traditionally telcos rely on the network equipment manufacturer to come up with the latest faster and higher capacity technology and they only simple deploy that technology and operate the network as usual. This trend has resulted in the lack of innovation in developing innovative digital services. To respond to competition that comes from outside telco space, most telcos embark on acquisition and partnership with the advanced digital firms to assist them in developing innovative capabilities and subsequently develop innovative services for their customers and remain competitive.

5.5.2.2 Adaptive Capability

An organisation's capacity to react to recognized market opportunities is known as its adaptive capability (Wang & Ahmed, 2007). Therefore, seizing a moment and taking action to create consumer insight and acting creatively in response to that information leads to the development of adaptive capabilities. Customers, suppliers, OTT competitors, and new entrants set the pace and direction for telco industry. Most of the participants indicated that they were forced to adapt faster to the new norm to survive and thrive. The change in customer behavior and preferences for services and mode of delivery required telcos to adapt to new ways of packaging and delivering services.

5.6 SUMMARY OF DISCUSSION

The analysis shows that digital transformation has played a major role in building dynamic explorative capability for a company to deliver cutting-edge digital services, it must explore and adopt new methods of doing things. This process, however, requires reconfiguring the structure of businesses where organisations develop strategic partnership, acquisition of the existing firms that are already advanced in digital services, and establish autonomous digital units to conduct research and develop new digital products. The effectiveness of digital transformation also depends on equipping and developing existing capabilities and skills to become digitally oriented and deliver digital services in the new prevailing omni-channel era. The findings of the study also show that the business models of telcos are altered by digital transformation and technologies. Owning infrastructure and wider coverage is no longer a competitive advantage for telcos, but packaging and delivering those data-driven services to create value for customers.

The findings of the study further reveal that digital transformation has a considerable role for telcos to transition from delivering traditional voice and SMS services to innovate, develop, and deliver new digital services. Digital transformation has enabled telcos to enter other industries such as fintech, insurtech, agriculture, and mining. Similarly, DT has opened the door for other players to enter the telco industry, increased competition, and challenged the dominance of few leading telecommunication companies.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1. INTRODUCTION

The conclusions and recommendations of the study are presented in this chapter. The first section will concentrate on the conclusions of the research questions and objectives; the second will detail recommendations from the study; the third will outline the study's limitations; and the last portion will offer recommendations for future research.

6.2 Conclusions regarding research objective 1

Research objective: The role of DT in building the organisational capability of Telcos

The results of the study indicate that digital transformation had two significant roles in the telco's capabilities, namely, the reconfiguration of businesses and acquisitions and the development of new capabilities and competencies. The key themes that emerged were the following:

i. Acquisition of new capabilities through partnership, contracting advanced digital firms;
ii. Developing and empowering existing resources;
iii. Reconfigure the organisation; and
iv. Adopt new ways of doing things.

6.3 Conclusions regarding research objective 2

Research Objective: the influence of DT on the new digital business model for Telcos

The business model is the blueprint of how an organisation does business and is concerned with creating, capturing value, visualising, understanding,

communicating and sharing the business logic (Osterwalder, 2005). The study shows that there has been a significant change on how telcos create, capture, and deliver value to their customers. The following changes in business models were identified:

i. Online purchase and contract signing and delivery of devices to the customer's address;
ii. Flexible packages and data conversion according to the changing needs of customers;
iii. Switch to content-driven services and offerings;
iv. Providing financial services; and
v. Application services for creating and delivering value.

Furthermore, telcos are rapidly moving away from being a telco to being techno. They are entering various industries like mining, agriculture, manufacturing, etc. to create, capture, and deliver value as most industries embark on digital transformation.

6.4 Conclusions on Research Objective 3

Research Objective: How DT has triggered the development of new innovative digital service offerings for telecommunication organisations

The findings of the study revealed that digital transformation in the teleommunication organisations had opened many doors for telcos to provide services beyond voice, data, and short massaging and enable the creation of new digital services such as the following:

i. data-driven services and packages
ii. mobile money
iii. Fintech services
iv. Insurtech services
v. Content-Driven Services

6.5 Recommendations

Organisational Capability

The digital transformation significantly changed the organisational capabilities of telco companies. From the study, it was clear that they needed to build these dynamic explorative and exploitative capabilities to defend the existing market and deliver new digital services and value to retain and attract the new generation of customers. The study has shown that they rely mainly on external consultants to create and deliver digital services as they do not have these capabilities internally. telcos must be intentional about building and acquiring internal capabilities, skills, and competencies to remain competitive and weather the competition coming outside the telco space.

Digital Business Model

The ambitions of telco to become techno require agility, innovation, and new organisational architecture. It is clear from the study that telcos need to future proof their digital capabilities to equip them to successfully respond to any future emerging business needs. Telcos must develop Research and Development units internally, which will play a vital role in creating new digital products and be innovative in creating new business models to deliver value to various customer needs. They need to welcome new ideas, be willing to explore them, and eager to push the frontiers of innovation.

Innovative Digital Services

Telcos must be customer-centric and keep in contact with the changing needs of customers to design, develop and launch new products that provide value to customers. R&D is crucial and cannot be overstated, but must be focused on the market to preserve competitive advantage. The findings have shown that the ownership of network infrastructure and wide coverage is no longer an advantage for telcos.

6.6 Possible limitations and challenges of the study

The study's findings are solely relevant to the case study organisations that took part in it; they cannot be generalised. However, they do draw attention to more general theoretical concerns regarding the role of digital transformation on the new digital business model and innovative service offerings. The need for the development of organisational capabilities and the role to play to deliver innovative services. The focus was on the telecommunication industry, but the results may be applicable to other industries. It was expected that participants may not be available on the scheduled dates, leading to delays in completing data collection on time. The researcher attempted to have more participants identified as an alternative to overcome this challenge.

6.7 Suggestions for further research

Future research in the following areas could be useful in extending the results of this study.

- Further studies can be conducted on the role of leadership in the implementation of DT and how successful can navigate the organisation in the DT journey.
- DT brings changes in the processes and structure of the organisations, study can be done on the role of DT on organisational culture and employees to adapt to the new ways of doing things.
- Customer experience and engagement featured prominently as DT changed how telcos engage and handle queries using Apps instead of call centres. Further research can be conducted to better understand customer experience as a result of digital transformation.
- Operational efficiency was outside the scope of the study, but data analysis has shown that it is an area that was cited as improved and benefited from the implementation of DT in telcos. Further research is needed on the role of DT in organisational operations and processes.

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Appendix A: Interview questions guide.

WITS BUSINESS SCHOOL – UNIVERSITY OF WITSWATERSRAND

Role of Digital Transformation of South African Telecommunication Industry

Interview Protocol Project: The role of digital transformation (DT) and influence on business model and organisational capabilities	
Time of interview:	
Date:	
Place:	
Interviewer:	
Interviewee:	

1. DEMOGRAPHIC INFORMATION

Instruction: Please select and mark (X) next to the appropriate box of your choice

1.1	**What is your highest qualification? (Please indicate the option that applies best to you)**	
	3-year degree or diploma	
	Bachelor's degree	
	Postgraduate degree (Honours, Master or PhD)	**Master) X**
	Other (specify)	

1.2	**How many years of experience do you have in Telecommunication Industry?**	
	0 – below 5 years (1 – 5 years)	
	5 – below 10 years (6 - 10 years)	
	10 – below 15 years (11 - 15 years)	
	15 years and over Longer than 16 years	
1.3	**What is your role or position**	
1.4	**What is the classification of your business unit**	
	Technical and operations	
	Strategy	
	Marketing or Sales and/or Customer services	
	Support (Finance, HR, etc)	
	Other (please specify)	

2	**Organisational Capability**
2.1	How has telecommunication industry evolved over the past 10 years?

2.2	How does the industry expand terrestrial network reach (self-owned network build or infrastructure sharing) to provide viable opportunities to develop and deploy ICT infrastructure?
2.3	What digital technologies have been deployed and how it has affected overall organisation's ability to deliver new digital services?
2.4	How does technological change impact your overall strategy, business model and decision-making to investment. Are there any investment made to technologies such as RPA, AI, machine learning, etc. How are technological choices made to ensure high quality innovative services.
2.5	How does DT affect the organisational capabilities? And what changes does it bring
2.6	What the organisation has done to develop new skills and competencies?
2.7	How has the organisation performed to develop and deliver digital innovative services?
2.8	What is your view on the current ICT policy and regulation, does it facilitate enabling environment such as competition, availability of spectrum to liberalize the market to the new entrants and issuances of licenses?
3	**Digital Business Model Questions**
3.1	What is the status of digital transformation in your organisation?

3.2	How does DT impact on business model, are there any changes made on business model?
3.3	What other avenues and opportunities does DT offer to telcos other than improving traditional voice & sms services?
3.4	How does DT affect your strategy, has the strategy been changed since the advent of DT?
4	**Digital Service Offering**
4.1	How the customers' needs, and consumption pattern of telecommunication services have changed over the past 10 years?
4.2	What services are the consumers currently demanding and consuming most, how do you meet those demands/needs.
4.3	How does DT change your service offerings, and what are the new service offerings and if there are any in the pipeline and progression of service offerings?
4.4	Do consumers still need voice and sms services or there has been significant shift to new services, what are those and how do you respond to meet those customers' services?
4.5	How do telcos compete and collaborate in this ever-changing market. Is there any competition outside the telco and possible substitute of your services, how do you respond?
5. BENEFITS OF DT	

5	**Open Questions**
5.1	Please give your overall impression or thoughts of digital transformation benefits on the performance of the organisation. Is there any corelation between DT and improved performance?
5.2	How challenging it is to plan and implement DT?
5.3	How is the overall adoption and acceptance of DT by stakeholders in your organisation?

APPENDIX B: Request to conduct an Interview



University of the Witwatersrand

1 Jan Smuts Avenue

Braamfontein

Johannesburg

2000

01 September 2022

Company X

Pretoria
0001

Dear Sir/Madam,

RE: Request to Conduct Research Interviews with Company X Personnel

My name is Meshack Mlungisi Majola and I am a Masters student in Digital Business Master of Management at Wits University in Johannesburg. As part of my studies, I have to undertake a research project, and I am investigating "**The role of digital transformation in Telecommunication industry"**. The aim of this research project is to explore the role of digital transformation and how it influences business model and the development of new organisational capabilities.

As part of this project, I would like to request permission to conduct a research interview. Interview took around 60 minutes and I have a target of 5 interviews with your organisation.

The collected data will be kept safe, treated with utmost confidentiality and used for academic purposes only. The research findings on request will be shared with your organisation and your organisational participation will be kept confidential.

I would greatly appreciate your consent at this request.

Yours sincerely,

Meshack Mlungisi Majola

Researcher: Meshack Mlungisi Majola, 2517107@students.wits.ac.za

Supervisor: Mis. Ayanda Magida, ayanda.magida@wits.ac.za

APPENDIX C: Consent Form



University of the Witwatersrand

1 Jan Smuts Avenue

Braamfontein

Johannesburg

2000

01 September 2022

Title of project: The Role of Digital Transformation of South African Telecommunication Industry

Name of researcher: Meshack Mlungisi Majola

I, ……., agree to participate in this research project.

I agree to the following:

(Please circle the relevant options below)

The research study was explained to me. I understand what this study is about.	YES	NO
I understand that I can volunteer to take part in the study	YES	NO

I agree that the interview/focus group/other activity may be audio recorded	YES	NO
I agree that direct quotations from my interview/focus group/other activity may be used by the researcher in their research report/ manuscript/book chapter	YES	NO
I agree that my participation will remain anonymous (my name will not be used by the researcher in their research report/manuscript/book chapter)	YES	NO
I agree that other researchers may use the information I provide in my interview/focus group/other activity (depending on their own ethics clearance being obtained) but my name and any personal information will not be used or passed on	YES	NO

…… (signature)

…… (name of participant)

…… (date)

…… (signature)

…… (name of researcher/person seeking consent)

…… (date)

Appendix D: Initial codes developed from the data

	Questions	**Initial Codes**
2.1	Telecom industry evolution in past 10 years	Introduction of LTE, 5G, IoT, machine learning technologies Smart devices (drivers of DT in Telco) Network digitalisation Integration of wearables and phones Smart homes and cities Data price reduction Rise of social media Rise of video teleconferencing and collaboration Online shopping Telco partnership with Retailers Shift from voice to data-centric OTT and financial players entering Telco space Use of Apps instead of call centres Entire Ecosystem evolving due to new technology New business models for new industries Introduction of value added service

2.2	Terrestrial Network reach build & sharing	Collaboration Infrastructure sharing partnerships Consolidation Hybrid investment on self-owned infrastructure and sharing other parts Advancement of technology enables sharing infrastructure Sharing reduces CAPEX investment Speed to market is faster for new entrants Share the network and compete on services and offerings
2.4 **(2.3)**	Technological change impact on strategy, business model. What Technologies deployed	Restructuring the business RPA and chatbot working 24 hours Kiosks queuing system Customer flexibility GPS & Location systems to communicate to customers Technology for product awareness/marketing and security alert

		Quality measurement of traffic throughput and drop-offs Eliminate repetitive and mundane tasks Enable efficiency and Increase productivity Online shopping One-stop shop like Amazon Investment in 5G technology Content delivery network (live streaming) Investment decision-making in new technologies needs to be faster before technology becomes obsolete Value derived from new technology 5G Networks technologies, AI Investment in green energy technologies Intrapreneurial solutions Mobile money Fibre To The Home (FTTH) & Home connectivity Customer Value Management (CVM) Customisation based on spending patterns Cloud technologies AI managing network (self-learning and self-healing

		API – See what customers want to purchase and have payment gateway Balancing technology and demand to make sound strategy Green ICT, technology consuming less energy for strategy
2.5	DT impact on organisational capabilities	Change management processes System infrastructure New Businesses outside telecom Information readily available and shared amongst employees and decision makers Products and services offered easily accessible by customers. AI and big data technologies to streamline and improve processes Entrepreneurial spirit Innovative culture New ways of doing thing Energy efficiency and smart building Partnership for capability build immediately while capacitating own over time AI, machine learning , robotics are now part of toolkit and asset

		Lack of digital skills and reliance on consultants
2.6	DT influence on skills and capacity to be innovative and competitive	Interlinked business units Upskilling and training Skill transfer Partnership with universities and DT Consultancy companies Bursaries offered for formal training Internal learning platforms Automated processes Reconfigure resources to have capability to deliver new opportunities Digital skills as part of KPI for employees. Data science skills
2.7	How org performed to develop digital innovative services	Partnering with other service providers Use of cutting edge technologies Progressive in developing new innovation services Exponential growth Super apps and platforms Bridging the gap for unbanked population with mobile money

		Digitalising processes and assets New product incubation, development and commercialised At infancy stage, trying different things with digital innovation
2.8	Spectrum availability and regulation	Opening of new markets Barriers to new entrants Increased competition Small players entering the market POPI Act for protection of customers' information Few players dominating the telco market Spectrum allocation to facilitate 5G technologies Digital divide Market distorted because few players with financial muscle can buy spectrum and influence policy direction Value of traffic on network is not aligned to what telcos are paid for Government is slow to avail spectrum for other technologies

		Whitespace for low frequencies can be used in Telco
3.1	Status of DT in telecommunication organisations	Continuous DT journey (with wins and pain points) Learning journey of DT Legacy systems Not yet taking advantage of omni-channel Journey to move from Telco to Techno Network and systems optimization Collaborative efforts / partnership with content providers as Telcos enter new phase Early movers to adopt DT, achieve agility and high performance DT advanced on internal processes and efficiency of operations
3.2	DT impact on business model	Data centric Self-service Self-discovery of company's products and services Online payments Focus on investing more on online infrastructure than brick & mortar

		Remodelling Predictive system for customers needs and demands Fintech Cloudification (move to cloud database) Partnership with retailers IoT and smart devices demands require new business model and strategy Flexible and hybrid working model Move from Telco to Techno Creating value, no longer selling minutes and data Gamification to attract and keep customers Partner with e.g video on demand provider to access existing market and customers and share value/profit
3.3	Avenues and opportunities brought by DT	Financial services (insurances , offer loans, IoT services WhatsApp pay Live-streaming services Partnership with developers of smart devices and smart cars Tele-medicine as new opportunity to enter

		Virtual and online education driving growth Metaverse and visual tour (real time connectivity) Analytics solutions Smart metering Agriculture space and advice on predictive weather advise, type of plants to grow on each season Content development and monetizing it
3.4	DT impact strategy	New strategy development to align with DT New generation Y expect fast network and services Data-centric Building new infrastructure that enable high speed data traffic There is drive to move from Telco to Becoming Techno Strategy change Competitive Speed of service to deliver products HR Strategy for talent acquisition Telco in manufacturing industries providing 4IR network for plant

		Factory real time monitoring
4.1	Consumer pattern in past 10 years	Entertainment consumption (Tik tok, social media, live streaming) content. Lifestyle content Traditional voice and sms Data-driven Data packages Content-driven Quality of network and speed Instant gratification Pay less for more Customers demanding online services Convenience Customers are well informed on what they want Customers are drivers of DT in Telco sectors High capacity, fast network Conducting businesses on platforms Most companies have their own apps and will require connectivity (new segment). Value added services Video calls, teleconference platforms driving data consumptions

		Instantaneous download
4.2	What services customers consume and demand most and how to meet those demands	Data and browsing Social media (Tk tok and youtube, Netflix services, Facebook, etc) Video calls Content services Network infrastructure uptime Investment in data and content Packaging data bundles to suit customers needs WhatsApp Viber Youth are the target market for Telco DT strategy Video on demand Stable and high speed network required to these types of services Undersea cable and international traffic Content developed and hosted locally in data centres Predictive analytics for demand

4.4	Innovative Service offering	Mobile applications Remote connectivity Mobile money Lending solutions Fast-food apps and delivery Self-service Financial services offerings by Telco Smart devices allowing even children to be customers to be considered for product development Admin fee waiver for online customers Omni-channel (order in store, move to online, delivered at home) Smart home connectivity remotely (home segment) Use of predictive analytics to customise product offerings and value Fully flexible products (converting minutes to data) Partnership with content writers to deliver innovative service
4.5	Competition outside telco	Competition from Adjacent industries

		New players entering Telco space without owning and worrying about infrastructure cost. Telcos entering new industries Value-added Services as differentiator in competition Introduction of Self-service terminals Shift from traditional voice and sms to OTT services. Less use of voice calls Diversifying to other markets and services Customer experience Network infrastructure has become commodity, no used as competitive advantage Unbundling businesses into focused specialities (e.g Fintech) to respond to market Competition on content and services Competition on big cities, remote areas customers still rely on 2G, 3G Wholesale Open Access Network Substitute of network services in minimal especially outside big cities. Fintech MVNO Verticalization approach

5.1	DT benefits and performance of the organisation	Fibre to the homes New product offerings Financial performance and improved profit margin Better Customer engagement Improved Customer satisfaction Platforms as call centres for customers queries Quick Customer feedback Efficiency of the organisation Cost savings Direct corelation of DT and improved performance Increased productivity levels Processes are faster and agile, optimised Innovative ways of doing things Embrace DT for sustainability of organisation Technology performs mundane tasks People now can perform meaningful tasks Customer self-service, no more waiting in the queue

		Online phone shopping with variety of colour options and models as opposed to physical 24 hour network monitoring remotely with sensors and robotic technologies Accurately predict customer consumption pattern Paperless office and digital signatures Cost reduction
5.2	Challenges in planning and implementation	Leadership Consultation and roadmap Learning new ways Resistance Slow pace of implementation Risk of technology change and customers move away if implementation pace is very slow DT solving pain-points of employees DT brings Empowerment of employees Staff support Change agents to promote and drive DT DT journey is a massive task that requires different mindset Issue of trust and security

		Labour union resisting
5.3	Acceptance and adoption	Strategic partners DT enables Telco to be IT hub for all industries Suppliers as drivers and initiators of DT Sometimes Customers and suppliers as drivers of DT Forced to adapt and embrace DT Lack of acceptance in support functions DT acts as a channel for marketing and sales Managing fears of employees Processes in Administrative part of business not yet digitally transformed organisational culture impacts acceptance Change brings fear and anxiety Change management/consultative committees