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Determinants of Digital Transformation in South African Telecommunication Organisations

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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

Johannesburg, 2024

ABSTRACT

In the dynamic gig economy, organisations are grappling with increasing pressure to adapt through digital transformation (DT) for continued relevance. Successful DT initiatives have proven to boost organisational performance and competitive advantage, resulting in a twofold increase in total enterprise value for digital companies. However, despite its strategic significance, the intricate and multifaceted nature of factors that influence DT contributes to consistently low success rates in adopting this initiative.

This study employed a qualitative research approach to develop a comprehensive DT framework, incorporating perspectives on strategy, technology and employee engagement. This involved a literature review of five seminal frameworks, which led to the conceptualisation of an artefact framework. The framework underwent rigorous evaluation through 15 semi-structured interviews with experts in digital transformation and telecommunications.

The findings from the expert interviews informed the design of a holistic proposed framework anchored in the Digital Dynamic Capabilities Theory and Business Strategy Framework. The proposed framework delineates crucial determinants of DT that are tailored for South African telecommunication organisations. It comprises six pillars, which are grouped into visionary, structural and foundational enablers and encapsulate nuanced perspectives on technology, strategy, employee engagement and change management dynamics. The framework aims to serve as a best practice guide for industry leaders, emphasising the development of the capabilities, mindsets and structural conditions necessary for a successful DT journey.

KEYWORDS

Digital transformation, key enabling factors, key determinants, telecommunications.

DECLARATION

I, Taazmin Tar-Mahomed, declare that this research report is my 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: Taazmin Tar-Mahomed Signature: T.Tarmahomed

Signed at Centurion

On the 28th day of February 2024

DEDICATION

In Loving Memory of My Beloved Parents

This research report is dedicated to the cherished memory of my late parents, Joosub and Rabia Tar-Mahomed. Their unwavering love, guidance and unyielding belief in my potential have been the guiding lights throughout my academic journey. Although they are no longer with me physically, their spirit and influence continue to resonate on every page of this work.

My parents, who instilled in me a passion for knowledge and a commitment to excellence, are the silent inspirations behind every milestone achieved. This dedication is a small token of gratitude for the sacrifices they made and the encouragement they provided, shaping the person I have become.

As I navigate the intricate realms of academia and contribute to the field of Digital Transformation in South Africa, I carry with me the lessons and values instilled by my parents. Their memory fuels my determination and serves as a constant reminder of the profound impact they had on my life.

Although they may not be here to witness the completion of this research, their legacy lives on in the dedication, perseverance and love they instilled in me. In their honour, I dedicate this work to the two remarkable individuals who will forever hold a special place in my heart.

May their souls rest in peace.

With heartfelt love and remembrance…

ACKNOWLEDGEMENTS

As I approach the completion of my research journey, I want to take a moment to express my deepest gratitude to my supervisor, Dr Manessah Alagbaoso, for his unwavering support, guidance and encouragement. Your expertise, invaluable feedback and dedication to my academic growth have been instrumental in shaping the trajectory of my research.

I would also like to extend my sincere appreciation to my sister, Khairoon (Kay – “my anchor”), for her unwavering support and understanding during this challenging yet rewarding endeavour. Your encouragement, listening ear and belief in my abilities have been a constant source of strength, and I am truly grateful to have you by my side.

Additionally, I extend my deepest gratitude to all the participants who provided invaluable support towards this research study. Your contribution has been instrumental in enabling the successful execution of this study. Without your unwavering support and participation, none of this would have been possible. Please accept my sincerest appreciation for your generosity and assistance.

This research journey has been a collaborative effort, and I am fortunate to have had such a supportive team. Your collective contributions have played a pivotal role in my academic success, and I am sincerely grateful for the impact you have had on my growth and development.

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ABBREVIATIONS AND ACRONYMS

4IR	Fourth Industrial Revolution
AI:	Artificial Intelligence
AMCIS:	Americas Conference on Information Systems
BFSI:	Banking, Financial Services and Insurance
CAQDAS:	Computer-Assisted Qualitative Data Analysis Software
CDO:	Chief Digital Officer
CEO:	Chief Executive Officer
CM:	Change Management
DANP:	DEMTEL-Analytical Network Process
DBS:	Digital Business Strategy
DC:	Dynamic Capabilities
DCF:	Dynamic Capabilities Framework
DDC:	Digital Dynamic Capabilities
DDCF:	Digital Dynamic Capabilities Framework
DSR:	Design Science Research
DT:	Digital Transformation
DTS:	Digital Transformation Strategy
EC:	European Commission
EFF:	Enabling Factor Framework
HR:	Human Resources
HRD:	Human Resource Development
ICT:	Information and Communications Technology
IoT:	Internet of Things
IS:	Information Systems
IT:	Information Technology
KPI:	Key Performance Indicator
ML:	Machine Learning
NLP:	Natural Language Processing
OECD:	Organization for Economic Co-operation and Development
OTT:	Over-The-Top
P:	Participant
PMO:	Project Management Office
RB:	Resource-Based
SEE:	Strategic Execution Enablement
SEO:	Search Engine Optimisation
SMACIT:	Social, Mobile, Analytics, Cloud and the Internet of Things

CHAPTER 1. INTRODUCTION

1.1 Statement of Purpose

This research report aims to identify the essential determinants (key enabling factors) that facilitate digital transformation (DT) in South African telecommunication organisations (telcos). The primary goal is to create a critical determinants framework for DT that industry executives can use as a best practice guideline to develop critical capabilities, mindsets and structural conditions to support and enable their organisation's digital transformation.

1.2 Background of the Study

Digital Transformation

As the impact of digital technology becomes more pervasive, organisations in all industries are facing mounting pressure to undergo DT to stay competitive in the digital economy (Hess et al., 2016; Nasiri et al., 2022; Rueckel et al., 2020; Sousa-Zomer et al., 2020; Verhoef et al., 2021; Vial, 2019). This is supported by research conducted by the Global Centre for Digital Business Transformation (Armstrong & Lee, 2021).

According to the working paper "Exposure of the South African economy to technological disruption", the industries that face the most significant risk of technological disruption and significantly impact the South African economy include Media, Information and Communication Technology (ICT), Banking and Insurance, and Retail (Armstrong, 2019).

Digital Transformation in the Telecommunications Industry

According to Verhoef et al. (2021), digital evolution moves from basic to extensive phases, beginning with (Phase 1) Digitisation and moving to (Phase 2) Digitalisation and finally (Phase 3) Digital Transformation. Section 2.2.1

elaborates upon the distinctions among the aforementioned three phases. Since the inception of computerisation and the change from analogue to digital telephony in the 1960s and 1970s, the telecommunications (telecom) industry has been at the vanguard of digital innovation and change. This phase represented the digitisation (basic) phase of digital evolution. Due to the challenges outlined below, incumbent telcos have encountered obstacles in progressing beyond the digitisation phase.

With the rapid proliferation of digital technology in the telecom industry, incumbent telecommunications companies (telcos) are caught in a paradoxical situation, as they are in a unique position within the digital economy. They are fulfilling dual roles of providing digital products and services and being a vital enabler of a phenomenal DT in other industries. However, the digital acceleration has also led to the emergence of new digital natives, known as over-the-top (OTT) players or "technology titans", which pose a risk to traditional telcos through their innovative business models. As a result, OTT players threaten the traditional telecoms business as they try to take ownership of the traditional telcos' customers. Voice connectivity, the primary source of conventional telco revenue, is rapidly declining with the introduction of new applications such as WhatsApp and customer preference not to pay for voice and text messaging but rather to pay for data to access powerful OTT tools at a lower price (moflixgroup, 2020; McKinsey & Company, 2021). Therefore, traditional communication services are experiencing changes in consumer behaviour, leading to a decline in total consumer spending in this area, while spending on OTT services is increasing (IBM Institute for Business Value, 2017; McKinsey & Company, 2017).

Additionally, the disruption faced by traditional telcos from new competitors in the core telco industry has reshaped the existing competitive landscape. It poses a threat to the current investments of telcos, putting their cost baseline under significant pressure. Moreover, telcos are compelled to invest heavily in advanced connectivity technologies owing to the increasing demand for broadband access. However, the profit margins on data services are notably

lower than on voice services; this is coupled with changing customer behaviour and mounting pricing pressure from both the government and the public to lower data prices, resulting in a significant drop in revenue that ranges from 15 to 30% (McKinsey & Company, 2017).

Accordingly, telcos have faced ongoing pressure over the past ten years as their traditional revenue has gradually diminished and new growth opportunities have been scarce. Consequently, the return-on-investment capital (ROIC) has become increasingly closer to the weighted average cost of capital (WACC), as shown in Figure 1 below; and this resulted in declining economics. This means that before the COVID-19 pandemic hit, the telecom industry had already been dealing with various disruptions for over the past decade (McKinsey & Company, 2021). The pandemic further accelerated digital adoption, revolutionising both work and lifestyles (Trenerry et al., 2021), and amplified digital trends in redefining the basis for success.

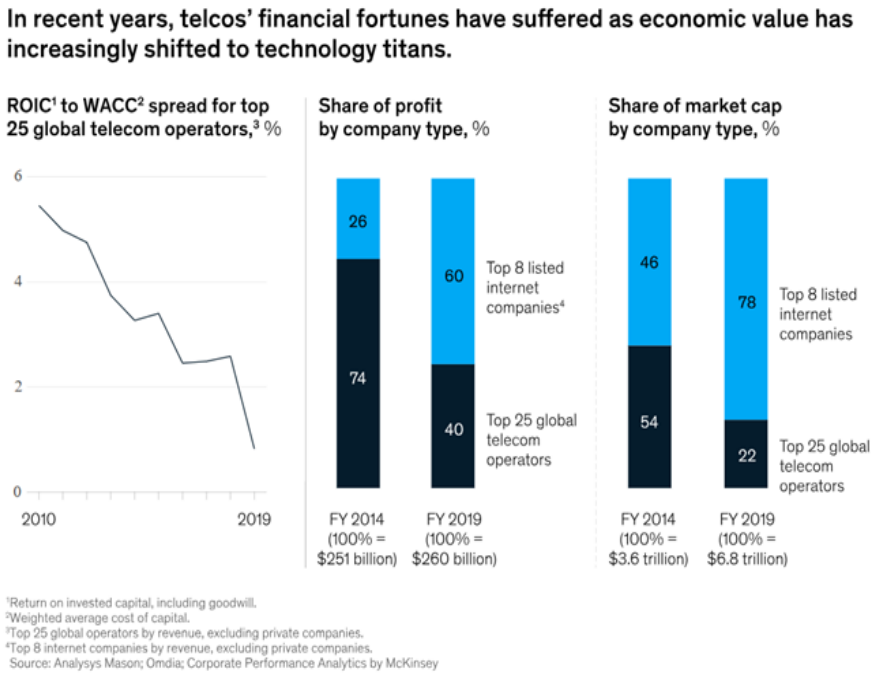

Figure.1.1: The Decline of Telcos Profitability over the past Decade due to the Increasing Power of OTT Players in the Core Telecoms Industry (McKinsey & Company, 2021, p. 2)

According to the McKinsey report, to thrive and combat the confluence of these disruptive forces of disintermediation, incumbent telcos should consider these strategic options: 1) Optimise operational efficiency and improve margins through DT to make core business lean, agile and cost-efficient, and 2) Identify areas of new growth that leverage telcos' core competencies and DT benefits (McKinsey & Company, 2017).

To achieve this goal requires telcos to rethink their operating models fundamentally (IBM Institute for Business Value, 2017; McKinsey & Company, 2017) and transform their business models through the implementation of DT, which is the most intensive phase of digital evolution and has become a strategic imperative for future business sustainability (Armstrong & Lee, 2021).

The need for telcos to transform their business models by implementing DT is further supported by a 2020 BCG report entitled “Flipping the Odds of Digital Transformation Success”. The report states that for organisations to remain relevant and thrive in the digital economy, DT is a strategic imperative that will enable building digital automation capabilities to harness the benefit of disruptive technologies fully. It will also enable organisations to develop and incorporate these technologies into innovative models, optimised processes and ways of working. DT essentiality has escalated due to the pandemic (Forth et al., 2020).

Furthermore, BCG research indicates that successful DTs enhance performance and competitive advantage while enabling companies to become more bionic. In addition, the research highlights that strong digital leading companies grow their earnings 1.8 times faster than digital laggards, resulting in double the growth in total enterprise value. DT streamlines working methods in the short term, resulting in optimised productivity and enhanced personalised customer experiences. In the medium term, DT creates new prospects for growth and innovation in business models. In the long term, successful DTs establish a foundation of sustained success by becoming proficient in innovation, removing the need for future DTs. Investors suggest that companies should invest more significantly in digital capabilities and technology (Forth et al., 2020).

However, implementing DTs can be daunting as it involves more than adopting new technologies; it requires fundamentally altering corporate culture and organisational structures and making significant investments to facilitate the transformation (Hess et al., 2016; Kane et al., 2017; Nasiri et al., 2022).

Research shows that companies fail in their efforts to transform digitally, despite failure being the least desired outcome. The impact of such failure can be enormous regarding financial investments, organisational efforts and time elapsed. Companies that fall behind in DT tend to lag in customer engagement, process efficiency and innovation (Forth et al., 2020).

1.3 Research Problem

Organisations face increasing pressure to adapt by undertaking DT to remain relevant in the gig economy (Hess et al., 2016; Nasiri et al., 2022; Sousa-Zomer et al., 2020; Verhoef et al., 2021; Vial, 2019). DT involves more than just implementing digital technologies; it encompasses fundamental changes beyond technology (Hess et al., 2016; Kane et al., 2017; Trenerry et al., 2021; Verhoef et al., 2021; Vial, 2019). DT is focused on how an organisation can evolve and enhance its capabilities to succeed in the digital economy (Armstrong & Lee, 2021; Hess et al., 2016; Kane et al., 2017; Verhoef et al., 2021; Vial, 2019; Warner & Wäger, 2019). However, the DT success rate is very low (Nasiri et al., 2022; Oh et al., 2022; Sousa-Zomer et al., 2020; Vial, 2019), which demonstrates that it is a complex process that can be influenced by multiple factors (Hess et al., 2016; Nasiri et al., 2022; Sousa-Zomer et al., 2020; Rueckel et al., 2020; Verhoef et al., 2021; Vial, 2019).

The complexity and low success rate of DT are supported by research conducted by BCG and summed up in its 2020 report. According to this BCG research, despite DT being a strategic imperative, it is not easy to execute, and only 30% of digital transformations succeed in achieving their goals, as indicated in Figure 2. This is mainly due to the complexity of delivering fundamental change at scale.

It also faces challenges related to the people dimension, which encompasses organisational structure and culture, the operating model and processes and is usually a critical influential factor because of the organisational apathy that results from deeply seated resistance behaviours.

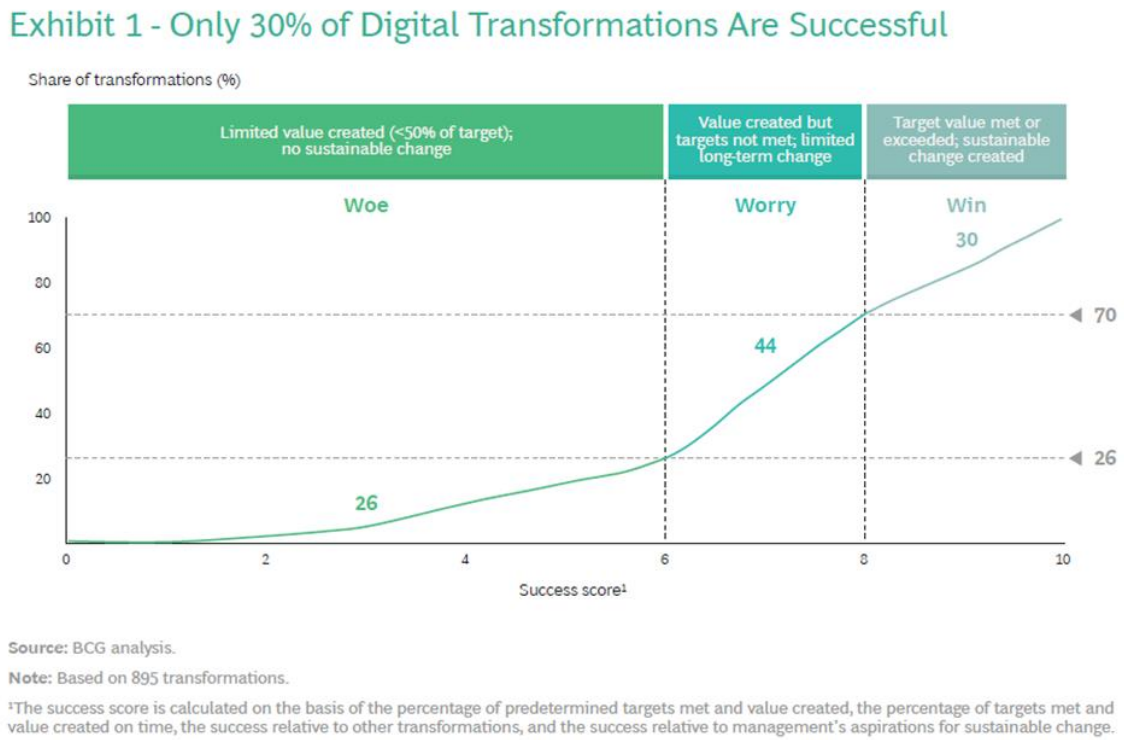

Figure 1.2: Success Rate of Digital Transformations (Forth et al., 2020, p. 5)

That DT is a complex phenomenon with far-reaching consequences is reiterated in the BCX Digital Innovation Index Report 2023. As depicted in Figure 3, respondent telcos in the sector cited the "complexity of multi-phased digital transformation programmes" as one of the main inhibitors that prevent them from innovating and finding new growth pools since there is a constant "tug of war" for investment between the ICT infrastructure and DT (BCX, 2023).

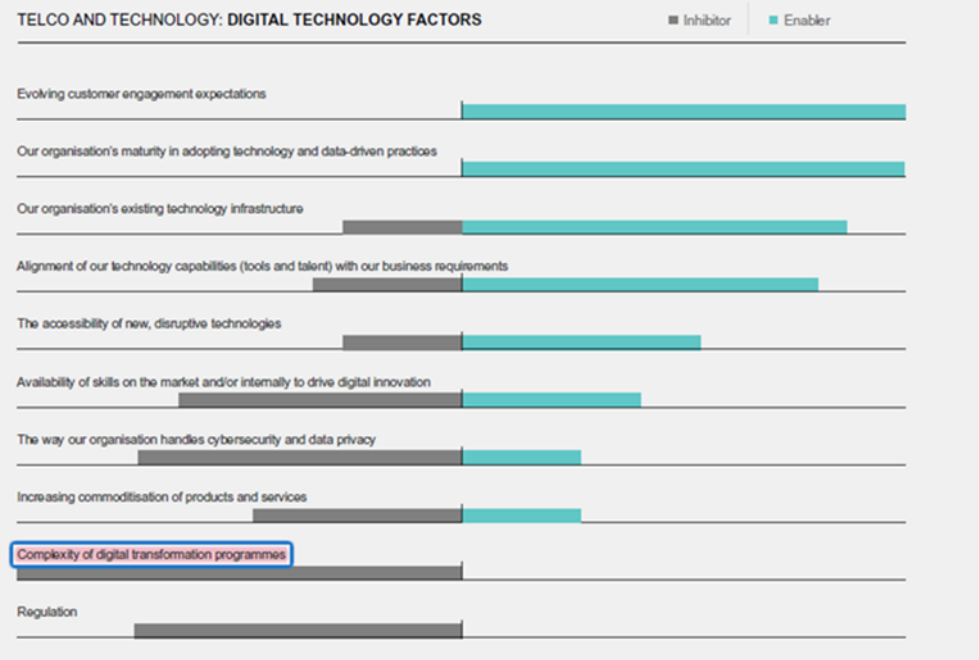

Figure 1.3: Complexity of Multi-Phased DT Programmes as Main Inhibitor of Innovation (BCX, 2023, p. 78)

While Rueckel et al. (2020), Vial (2019), Verhoef et al. (2021) and Trenerry et al. (2021) offer valuable insights into the various individual success factors, there is a lack of consolidated information on these factors that can be used as a best-practice guide to facilitate successful DT for organisations. In addition, the factors are very generic and not country or industry-specific. DT goes beyond digital technologies and significantly affects an organisation's culture, industry and location (Armstrong & Lee, 2021; Hess et al., 2016; Kane et al., 2017; Trenerry et al.,2021). Therefore, the specific type of organisation and the country it operates in can significantly influence the key enabling factors that promote successful DT.

From the initial literature review conducted for this study, there appears to be a noticeable gap in scholarly research regarding the digital transformation of the telecommunications sector worldwide. Only one study from an Iranian telecommunications regulator perspective was found, with no local studies available. This suggests that an empirical gap exists in the South African context

related to the critical enabling factors that facilitate digital transformation in telecommunications organisations.

1.4 Research Objectives

This research had two research objectives:

1. To determine the key factors that enable digital transformation in telecommunications organisations in South Africa.
2. The identified critical enabling factors will be organised into a framework that telecommunications organisations may apply as a guideline to facilitate digital transformation.

To achieve the second primary objective, the following five steps will be undertaken:

I. Derive key enabling factors from a structured literature review.

II. Ensure that these factors are grounded in theory, categorised into categories and organised into an artefact framework.

III. Evaluate the identified factors with industry experts through semi-structured interviews.

IV. Update the artefact framework with the insights from the interviews.

V. Develop the framework of determinants (enabling factors) of digital transformation for South African telecommunications organisations.

1.5 Rationale

Digital transformation (DT) generally requires a significant investment of time, money and resources. Conducting a digital maturity assessment to identify areas for improvement can also be expensive, subjective and resource-intensive since

everyone in the organisation must complete the assessment for it to be meaningful. This study aims to benefit telecoms organisations by proactively identifying the critical success factors for DT. Doing so can guide the areas of focus and allocation of essential resources more optimally throughout the organisation's DT journey, ultimately leading to better best practices.

Furthermore, because the telecoms sector is a critical enabler for the DT of many essential industries within the economy, ensuring the successful DT of organisations that operate in the telecoms sector will have a positive multiplier effect on the South African economy and ensure the country's relevance in the global digital economy.

Additionally, African organisations must embrace DT. The Digital Transformation Strategy for Africa (2020–2030), developed by the African Union, highlights that digital technologies offer a unique opportunity for Africa to revolutionise traditional socio-economic structures (African Union, n.d.). The strategy underscores the importance of affordable, accessible and reliable digital infrastructure in achieving digital inclusivity. This makes DT a strategic imperative for African organisations.

1.6 Delimitations of the study

The study aims to explore the pivotal factors facilitating digital transformation within South African telecommunications organisations. However, it specifically delineates its purview to incumbent telcos within the region. This delineation is purposive, as these entities are not only dominant market players that wield substantial market power but are the traditional telco operators poised to accrue maximal benefits from the digitalisation of their operations in terms of enhanced business efficacy and augmented consumer satisfaction. While the investigation principally focuses on identifying the enablers of digital transformation, it does not extend to analysing the nuanced facets associated with the adoption and innovation of nascent technologies emblematic of the Fourth Industrial Revolution (4IR).

1.7 Assumptions

The following assumptions apply to the study:

I. The incumbent telcos in South Africa are the traditional telcos that will benefit most from the digital transformation of their operations regarding business performance and customer satisfaction.

II. Digital transformation benefits long-term customer satisfaction and business performance.

III. Although 4IR technologies play a significant role in driving digital transformation, emerging technology adoption is not the only enabler.

IV. Interview participants will provide honest and genuine responses.

1.8 Chapter Outline

The chapter outline of this research report is presented in Figure 1.4 below.



Figure 1.4: Chapter Outline of the Research Report

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction

This chapter establishes a theoretical and empirical background regarding DT and its critical determinants by identifying, defining, critically evaluating and comparing various academic literature related to this research topic. In this way, the literature review lays the theoretical foundation for the study.

Figure 5 below provides a view of the various topics that this chapter covers:

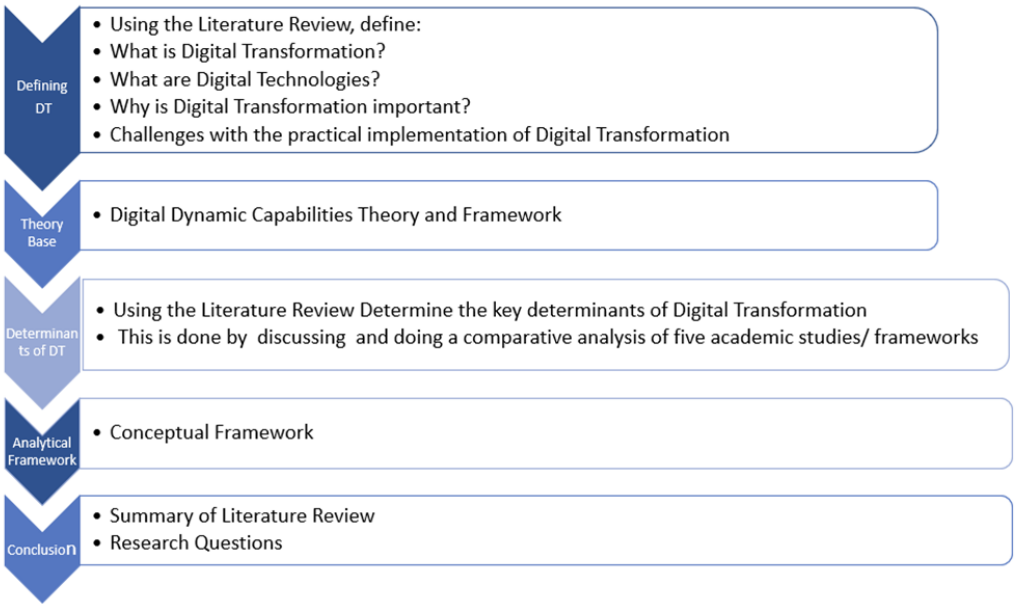

Figure 2.1: Overview of Chapter 2 Topics

2.2 Background Discussion

2.2.1 Digital Transformation

The idea of "IT-enabled organisational transformation" was first introduced by Venkatraman in 1994. According to Rueckel et al. (2020), in 2003, Andal-Ancion et al. (2003) coined the term "Digital Transformation" (DT) in the information systems (IS) literature to describe IT-enabled changes. Since 2010, digital

evolution has been studied from different perspectives, including strategic organisation management; Digital Business Strategy (DBS) (Bharadwaj et al., 2013.); DT Strategy (DTS) (Matt et al., 2015); and marketing (Verhoef et al., 2015). However, despite these concepts being explored in multiple disciplines, academic literature lacks a clear distinction between digitisation, digitalisation and DT. The lack of distinguishing definitions for these terms has resulted from the multidisciplinary perspectives of DT and the diverse areas of change that the DT process encompasses and has led to confusion among researchers (Vial, 2019).

Verhoef et al. (2021) analysed how different disciplines (IS, marketing, innovation and strategy) comprehend and define DT. Their findings revealed that all the disciplines acknowledge three phases of digital change, ranging from basic, which involves digitisation, and moving through the digitalisation phase to arrive at the extensive phase of DT. In addition, most experts in this field (Matt et al., 2015) believe that the first two phases are crucial to the comprehensive third phase of DT. However, according to Verhoef et al. (2021), the current process may not be the most optimal approach for the incumbent organisation. Nevertheless, further research is required to understand this perspective, specifically regarding the influence of the organisation's digital readiness.

In their study, Verhoef et al. (2021) define digitisation as converting analogue information into digital or binary code (see also Dougherty & Dunne, 2012; Loebbecke & Picot, 2015; Yoo et al., 2010; Krumay et al., 2019). The primary focus of digitalisation is to digitise internal and external documentation in processes to enable the organisation to be more cost- and resource-effective without altering value-creation activities. As digitalisation involves the utilisation of digital technologies to enhance organisation and customer-facing processes, which lead to improved coordination, efficiency, cost-effectiveness and customer experience, it, in turn, creates additional value for the organisation. Ultimately DT is the most pervasive and complex phase, since implementing digital technologies affects every aspect of the organisation, resulting in fundamental

changes in how the organisation operates to attain competitive advantage and generate value. This means that DT has strategic implications for the organisation model.

Since DT has multiple definitions in academic literature, Vial (2019) analysed 23 unique definitions of DT. Vial (2019) observed three key points that align with the findings of Verhoef et al. (2021). Firstly, DT is mainly studied from an organisational perspective. Secondly, definitions of DT vary depending on the specific digital technologies involved and their impact. Lastly, digital technologies are fundamental to DT. On this basis, Vial (2019) developed the following conceptual definition for DT: “a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies.”

In 2017, the European Commission (EC) prioritised the DT of organisations and society to achieve its 2030 ambitions. To support this objective, the Organization for Economic Co-operation and Development (OECD) initiated a worldwide initiative called "Going Digital: Making the Transformation Work for Growth and Well-being". The primary objective of this effort is to support policymakers in comprehending digital technology and establishing a policy framework that fosters economic and societal growth in a digital environment (OECD, 2018; Verina & Titko, 2019).

In terms of this context, Verina and Titko (2019) conducted a study to examine the idea of DT in the organisational world. To gather information, they collected 30 definitions and text segments related to the term "digital transformation". These were obtained from various sources.

The initial assessment found that the term "technology" was the most cited component in the definitions of DT. Following this, "processes," "data" and "organisation model" were also frequently mentioned. It became apparent that DT’s “people” aspect was not considered much in most DT literature. For this reason, the information was reviewed using categories provided by Sarika Puri,

a senior director and head of the digital commerce platform transformation at Dell EMC. In discussing successful DT in the organisation, Puri emphasised the importance of aligning "people, process, and technology".

Following this approach and the perspectives of industry experts, it was found that the most appropriate definition of organisation DT is the amalgamation of the following two definitions: Firstly, DT encompasses the utilisation of technology to forge innovative organisation models, processes, software and systems that generate increased profitability, superior competitive advantage and heightened efficiency (Schwertner, 2017). Secondly, DT entails investing in people and technology to expand an organisation that can adapt, scale and evolve over the long term (Del Rowe, 2017).

In accordance with an analysis of academic literature, this study defines DT as a crucial strategy that entails investing in both human resources (HR) and technology to develop essential skills, capabilities, innovative organisation models, efficient processes, and advanced systems. Together these developments enable an organisation to adapt, grow and evolve, with the ultimate objective of achieving greater profitability, competitive advantage and overall efficiency in a rapidly changing digital economy. Since technology is a fundamental component of DT, the concept of digital technologies is defined in the following section.

2.2.2 Digital Technologies

As digital technologies become more pervasive, various terms are used to describe these technologies, including “ICT”, “4IR” and “intelligent technologies”.

According to Vial (2019), another term used to describe digital technologies is “SMACIT”, which stands for social, mobile, analytics, cloud and the internet of things. This term includes technologies related to social media (Web 2.0), mobile devices (smartphones), data analytics, cloud computing and IoT. In addition to these, there are also platforms, the World Wide Web (broadband internet),

blockchain, speech recognition, machine learning (ML), search engine optimisation (SEO), online payment systems and cryptocurrencies (Verhoef et al., 2021).

It is important to note that digital technologies are rarely used alone in the DT context. Instead, a combination of technologies is used to achieve specific outcomes (Günther et al., 2017; Newell & Marabelli, 2015). For example, to implement data-driven decision-making in an organisation, it is necessary to have robust analytics capabilities and access to vast amounts of big data gathered through digital mediums (Newell & Marabelli, 2015).

Vial's (2019) study of academic and practitioner literature revealed that digital technologies are often described as inherently disruptive. The study identified three types of disruptions caused by these technologies: (1) changes in consumer behaviour and expectations; (2) shifts in the competitive landscape; and (3) increased data availability. These disruptions are having an impact on organisations, making DT extremely important.

2.2.3 Importance of Digital Transformation

According to Vial (2019), the emergence of digital technologies has significantly disrupted consumer behaviour, the competitive landscape and availability of data. Therefore, companies must embrace DT and adapt to the ongoing disruptions to remain competitive and viable in the ever-evolving gig economy.

Consumer behaviour disruption: The digital revolution, coupled with the COVID-19 pandemic, has accelerated the adoption of digital technologies (Trenerry et al., 2021). This has significantly impacted consumer behaviour, as stated by Vial (2019) and confirmed by Verhoef et al. (2021). These technologies have bolstered the growth of e-commerce, as evidenced by the rise in online shopping (Verhoef et al., 2021). As a result, digital touchpoints have become essential for providing a positive customer experience (Kannan & Li, 2017). Owing to the availability of new digital platforms, consumers now have more access to

information and are better empowered than ever before (Lamberton & Stephen, 2016; Verhoef et al., 2017).

Consequently, consumers can influence product and service value propositions according to their expectations and even co-create value through designing and customising products and sharing product reviews (Beckers et al., 2018; Grönroos & Voima, 2013). In addition, mobile devices, including applications and artificial intelligence (AI)-based technologies such as Amazon's Echo and Google Home, have become essential for consumers, enabling offline examination of merchandise and online purchases through “showrooming behaviour”. Organisations that fail to adapt to the digital revolution risk becoming less attractive to customers and being replaced by those that have successfully embraced digital change (Verhoef et al., 2021). This suggests that organisations must digitally transform and proactively anticipate and respond to changes in customer expectations if they intend to remain relevant and competitive in the digital economy, as emphasised by Vial (2019).

Competitive landscape disruptions: The rapid advancement and widespread adoption of digital technologies fundamentally change the competitive landscape, market structure, and how organisations operate and compete. These technologies optimise an organisation's cost structure and allow for innovative digital products and services, disrupting markets and making it easier for new players to enter previously capital-intensive industries (Woodard et al., 2012). Platforms such as Airbnb and Netflix are examples of organisations that are facilitating the exchange of digital and physical goods and services while generating additional revenue through fees (Tiwana et al., 2010). In the music industry, traditional physical goods have been replaced by subscription services that are offered by non-traditional players such as Apple and Spotify (Lucas Jr et al., 2013). Blockchain technology is also revolutionising various domains, such as banking and contract management, by creating decentralised digital infrastructures that complement or replace established centralised institutions (Friedlmaier et al., 2018). As a result, sales are shifting to younger digitally native

organisations, according to Verhoef et al. (2021), eroding incumbent organisations' competitive advantage and long-term sustainability (Kahre et al., 2017).

This trend is highlighted globally, where large, data-rich organisations from the United States (such as Amazon, Alphabet, Apple and Facebook) and China (such as Alibaba and JD) have started to dominate multiple industries. This shift is reflected by the most lucrative organisations in the S&P 500 Index: digital companies such as Apple, Alphabet, Microsoft, Amazon and Facebook. This is in stark contrast to a decade ago, when Exxon, GE, Microsoft, Gazprom and Citigroup were among the most valuable organisations, with only one being a digital organisation. Another significant indicator of the exponential growth of digital companies is the FAANG stocks, which consist of Facebook, Apple, Amazon, Netflix and Google. Despite only making up 1% of the S&P 500 Index, these stocks had a market valuation increase of $260 billion during a three-month period in 2017, while the remaining 99% experienced an equal loss (Verhoef et al., 2021).

With the above in mind, organisations need to transform to remain relevant and competitive in the digital economy, as Vial (2019) and Verhoef et al. (2021) emphasise.

Increased availability of data disruption: Digital technologies offer more than just operational benefits; they also generate data using mobile devices and social media sites such as Facebook and Instagram. Big data is valuable for firms looking to train AI bots or monetise the information by selling it to third parties (Loebbecke & Picot, 2015). Furthermore, companies can use analytics to strengthen their competitive advantage by providing customised products and services to improve customer experience and operational efficiency through data-driven decision-making (Günther et al., 2017). This is highlighted by the airline company KLM, which utilises social media platforms such as Twitter and Facebook to gain real-time customer insights and provide a customised customer experience (Kane, 2014).

Apart from the disruptive forces, there is a pressing need for African organisations to undergo DT. The Digital Transformation Strategy for Africa (2020–2030), set up by the African Union, states that digital technologies present a chance for Africa to leapfrog its way to transforming the conventional socio-economic sector (African Union, n.d.). The strategy emphasises that having affordable, accessible and dependable digital infrastructure is crucial to achieving an inclusive DT. However, there are several practical obstacles to implementing DT. The following section elaborates on these challenges.

2.2.4 Challenges associated with the Practical Implementation of Digital Transformation

Although DT offers many opportunities to enhance financial success, companies often struggle with its implementation owing to its complex and multifaceted nature (Rueckel et al., 2020). DT goes beyond simply adopting digital technologies and, instead, impacts all aspects of an organisation, fundamentally changing its operations and value creation in a rapidly evolving digital economy (Chanias et al., 2019; Hess et al., 2016; Kane et al., 2017). The DT process is further complicated by the rapid evolution of technology coupled with digital technologies that blur market boundaries and alter the roles of crucial change agents such as customers, co-producers, partners and competitors (Verhoef et al., 2021). Given the extensive changes required and the high failure rates associated with DT (Matt et al., 2015; Sousa-Zomer et al., 2020; Vial, 2019), successful implementation relies on understanding the key determinants (enabling factors and/or dynamic capabilities) that can positively impact an organisation's ability to transform digitally.

2.3 Theory Base

2.3.1 The Dynamic Capabilities Theory

The Dynamic Capabilities (DC) theory was developed by Teece in 2007, building upon the organisation's Resource-based (RB) theory by Barney in 1991. While both theories aim to achieve a competitive advantage for the organisation, the RB theory focuses on strategically using resources for a competitive advantage. The DC theory expands on the RB theory by emphasising how organisations can intentionally modify their resources to better adapt to their environment and ensure sustainability (Vial, 2019).

According to the DC theory, organisations have both ordinary and dynamic capabilities. Standard capabilities are the technical functions that are necessary for completing tasks, while dynamic capabilities allow organisations to adapt and innovate in response to environmental changes. Adaption and innovation are achieved through the three mechanisms of sensing, seizing and transforming. First, sensing involves identifying and assessing technological opportunities in terms of customer needs; second, seizing involves mobilising resources to address those opportunities and capture their value; and third, transforming involves continually renewing the organisation by reconfiguring resources to seize opportunities and respond to threats strategically (Teece, 2007).

According to Vial (2019), it is intriguing how DC is a conceptual foundation for exploring DT as a phenomenon. DT is shown in the literature as the process of fundamental change within the organisation in response to volatility in the organisation’s competitive landscape. To embrace DT, organisations must create mechanisms (DCs) that enable them to adapt continuously despite these rapid changes. Since DCs are most useful in market disruption or hyper-competition, the DC theory is particularly applicable in the rapidly changing and volatile environments created by digital technologies (Teece, 2007).

The DC framework has been widely used to analyse an organisation's ability to sense, seize and transform its tangible and intangible resources (Warner & Wäger, 2019). Recently, Warner and Wäger (2019) developed their framework for digitally based Dynamic Capabilities (DDCs), building upon Teece's initial model. They argue that the introduction of digital technologies has significantly changed the competitive environment since the DC framework was first presented, and their framework aims to address this. In addition, the authors offer a relevant and novel approach to DDCs by combining organisational theory with DT literature. While the theory is relatively new, the authors have already used it in an empirical study to investigate how incumbents in traditional industries build DDCs for DT and remain competitive.

2.3.2 Overview of the Digital Dynamic Capabilities Model

According to Teece (2018), DCs are made up of three abilities. The first is the ability to sense opportunities and threats, the second is the ability to seize opportunities, and the third is the ability to enhance tangible and intangible assets by reconfiguring or transforming them.

Teece (2007) posits that ordinary capabilities are concerned with doing things right, while dynamic capabilities are more about doing the right things. This implies that an organisation's managerial competencies in identifying opportunities, making resources available and fostering innovation are critical in developing and improving the business model. In contrast, Warner and Wäger (2019) emphasise that digital dynamic capabilities are innovation-based and provide organisations with the ability to develop, expand and adapt their resource base.

Warner and Wäger’s (2019) study makes two contributions to the existing literature: (1) it defines DT as a process of developing DDCs for continuous strategic regeneration, and (2) it provides practical insights regarding the types of DDCs that are required for DT.

In addition, these authors suggest that digital technologies have enabled organisations to scale at speed, cost-effectively and with ease, feats that would not have been considered possible a decade ago. In the digital age, three primary external triggers fundamentally alter the characteristics of dynamic capabilities. These are (1) disruptive digital competitors, (2) changing consumer behaviours and (3) disruptive digital technologies (Warner & Wäger, 2019).

Considering these external triggers and the empirical insights gathered from their study, Warner and Wäger (2019) developed a process model, as depicted in Figure 6. The model comprises the following five vital elements: (1) external triggers; (2) the three dynamic capabilities and nine sub-capabilities that enable the development of digital sensing, digital seizing and digital transforming capabilities; (3) focus areas of strategic renewal; (4) internal enablers; and (5) internal barriers (Warner & Wäger, 2019).

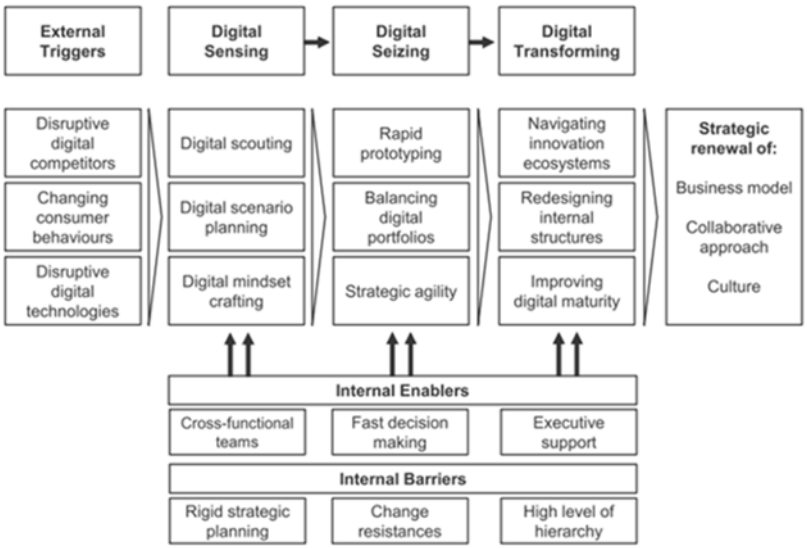

Figure 2.2: Building Digital Dynamic Capabilities for Digital Transformation: A Process Model (Warner & Wäger, 2019, p. 336)

The Digital Dynamic Capabilities Framework (DDCF) was adopted by the current study and used to guide and evaluate the key enabling factors identified from the literature review and obtained from the research process. A literature review of

five key frameworks was conducted to identify these enabling factors, and this is presented in the section below.

2.4 Literature Review: Evaluation of Existing Frameworks

Existing Frameworks that articulate the Determinants (enabling factors) of Digital Transformation

As previously discussed, DT involves significant changes across an entire organisation and can be costly. Moreover, there is a high likelihood of failure associated with this process, as demonstrated by studies conducted by Matt et al. (2015), Sousa-Zomer et al. (2020) and Vial (2019). To ensure successful implementation, it is crucial to identify the prerequisites or essential determinants (enabling factors and DCs) that can enhance an organisation's capacity to undergo DT. To achieve this objective, the key enabling factors that support DT were articulated in an artefact framework by evaluating five frameworks with similar objectives to this study.

The list of the frameworks that were evaluated is shown in Table 2.1. Since the studies provide a set of factors, the studies are called frameworks for easy comparison.

Table 2.1: Frameworks Discussed in the Literature Review

Framework number	Authors	Title of study	Focus
1	Rueckel et al. (2020)	An Updated Framework of Factors Enabling Digital Transformation	Business, Strategy and Technology
2	Vial (2019)	Understanding Digital Transformation: A review and research agenda	Business, Strategy and Technology
3	Verhoef et al. (2021)	Digital Transformation: A multidisciplinary reflection and research agenda	Business, Strategy and Technology
4	Trenerry et al. (2021)	Preparing Workplaces for Digital Transformation: An Integrative Review and Framework of Multi-level Factors	Employee
5	Aghayari et al. (2022)	Explaining the Effective Factors on Digital Transformation Strategies in the Telecoms Industry of Iran using the Delphi Method	Iranian Telecom Ministry

2.4.1 Overview of Framework 1

An Updated Framework of Factors Enabling Digital Transformation (Rueckel et al., 2020)

Study Objective

Muehlburger et al. (2019) initially created a framework of factors that can positively impact an organisation's ability to implement DT initiatives successfully. This was motivated by the DT phenomenon. Despite the recognised importance and advantages of DT, empirical evidence and case studies by Eastman and Sisson (2016) revealed that only a small proportion of organisations manage to implement DT. In contrast, some organisations have effectively utilised technology to reshape their business models and structures, achieving successful DT implementation. While empirical and theoretical studies have provided insights into the potential factors that drive successful DT, these insights often lack structure and coherence. Against this background, Muehlburger et al. (2019) created a framework of enabling factors, based on an extensive literature review and expert interviews, to address this issue.

Initial Framework: Design Approach and Results

A structured literature review of 36 papers that covered existing frameworks was conducted by these authors to establish a solid foundation. From this review, a list of factors that were found to contribute to the success of DT initiatives was generated. A design science approach was used. The results were then classified into nine factors: (1) Individual creativity and innovation capabilities; (2) ICT literacy; (3) Innovative organisational culture; (4) Internal and external collaboration; (5) Digital platform infrastructures; (6) IT agility; (7) Institutionalised innovation processes; (8) Strategic embeddedness; and (9) Digital leadership.

These nine enabling factors were then categorised into the following four categories: (1) Workforce capabilities; (2) Organisational values; (3) Organisational infrastructure; and (4) Management capabilities. These categories were then compiled into a framework.

The framework's effectiveness was assessed using semi-structured interviews with seven experts to validate the defined enabling factors and categories and to explore potential modification. The participants were selected on the basis of their extensive managerial or consulting experience in one or more DT programmes. This structured approach simplifies the complexity of DT implementation and can be utilised by practitioners to better plan and manage DT implementation.

Table 2.2 provides a view of the initial Enabling Factor Framework (EFF), which consists of four categories and nine underlying enabling factors.

Table 2.2: The Initial Enabling Factors Framework (Muehlburger et al., 2019, pp. 4-5)

	Enabling Factor	Referring Sources
Workforce Capabilities	Individual Creativity and Innovation Capabilities	An individual's capability to think creatively, work creatively with others and implement innovations (Binkley et al. 2012); see also (El Sawy et al. 2016; Rothmann and Koch 2014).
	ICT Literacy	The individual's capability of "using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate and create information in order to function in a knowledge society and at its highest level enable innovation, individual transformation, and societal change" (Educational Testing Service 2002); also (Brown et al. 2013; El Sawy et al. 2016; Kane et al. 2015).
Organizational Values	Innovative Organizational Culture	A company culture which fosters innovation, creativity and an entrepreneurial mindset of the employees by cultivating tolerance for mistakes, encouragement for the generation of new ideas, support for continuous learning, risk taking and experimenting, competitiveness, management support for change and finally tolerance and constructive handling of conflicts as central organizational values.(Martins and Terblanche 2003); also (Bärenfänger and Otto 2015; Hess and Barthel 2017; Kane et al. 2015; Karimi and Walter 2015; Khazanchi et al. 2007).
	Internal and External Collaboration	A value structure within a company which fosters collaboration between its employees, independent of their specific roles and departments while also fostering the inclusion of third parties within all steps of an innovation process following the paradigm of open innovation. Derived from (Chesbrough 2006; El Sawy et al. 2016; Hosseini et al. 2017; Hylving 2015; Islam et al. 2017; Leipzig et al. 2017).
Organizational Infrastructure	Digital Platform Infrastructures	Highly integrated infrastructures following investments into technology infrastructure, data, digitized business processes and electronic linkages to external parties (Quaadgras et al. 2014); also (Bärenfänger and Otto 2015; Westerman et al. 2011).
	IT-Agility	An IT–function's capability to identify changes within a company's environment and adapting to the changing business needs following these changes (Leonhard et al., 2017); also (Fowler and Highsmith 2001; Haffke et al. 2017; Westerman et al. 2011).
	Institutionalized Innovation Processes	A process imposing structural value profiles which encourage efficiency, productivity, stability and structure on the innovation environment that is generally based on flexibility value profiles such as creativity, individual empowerment and change (Khazanchi et al. 2007); also (Brown et al. 2013; Kohli and Melville 2009).
Management Capabilities	Strategic Embeddedness	An interwoven digital business strategy which effectively governs the necessary transformational processes within the organization. Derived from (Kahre et al. 2017; Kane et al. 2015; Matt et al. 2015; Mithas and Lucas 2010; Peppard et al. 2014).
	Digital Leadership	Management board that has reached a mutual understanding to view IT as an asset, recognize its' strategic or turnaround orientation; contains a member fulfilling the role of an IT Orchestrator (Hansen et al. 2011); also (El Sawy et al. 2016; Gerth and Peppard 2016; Hansen and Siew Kien Sia 2015; Horlacher and Hess 2016; Yin and Chen 2008).

An Updated Framework of Factors Enabling DT

The initial framework required a second iteration after Rueckel et al. (2020) had received feedback from IS scientists at the Americas Conference on Information Systems (AMCIS) 2019. The authors then conducted a comprehensive assessment of Vial's (2019) literature on DT, mainly focusing on the 59 studies identified by Vial (2019) that related to the Structural Changes cluster in his DT framework. Related to this cluster, Vial identified four categories: (1) Organisational structure; (2) Organisational culture; (3) Leadership; and (4) Employee roles and skills.

As part of Rueckel et al.'s. (2020) redesign process, a thorough review of these studies discovered new insights, which were used to identify new enabling factors. Six factors remained unchanged: (1) Individual creativity and innovation capabilities; (2) ICT literacy; (3) Innovative organisational culture; (4) Internal and external collaboration; (5) Institutionalised innovation processes; and (6) Digital leadership.

Three enabling factors were significantly changed. First, the concept of "IT agility" was updated to include "bimodal IT structures". Second, the initial concept of digital platform infrastructures was expanded to include the idea of an operational backbone (Sebastian et al., 2017). Finally, strategic embeddedness was expanded to encompass the organisation's leadership, focusing on partnerships with third parties and co-creation with customers. This view is supported by DT strategy-building research.

The framework was updated by categorising the new nine factors into the four initial categories. Four additional experts assessed this updated framework.

The experts recognised the resemblance to widely used management frameworks. In accordance with their knowledge and experience, the four categories are closely aligned with the four management layers. Linking the enabling factors with management layers reveals interconnections between different categories. This enhances the organisational and scientific foundation

of the updated framework. Figure 2.3 reflects the managerial relationships among categories.

This structured approach simplifies the complexity of DT implementation and can be utilised by practitioners to plan and manage the DT implementation more effectively. Furthermore, the framework provides academic advantages, as it encompasses the latest research findings on the key factors that facilitate DT. This enables a more methodical research methodology to investigate organisational traits that support successful DT.

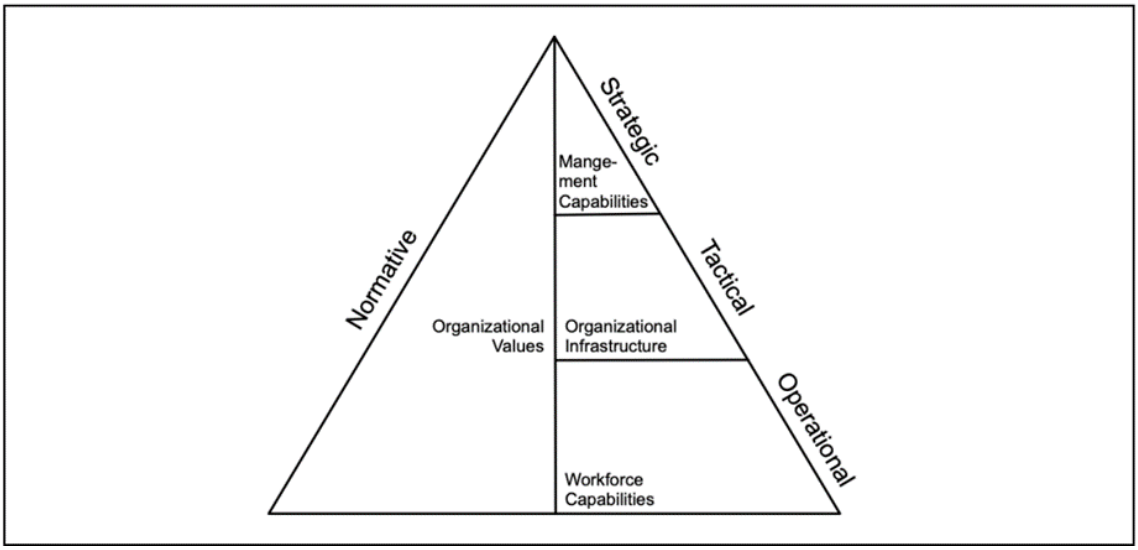

Figure 2.3: Managerial Relationship among Categories (Rueckel et al., 2020, p. 12)

Table 2.3 reflects the updated EFF. It provides a view of the four managerial layers, four categories and nine enabling factors, with a brief description of each of the factors.

Table 2.3: Digital Transformation Enabling Framework (Rueckel et al., 2020, pp. 17-18)

Layer	Category	Enabling Factor	Short Description
Normative	Organizational Values	Innovative organizational culture	A company culture that fosters innovation, creativity, and an entrepreneurial mindset in its employees by cultivating openness toward change, agility, tolerance of failure, willingness to learn, participation, trust, risk affinity, entrepreneurship, innovation, cooperation, communication, innovation, and customer-centricity as central organizational values.
		Internal and external collaboration	A value structure within a company that fosters cooperation and problem-solving between its employees, independent of their specific roles and departments. It also fosters the inclusion of third parties within all steps of an innovation process following the paradigm of open innovation.
Strategic	Management Capabilities	Strategic embeddedness	A set of collaborative strategizing processes resulting in an interwoven DBS which also governs the necessary transformational processes within the organization.
		Digital leadership	A management board which includes a member, fulfilling the role of IT orchestrator that has reached a mutual accord to view digital technology as an asset and recognize its strategic or turnaround orientation.
Tactical	Organizational Infrastructure	Digital platform infrastructures	An integrated infrastructure created by investment in digital technology and data infrastructures, digitized business processes, and electronic linkages to external parties that enables efficiency, scalability, reliability, high quality, and the predictable execution of core organizational operations.
		Bimodal IT structures	Infrastructures that enable the IT function to develop and maintain stable core infrastructures by exploiting the existing organizational model while simultaneously enabling the rapid exploration and implementation of innovative uses of digital technology.
		Institutionalized innovation processes	A set of systematic processes aligned with the individual organizational setting that imposes structural value profiles encouraging efficiency, productivity, stability, and structure on an
			organization's innovation environment that is generally based on flexibility value profiles such as creativity, individual empowerment, and change.
Operational	Workforce Capabilities	Individual creativity and innovation capabilities	An individual's capability to think creatively, work creatively with others, and implement innovations.
		ICT literacy	An individual's capability for using digital technology, communications tools, and networks to access, manage, integrate, evaluate, and create information to function in a knowledge society, and at its highest level, enable innovation, individual transformation, and societal change.

2.4.2 Overview of Framework 2

Understanding Digital Transformation: A Review and a Research Agenda (Vial, 2019)

Study Objective

According to Vial (2019), although numerous aspects of DT have been researched, a complete comprehension of this phenomenon and its implications at various levels of analysis is still lacking (Gray & Rumpe, 2017; Matt et al., 2015). To address this knowledge gap, a study was conducted to answer the research question: "*What do we know about DT?*" The study employed an inductive approach and reviewed 282 studies on DT. A conceptual definition of DT was developed based on existing definitions, which are discussed in Chapter 1 and Chapter 2, Sections 2.2.1 of this research study.

DT Inductive Framework

Following the study, Vial (2019) formulated an inductive framework, as shown in Figure 2.4. This framework is constructed on the basis of connections that were observed through an examination of eight foundational components. DT involves organisations adapting to environmental disruptions that are caused by digital technologies by leveraging those technologies to adjust their methods of creating value to stay competitive in a changing landscape. These changes could lead to positive or negative impacts. Therefore, for organisations to achieve successful outcomes, they must consider implementing specific structural changes and overcoming barriers that could impede the execution of the transformation.

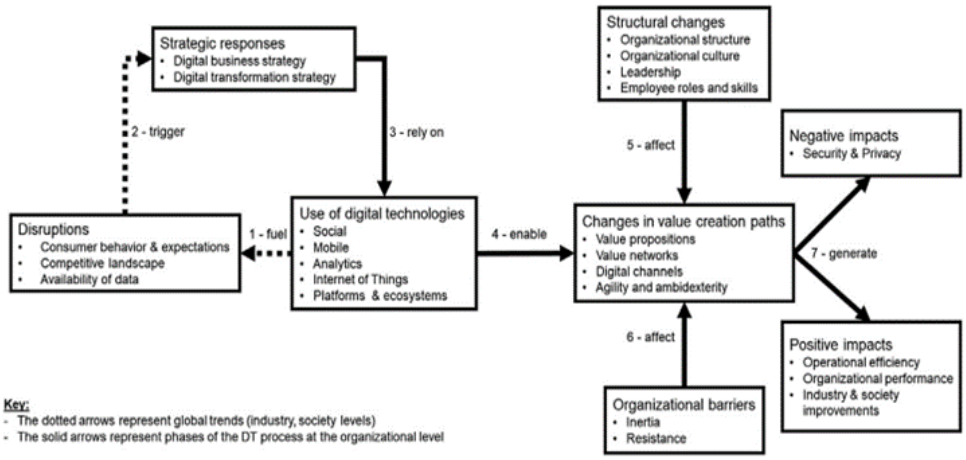

Figure 2.4: Inductive Framework – Foundational Components of Digital Transformation (Vial, 2019, p. 122)

Understanding the Enabling Factors and Categories

As with Rueckel et al. (2020), this research focuses on understanding the Strategy, Technology and Structural Changes cluster and the related six categories: (1) Strategic responses; (2) Digital technologies; (3) Organisational structure; (4) Organisational culture; (5) Leadership; and (6) Employee roles and skills.

Summary of Identified Categories and Enabling Factors

Vial (2019) and Rueckel et al. (2020) identify similar categories: (1) Organisational values (Culture); (2) Management capabilities (Strategy and Leadership); and (5) Workforce capabilities (Employee skills). The distinction between the two frameworks is that Rueckel et al. have a specific category for Organisational infrastructure, which encompasses digital infrastructure. In contrast, Vial's Digital technologies category encompasses various digital technologies, including platforms and ecosystems. Additionally, Vial has an Organisational structure category relating to the characteristics of an agile organisational structure.

Table 2.4 summarises the six categories and the related enabling factors that Vial (2019) identified.

Table 2.4 Summary of Categories and Enabling Factors (Vial, 2019)

Framework 2 - Vial (2019)		
Category	**Enabling Factor**	
Strategic Responses	1	Digital Business Strategy (DBS)
	2	Digital Transformation Strategy (DTS)
Digital Technologies	1	Social
	2	Mobile
	3	Analytics
	4	Internet of Things (IoT)
	5	Platforms and ecosystems
Organisational Structure	1	Cross-functional collaboration
	2	Agile
	3	Ambidextrous
Organizational Culture	1	Learning organisation
	2	Open to experimenting and risk-taking ("fail-fast")
Leadership	1	Introduce CDO position to lead DT and later DBS implemention
	2	Ablity to inculcate digital mindset
	3	Ability to handle disruption resulting from technology use
	4	Ability to engender cross-functional collaboration
Employee Roles and Skills	1	Cross-functional skills
	2	Digital skills (analytics etc.)
	3	Upgrade traditional HR skills to support employees skills evolution

2.4.3 Overview of Framework 3

Digital Transformation: A Multidisciplinary Reflection and Research Agenda (Verhoef et al., 2021)

Study Objective

According to Verhoef et al. (2021), no multidisciplinary perspective of DT has been offered. Considering the multidisciplinary nature of DT, it is crucial to have a multidisciplinary view that can help business managers to adapt to the competitive market's ongoing changes brought about by the emergence of digital technologies that are redefining markets. To contribute to the academic

knowledge base on DT, a multidisciplinary approach to DT was taken by Verhoef et al. (2021) to address existing knowledge gaps.

To guide DT, it is crucial to understand how organisations can gain viable competitive market leadership by leveraging essential resources, adopting effective strategies and restructuring their internal organisation. To create this understanding, Verhoef et al. (2021) used a standard flow model (Figure 2.5) to discuss the DT process. The study first identified the external factors that create the necessity for DT; second, it set out the phases of DT; and third, it listed the strategic imperatives of DT as required: (1) Digital resources, (2) Organisational structure, (3) Growth strategies, and (4) Metrics and goals.

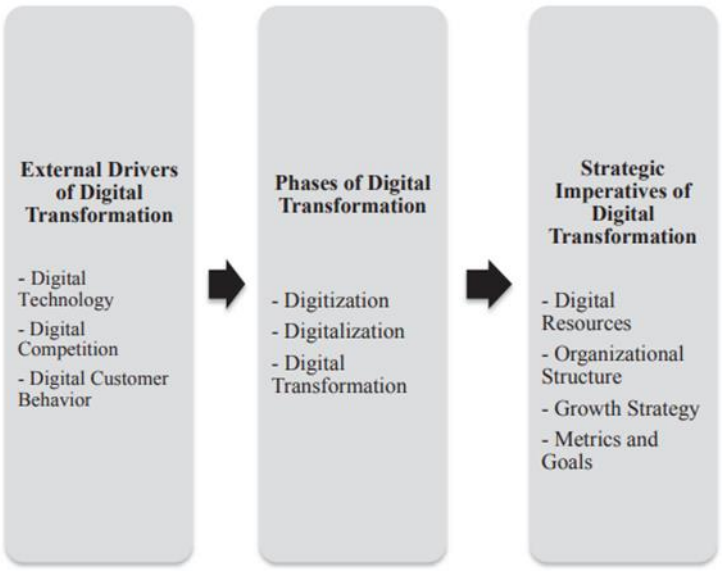

Figure 2.5: Flow Model for Discussion on Digital Transformation Process (Verhoef et al., 2021, p. 890)

The external drivers and phases of DT are discussed in Chapter 1 and in Chapter 2, Sections 2.2.1 and 2.3.2 of this research study. For this section, the focus is on comparing the identified strategic imperatives of DT with the other frameworks. Verhoef et al. (2021) identified four categories of strategic imperatives: (1) Digital

resources; (2) Organisation structure; (3) Digital growth strategies; and (4) Metrics and goals.

Summary of Identified Categories and Enabling Factors

Table 2.5 summarises the four categories (strategic imperatives) and the related enabling factors identified by Verhoef et al. (2021).

Table 2.5: Summary of Categories and Enabling Factors (Verhoef et al., 2021) and Comparison to Frameworks 1 and 2

Framework 3 - Verhoef et al. (2021)			Description	F1	F2
Category	Enabling Factor				
Digital Resources	1	Digital assets	Digital Technologies, ICT + Platform infrastructure, Cloud storage Hardware, Software	X	X
	2	Digital agility	Ability to sense + seize opportunities, flexible, quick, adapt offerings	X	X
	3	Digital networking capability	Ability to attract ecosystem partners, co-creators and customers		
	4	Big data analytics capability	Invest in Big Data capability but also in Data validation and continuous training		
Organizational Structure	1	Separate Business Units	Establish separate autonomous BU-enable innovation -experiment + rapid learning	X	X
	2	Agile Organisational Forms	Flat org structure, autonomous team, agile self-management approach	X	X
	3	Digital Functional Areas	Transform IT -strategic role, support digital R&D, upskill existing staff, attract digital talent	X	X
Digital Growth Strategies	1	Market penetration	Traditional strategy that can also be used by digital organisation		
	2	Product-based Market Development	Traditional strategy that can also be used by digital organisation		
	3	Platform-based Market Penetration	Platform-based growth strategies for digital organisation		
	4	Product development	Traditional strategy that can also be used by digital organisation		
	5	Co-creation platform	Platform-based growth strategies for digital organisation		
	6	Platform diversification	Platform-based growth strategies for digital organisation		
Metrics and Goals	1	Metrics for different phases of DT	ROI, profitability, and revenue growth metrics + intermediate implementation metrics		
	2	Digital organisation metrics	Growth metrics		
	3	Digitally transforming incumbent organisation metrics	Growth + Profitability metrics		
Framework 1	*F1*	*Reukel et al.*			
Framework 2	*F2*	*Vial*			

The Digital Resources and Organisational Structure categories mentioned above by Verhoef et al. (2021) closely resemble those identified by Rueckel et al. (2020) and Vial (2019). However, while these two frameworks discuss strategy, they do not incorporate the categories of Digital Growth Strategies and Metrics and Goals.

2.4.4 Overview of Framework 4

Preparing Workplaces for Digital Transformation: An Integrative Review and Framework of Multi-Level Factors (Trenerry et al., 2021)

Study Objective

The fast-paced development of innovative digital technologies, coupled with the COVID-19 pandemic, has significantly altered how we live and work, raised concerns about the future of jobs, and highlighted the significance of employee resilience and well-being. As the need to adopt DT becomes more pressing, extensive research has been conducted in this field. Although most academic studies related to DT have predominately had a more business and strategy focus (Vial, 2019; Verhoef et al., 2021), there is a growing need to integrate employee-related factors into understanding this phenomenon.

On this basis, Trenerry et al. (2021) attempted to address this issue by developing a multi-level framework of critical factors essential for workplace DT (Figure 2.6) that form part of an organisation's overarching DT strategy.

Trenerry et al. (2021) initiated the process by integrating digitalisation and DT studies with prevailing organisational behaviour and management models (Ployhart, 2015; Robbins & Judge, 2019). They identified critical enabling factors for three levels of the organisation: (1) the Individual level, (2) the Group level and (3) the Organisational level.

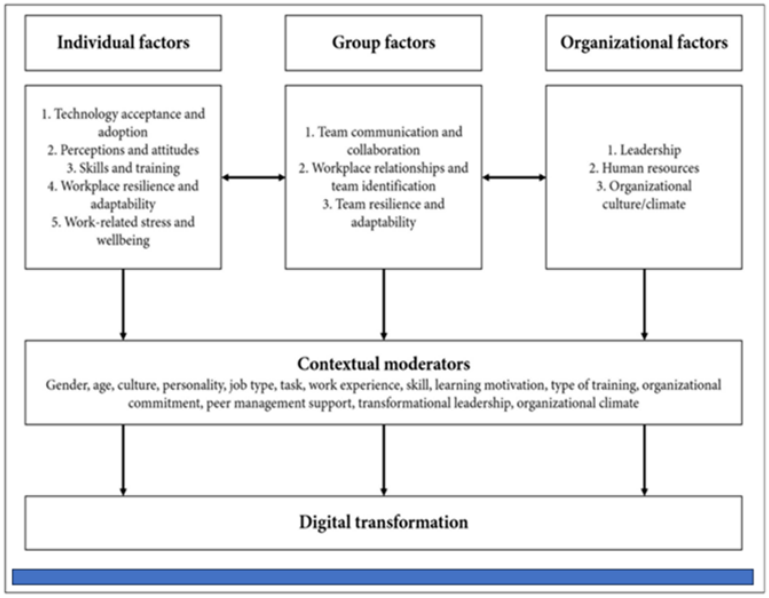

Figure 2.6: A Multi-Level Framework for Workplace Digital Transformation (Trenerry et al., 2021, p. 15)

Individual level: Five employee-related factors were identified: (1) technology adoption; (2) perceptions and attitudes toward technological change; (3) skills and training; (4) workplace resilience and adaptability; and (5) work-related well-being.

Group-level: Three team-related factors were identified: (1) team communication and collaboration; (2) workplace relationships and team identification; and (3) team adaptability and resilience.

Organisational level: Three company-wide factors were proposed: (1) leadership; (2) human resources; and (3) organisational culture.

Moderators: According to the literature, it is crucial to consider certain factors when planning and undertaking DT. However, there is evidence that personal, contextual and cultural contexts (as moderators) may impact the outcome of DT. This makes it essential to take these moderating factors into account during implementation. However, not all of them may be applicable at the same time.

Summary of Identified Categories and Enabling Factors

Table 2.6 summarises the four categories (strategic imperatives) and the related enabling factors that Trenerry et al. (2021) identify.

The categories outlined by Trenerry et al. (2021) differ significantly from those identified by Rueckel et al. (2020), Vial (2019) and Verhoef et al. (2021). Trenerry et al.'s (2021) study focuses on employee-related factors facilitating DT, whereas the other studies focus more on business and technology. Although these other studies touch on organisational and skills development factors, they do not address the soft issues related to employees that Trenerry et al. (2021) focus on. For the current study, it was crucial to consider both the business and employee perspectives to implement DT across an organisation successfully since DT is a company-wide change phenomenon that impacts technology, business and employees.

Table 2.6: Summary of Categories and Enabling Factors (Trenerry et al., 2021) and Comparison to Other Frameworks

Framework 4 - Trenerry et al.			F1	F2	F3	F5
Category	**Enabling Factor**					
Individual	1	Technology acceptance and adoption				
	2	Perceptions and attitudes				
	3	Skills and training	x	x	x	x
	4	Workplace resilience and adaptability				
	5	Work-related stress and wellbeing				
Group	1	Team communication and collaboration				
	2	Workplace relationship and team identification				
	3	Team resilience and adaptability				
Organisational	1	Leadership	x	x		
	2	Human resources		x		x
	3	Organisational culture/ climate		x		x
Framework 1	*F1*	*Reukel et al.*				
Framework 2	*F2*	*Vial*				
Framework 3	*F3*	*Verhoef et al.*				
Framework 5	*F5*	*Aghayari et al.*				

2.4.5 Overview of Framework 5

Explaining the Effective Factors of Digital Transformation Strategies in the Telecom Industry of Iran Using the Delphi Method (Aghayari et al., 2022)

Study Objective

In the Iranian context, a locally tailored framework that guides the DT implementation across various functional and focus areas is notably absent. Therefore, the primary focus of Aghayari et al.'s (2022) study is to explore the potential benefits of digital advancements in Iran's telecom sector and to develop a model for implementing effective DT strategies for the Iranian telecom industry. Within this context, the main objectives of this research are twofold. The first objective is to identify DT's critical components (categories) and indicators (factors) in the telecom industry, with the second objective being to establish the priority and weighting of these categories. These findings are then utilised to create a tailored DT strategy and model for the Iranian telecom industry, in line with its unique circumstances and requirements. This research was conducted for the Ministry of Information Technology in Tehran from the summer to autumn of 2020 (Aghayari et al., 2022).

Research Methodology

The study utilised a mixed-method approach, combining quantitative and qualitative methods for a more comprehensive analysis.

Research Process

Step One: A qualitative content analysis was conducted to extract an initial list of components and indicators of digital evolution. This involved analysing research studies, books, articles, domestic and foreign conference papers, and industry models. Additionally, structured interviews were conducted with industry experts.

Step Two: The Delphi method was used to identify the most relevant indicators. Twenty indicators were identified as high-importance indicators.

Step Three: The DANP (DEMTEL-Analytical Network Process) method was utilised to determine the relationship between the components and indicators and their ranking. The outcome revealed six essential categories. Twenty indicators (factors) were related to these categories, as displayed in Table 2.7. In addition, Figure 2.7 indicates the weighting in terms of the importance of the six components (categories)

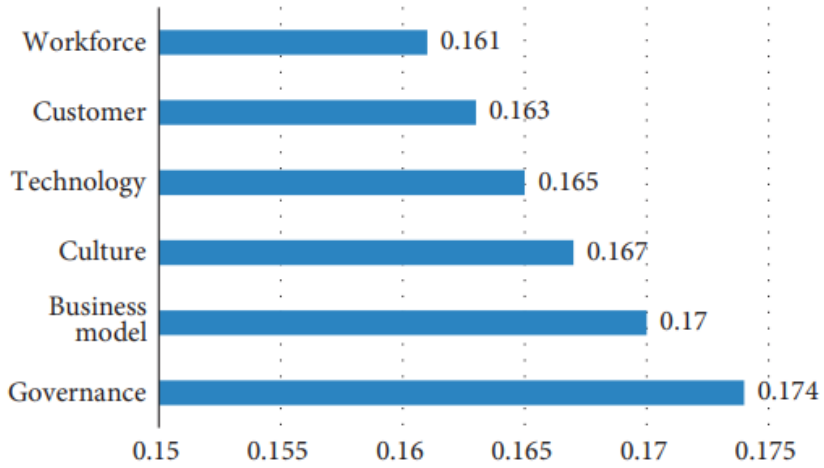

Figure 2.7: The Importance Weighting of Categories
(Aghayari et al., 2022, p. 12)

Summary of Identified Categories and Factors

In summary, Table 2.7 compares this framework's six categories (components) and their respective factors (indicators) with the previously discussed frameworks in this section.

Table 2.7: Summary of Categories and Enabling Factors (Aghayari et al., 2022) and Comparison to Other Frameworks

Framework 5 - Aghayari et al.			F1	F2	F3	F4
Category	**Enabling Factor**					
Customer	1	Customer Insights				
	2	Customer touch points				
	3	Customer experience				
Business Model	1	New Digital Business	X	X	X	
	2	Digitally Modified system				
Culture	1	Awareness				
	2	Train	X	X	X	
	3	Organisational mindset	X	X		
Workforce	1	Mindset	X	X		X
	2	New talent and creativity	X	X	X	X
Technology	1	New trend	X	X	X	
	2	Security	X	X	X	
	3	Infrastructure	X	X	X	
	4	Applications (game architecture, microservices, etc.)	X	X	X	
Governance	1	Sustainability (environmental, social and economic)				
	2	Leadership	X	X		X
	3	Data (data sovereignty etc.)			X	
	4	Operations				
	5	Policies, rules and regulations				
	6	Communication (social networks etc.)				
Framework 1	*F1*	*Reukel et al.*				
Framework 2	*F2*	*Vial*				
Framework 3	*F3*	*Verhoef et al.*				
Framework 5	*F4*	*Trenerry et al.*				

The categories outlined in Aghayari et al. (2022) differ significantly from those identified by Trenerry et al. (2021), with only Leadership and Workforce being shared between the two. This is unsurprising as Trenerry et al. (2021) primarily focus on the employees in their framework. The categories emphasised in the research conducted by Aghayari et al. (2022) also differ significantly from those highlighted in the works of Rueckel et al. (2020), Vial (2019) and Verhoef et al. (2021). While all these frameworks acknowledge the significance of customers, none of them has a specific category dedicated to them. However, having a separate customer category is vital as they play a crucial role in the DT journey. In addition, none of the frameworks covers most of the factors identified under the Governance category. This may be attributed to the study being conducted from the Iranian Telecom Ministry perspective and not a telecoms organisation's perspective.

2.4.6 Findings from the High-Level Comparative Analysis of the Five Frameworks

The high-level comparative analysis of the five frameworks revealed that Trenerry et al.'s (2021) research concentrates on the employee-related aspects that contribute to DT. In contrast, Rueckel et al. (2020), Vial (2019), and Verhoef et al. (2021) place greater emphasis on business and technology. Although these studies touch upon organisational and skills development factors, they do not address the human element as prioritised by Trenerry et al. (2021).

In addition, Aghayari et al.'s (2022) research was conducted from a regulator (Iranian Telecoms Ministry) perspective and focused on different categories from Rueckel et al. (2020), Vial (2019) and Verhoef et al. (2021). Despite recognising the importance of customers, none of these frameworks has a specific category dedicated to them. On the basis of these observations, the artefact framework developed for this research study incorporated technology, strategy, employees and customer perspectives to implement DT successfully across an entire organisation since DT is essentially a company-wide change that affects all facets of the business.

Following the high-level findings, a thorough and comprehensive analysis of the frameworks was undertaken to establish the categories and corresponding enabling factors for the artefact framework. The section below presents this analysis in greater detail.

2.4.7 The Development of Categories and Enabling Factors Based on a Literature Review

This section presents a comprehensive review of relevant literature, which forms the basis for the development of categories and corresponding enabling factors in the artefact framework developed for this study.

In this section, the development of eight categories and corresponding enabling factors are discussed. These categories are (1) Digital resources; (2) Organisational structure; (3) Strategic embeddedness; (4) Leadership; (5) Organisational culture; (6) Employee attitudes and development; (7) Customer; and (8) Metrics and goals.

(1) Digital Resources: This category took its name from the study conducted by Verhoef et al. (2021). According to Barney (1991), resources denote an organisation's possession and control of assets and abilities. Physical and intellectual assets reflect an organisation's assets, while human capital typically embodies capabilities that bind assets together to ensure their successful implementation. Organisations frequently need to obtain or build additional digital resources and dynamic capabilities (Teece, 2007) and skills to achieve DT as they redefine how they generate and provide value to their clients (Warner & Wäger, 2019).

The Digital Resources category identified by Verhoef et al. (2021) closely resembles the Organisational Infrastructure category identified by Rueckel et al. (2020), the Digital Technologies category identified by Vial (2019) and the Technology category identified by Aghayari et al. (2022).

This Digital Resources category consists of four enabling factors that are essential digital assets and capabilities required for DT: (1) digital assets; (2) digital agility; (3) digital networking capability; and (4) big data analytics capability. These enabling factors also take their names from the study conducted by Verhoef et al. (2021).

Digital Assets: According to Verhoef et al. (2021), to compete in the digital world effectively, organisations need various digital assets such as data storage, communication, digital (platform) infrastructure and related technologies. Digital organisations must invest in hardware and software that enable AI, ML, IoT and robotics. These technologies and data resources offer a foundation for leveraging existing knowledge and resources to deliver greater customer value.

The significance of digital technologies as a means of enabling DT is further underscored by Vial's (2019) research. His study of academic and practitioner literature revealed that digital technologies are often described as inherently disruptive but also fundamental in establishing new value-creation paths in the DT context. As discussed in Section 2.2.2 above, Vial (2019) uses the term “SMACIT” to describe digital technologies, which includes technologies related to social media (Web 2.0), smartphones, data analytics, cloud computing, IoT and platforms.

Digital technologies in the DT context are generally used in combination to achieve specific outcomes (Günther et al., 2017; Newell & Marabelli, 2015). It is worth noting that digital technologies offer more than just immediate operational benefits. They also enable the collection and analysis of vast amounts of data, which can provide valuable insights and inform strategic decision-making.

Rueckel et al. (2020) also identified digital platform infrastructure as an organisation's essential enabling digital asset. Digital platform infrastructure seamlessly integrates the organisation’s technological infrastructure, business processes and data, while establishing connections with external entities. This enables businesses to unlock their full potential to expand their value-creation globally. Moreover, according to Sebastian et al. (2017), this platform infrastructure is the technological backbone of an organisation's essential operations, guaranteeing quality, reliability and scalability. Additionally, Rueckel et al. (2020) identified a bimodal IT infrastructure that provides organisations with the necessary agility to innovate and respond to market changes while maintaining the stability and reliability of their core IT infrastructure. By creating

a structured and organised environment that supports both modes of operation, organisations can balance stability and innovation that can drive growth and competitive advantage (Badr, 2018).

Aghayari et al. (2022) highlight in their study that the telecommunications industry is distinguished by its progressive digital technologies, which are characterised by rapidly evolving and cascading effects on other sectors. Transformational technologies encompass infrastructure (spatial technologies, cloud); security (e.g. cyber security identification tools); trending technologies (e.g. big data analytics, IoT, blockchain, social media); cognitive technologies (AI, robotics, natural language processing (NLP) and ML); digital reality (augmented and virtual reality); and applications (e.g. mobile and gaming apps). These technologies are paramount to the DT of organisations and the industry. As these technologies enable telcos to create innovative business models to improve sustainability, they enhance customer experiences by providing personalised services and optimising operational processes.

Digital Agility: According to Teece's (2007) DC theory (discussed in Section 2.3.1), organisations have ordinary (standard) and dynamic capabilities. Standard capabilities are the necessary technical functions that the organisation uses to complete tasks. In contrast, organisations use dynamic capabilities to adapt and innovate in response to environmental changes. The organisation is able to adapt and innovate using the three mechanisms of sensing, seizing and transforming. Agility is the organisation's sensing and seizing dynamic capability, with sensing involving identifying and assessing technological opportunities based on customer needs, and seizing involving mobilising resources to address those opportunities and capture their value.

Digital agility is an organisation's digital dynamic capability to sense and quickly seize market opportunities that are created by digital technologies (Lee et al., 2015; Warner & Wäger, 2019). It is a critical capability that organisations need to survive in today's volatile markets. This is because it enables them to be flexible, quickly adapt, continuously adjust, and reconfigure their digital assets and

capabilities to develop new products, services, and business models to meet customer expectations and enhance their value-creation process. As an organisation progresses through the stages of DT, this capability becomes increasingly important (Verhoef et al., 2021).

The need for digital agility is also underscored by Vial (2019), who suggests that digital technologies can be utilised to achieve the agility and ambidexterity, or bimodality needed to adjust quickly to environmental changes by contributing to organisational agility. This agility refers to an organisation's ability to identify and capitalise on innovative opportunities quickly by rapidly assembling resources, knowledge and relationships. Ambidexterity is the ability to combine the exploration of digital innovation with the exploitation of existing resources successfully. Both these capabilities are fundamental to remaining competitive in a digital economy. According to Sebastian et al. (2017), ambidexterity is essential since it is an organisation's ability to maintain an operational backbone and a digital service platform. This view is also supported by Rueckel et al. (2020); their study states that implementing bimodal IT infrastructure supports organisations in achieving the digital agility required to innovate and respond to market changes and maintain a stable and reliable core IT infrastructure concurrently.

Digital Networking Capability: According to Verhoef et al. (2021), digital networking capability involves an organisation's capacity to connect users digitally and address their mutual needs. As technology permeates the market, organisations realise the significance of embracing a network-centric approach to co-creation and of collaboratively generating value with digitally connected entities (Koch & Windsperger, 2017). According to a recent survey by Accenture (2017), 75% of the executives surveyed confirmed that their competitive advantage was based on the quality of the partners and ecosystems they collaborated with. In addition, businesses could empower their customers by allowing them to co-create and personalise their products and act as brand advocates through social media (Dong & Wu, 2015). This would ensure that customers are a valuable resource for gaining a competitive edge (Prahalad &

Ramaswamy, 2000). The ability of organisations to effectively choose, appeal to, connect with and involve a diverse range of network participants such as consumers, vendors, partners and third-party entities greatly enhances the creation of value and expansion of platforms (McIntyre & Srinivasan, 2017). This is crucial for achieving DT.

The importance of the ability to construct value networks via fostering collaboration with third-party entities and customers is underscored in the study conducted by Vial (2019). According to Vial's (2019) study, digital technologies have brought about a significant transformation in the way that value networks are formed and operated. According to Andal-Ancion et al. (2003), organisations can leverage digital technologies to pursue three primary mediation strategies. The first strategy, disintermediation, allows for direct exchanges among participants such as customers, bypassing intermediaries. The second strategy, remediation, fosters stronger relationships among participants, creating an ecosystem of partners for closer collaboration and coordination that is supported by a digital platform. The third strategy, network-based mediation, creates intricate relationships among stakeholders with potentially competing interests to benefit customers.

Digital technologies have also empowered customers to become co-creators of value within a value network (Lamberton & Stephen, 2016; Verhoef et al., 2017). These customers, referred to as "prosumers", can contribute actively to online communities on social media platforms without obligation (Dong & Wu, 2015). Implementing these strategies to drive value co-creation through value networks allows organisations to optimise their business value creation globally. However, the success of this approach essentially relies on the organisation's ability to engage, incentivise and foster collaborative relationships with partners and consumers. Such capability is vital to the success of this approach (McIntyre & Srinivasan, 2017).

Big Data Analytics Capability: According to Verhoef et al. (2021), in the digital economy, gathering and analysing large amounts of data to enable informed decision-making is essential (Dremel et al., 2017). This is because all digital technologies depend on digital data to function effectively. Despite the easy accessibility and abundance of big data, many organisations face difficulties in developing the necessary skills to analyse and use it effectively. According to a 2018 Accenture survey, 71% of executives acknowledge that their essential systems and strategies depend on data, although many still need to invest in ensuring data accuracy and dependability (Accenture, 2018). Digital organisations such as Amazon and Booking.com rely heavily on analytics to customise customer products and services while using dynamic pricing and revenue management to maximise profits. This suggests that to achieve sustainability in a digital economy, organisations must invest in data validation and prioritise the development of big data capabilities. This can be achieved by investing in teams with expertise in analytics, data management (governance), data visualisation and business skills (Verhoef et al., 2016). After integrating big data analytics capability, it is crucial to establish ongoing training programmes to keep skills updated as more advanced techniques emerge (Kübler et al., 2017).

Vial's study (2019) further emphasises the importance of possessing big data capability. According to Vial (2019), an organisation's potential to make data-driven decisions to enhance its competitive advantage by offering personalised products and services for better customer experience and operational efficiency through real-time insights (Günther et al., 2017) depends on its capability to perform big data analytics (Newell & Marabelli, 2015).

(2) Organisational Structure: This category took its name from the study conducted by Verhoef et al. (2021). According to these authors, in addition to the essential digital resources for achieving DT, it is crucial to consider the organisational changes that are required for an organisation to adapt to DT (Eggers & Park, 2018). These changes include having a flexible organisational structure that can accommodate digital change.

The Organisational Structure category, as identified by Verhoef et al. (2021), closely resembles the Organisational Structure category delineated by Vial (2019). Rueckel et al.'s (2020) framework does not have a dedicated category for organisational structure. However, elements from the Institutionalised Innovation factor and IT-Bimodal Structure factor have been incorporated into the enabling factors within this category. Furthermore, while the Aghayari et al. (2022) framework does have a Business Model category, the information contained in this category is relatively high-level and does not necessarily align with the Organisational Structure category as identified by Verhoef et al. (2021) and Vial (2019).

This Organisational Structure category consists of four enabling factors, which are essential types or forms of organisational structures that will promote DT: (1) agile organisational forms; (2) separate business units; (3) digital functional areas; and (4) cross-functional teams. Enabling factors one to three take their names from the study conducted by Verhoef et al. (2021). Enabling factor four takes its name from the study conducted by Vial (2019). The enabling factors are outlined below.

Agile Organisational Forms: According to Verhoef et al. (2021), the traditional, heavily hierarchical organisational structures, as a result of their bureaucracy, are not effective in rapidly evolving digital environments, as they impede response speeds and hinder innovativeness. To achieve digital agility, organisations must adopt flexible organisational structures that enable them to respond quickly to the rapidly evolving digital landscape. An example is ING's "Spotify model" implementation in its DT process. The approach involves a flat organisational structure that empowers autonomous teams to take responsibility for their tasks. This method promotes an agile approach, involving short, iterative cycles to test and update market assumptions rapidly (McGrath, 2010). Certain organisations use the "Holarctic" organisational form, with a self-management approach that enables purpose-driven and responsive businesses to operate effectively (Robertson, 2015).

Separate Business Units: Owing to their heavily hierarchical structure, traditional organisations tend to be slow in identifying (sensing) and taking advantage of (seizing) opportunities presented by digital technologies (Venkatraman, 2017). According to business model innovation research, the approach of establishing separate autonomous business units and implementing new and potentially disruptive business models is a viable solution. This approach enables experimentation and rapid learning while mitigating cannibalisation risks and conflicts (Christensen et al., 2016). Rueckel et al.'s (2020) framework has an enabling factor that encourages institutionalised innovation, which is enabled by a systematic set of processes that are based on a structural or flexibility profile. This separate business unit structure could support this type of innovation process.

Vial's (2019) study supports the view of creating an independent business unit, suggesting that despite cross-functional collaboration being difficult to achieve practically, one way of achieving this collaboration is through creating an independent unit. An independent unit allows for flexibility in innovation while still having access to existing resources.

Digital Functional Areas: According to Verhoef et al. (2021), a fundamental characteristic of DT is that it involves a greater dependence on IT and analytical functions. However, it is essential for the IT function also to transform. The function must transition from being merely a facilitator of communication and data flow to adopting a strategic and coordinating role. This role will enable the organisation to leverage digital technologies to achieve its objectives effectively, enhance digital value creation, and enable the research and innovation of digital technology (Leonhardt et al., 2017). Implementing a bimodal IT structure, according to Rueckel et al. (2020), could enable organisations to gain the necessary agility to innovate and respond to market changes while maintaining the stability and reliability of their core IT infrastructure. By creating a structured and organised environment that supports both modes of operation, organisations

can balance stability and innovation in a way that can drive growth and competitive advantage (Horlach et al., 2017).

Cross-Functional Teams: In his study, Vial (2019) suggests that in terms of DT literature, it is crucial to have cross-functional collaboration alongside agility and ambidexterity to succeed in the highly competitive digital landscape. However, practically achieving this collaboration is challenging, despite it being a well-known concept in IS research. Cross-collaboration means the merging of organisational and IT strategies. Cross-functional teams within the organisation can create multidisciplinary competence networks to drive IT initiatives for the benefit of business units.

(3) Strategic Embeddedness: This category took its name from a category put forward in the study conducted by Rueckel et al. (2020). According to these authors, the DT literature suggests that adopting a strategic approach to DT is a fundamental prerequisite for organisations to ensure that their DT initiatives are sustainable. Over the long term, these initiatives will lead to tangible business benefits (Bharadwaj et al., 2013; Matt et al., 2015).

The Strategic Embeddedness category, as identified by Rueckel et al. (2020), bears a close resemblance to the Strategic Response category delineated by Vial (2019) and the Growth Strategy category identified by Verhoef et al. (2021).

The Strategic Embeddedness category consists of one enabling factor, Digital growth strategies. These strategies incorporate Traditional growth strategies; Platform-based growth strategies; Digital Business Strategy (DBS); and Digital Transformation Strategy (DTS).

Traditional and Platform-based Growth Strategies: Digital organisations employ various strategies to achieve growth. Verhoef et al. (2021) identified six growth strategies that digital businesses should use: two traditional and four platform-based growth strategies. Studies have shown that platform strategies are more prevalent during the more dominant phase (DT phase) of digital change (Parker et al., 2016). Verhoef et al. (2021) highlighted that a common trait of digital

organisations that operate on digital platforms is that they generate significantly higher net income and profitability than their counterparts. This is due to the scalability of digital platforms and their emphasis on network effects. At the onset, the growth of a platform depends on launching a commercially viable product, but eventually, the focus changes towards managing and fostering collaborative relationships with platform ecosystem partners. This change in focus highlights a mindset change in the overall approach to the business.

DBS and DTS: In his study, Vial (2019) recommended using both a DBS and a DTS to respond to market disruptions that result from using digital technologies. At the same time, Rueckel et al. (2020) proposed using a DTS in their study. A DBS represents the integration of the overall organisational strategy and the IS strategy in the context of digital technologies (Bharadwaj et al., 2013). The DBS represents an organisational approach that harnesses digital resources to create a sustainable competitive advantage. In contrast, Matt et al. (2015) introduced the idea of a DTS to focus on using new technologies in changing products, processes and organisational aspects. DTS differs from organisational and IT functional strategies and the DBS, which has a future focus. The DTS provides a framework that assists organisations in overseeing changes while incorporating digital technologies and managing their activities following the transformation.

(4) Leadership: This category took its name from the study conducted by Trenerry et al. (2021). According to these authors, strong leadership during DT is critical for the performance of the organisation and its employees.

As identified by Vial (2019), the Leadership category bears a close resemblance to the Digital Leadership category delineated by Rueckel et al. (2020) and the Leadership factor identified by Aghayari et al. (2022). All three frameworks relate more to leadership skills, while Trenerry et al.'s (2021) framework addresses the soft issues related to employees and leadership and offers views on leadership styles.

The Leadership category consists of two enabling factors: (1) Digital leadership style and (2) Digital leadership skills.

Digital Leadership Style: According to Trenerry et al.'s (2021) study, leadership significantly impacts the success of the DT processes and outcomes for both employees and organisations. It relates to a leader's ability to inspire collaboration towards achieving shared goals. Strong leadership is pivotal for the performance of the organisation and its employees (Cortellazzo et al., 2019). As part of the DT process, leadership faces unique challenges and responsibilities, particularly in adopting new technologies (Fitzgerald et al., 2014). This change frequently encounters resistance from employees, making it imperative for leaders to upskill, lead by example and cultivate a positive environment underpinned by a digital-oriented culture. By doing so, leaders can persuade employees to accept the change and improve their skills, ensuring a successful transition (Cortellazzo et al., 2019). A combination of transformational and responsive leadership is recommended to implement DT and promote innovation in organisations. Transformational leadership is a more effective style than transactional and laissez-faire leadership because it supports employees towards an elevated level of commitment and performance (Bass et al., 2003). Responsive leadership gives priority to the learning mechanisms, connectedness, and experiences of employees. In this context, to support the practical implementation of DT, leaders create specialised experimentation units that are focused on exploring and working with new technologies in a real-life work setting, in this way fostering continuous learning (Dery et al., 2017).

Digital Leadership Skills. According to Vial's (2019) study, for DT, leaders of organisations must strive to cultivate a digital mindset and be equipped to tackle the disruptions that arise from using digital technologies (Benlian & Haffke, 2016). With this in mind, experts suggest that new leadership positions, such as chief digital officer (CDO), be introduced to signify the strategic importance of DT for the entire organisation (Horlacher et al., 2016). Typically, the CDOs merge organisational and IT strategies, ensuring digital technologies are employed

effectively and aligned with the organisation's objectives (Singh & Hess, 2017). Essentially, they serve as bridge-builders and help to implement DBSs into practical actions, leading to greater cross-function collaboration between the business and IT functions.

Rueckel et al.'s (2020) findings support Vial's (2019) study. However, Rueckel et al. (2020) highlight that numerous studies have cited senior leadership teams' lack of understanding of digital technologies and their importance as a significant obstacle to the successful implementation of DT initiatives. Taking this view, the authors used the A. M. Hansen et al. (2011) framework as a basis for designing their digital leadership factor. This factor is characterised by a management board that recognises the value of digital technology, understands its potential to drive strategic transformational changes and assigns a member to serve as an IT orchestrator.

Trenerry et al. (2021) found that effective digital-age leaders must possess expertise in five essential abilities, the ability to: (1) make prompt and accurate data-driven decisions; (2) communicate effectively through digital mediums; (3) manage change effectively; (4) maintain connections, and (5) have technical proficiency (Cortellazzo et al., 2019). An additional skill is responsive leadership, which means leaders should actively listen, be receptive to employee feedback and communicate frequently with employees (Dery et al., 2017).

The research by Aghayari et al. (2022) emphasised the critical role senior executives within the telecom industry play in developing and communicating their organisation's digital vision. This role requires a concerted effort to engage all organisation members in the change process while fostering technological leadership capabilities. To ensure a successful transition towards DT, senior managers must also work to engender a culture that is conducive to change and innovation. This requires a strategic approach that emphasises: (1) collaboration; (2) effective communication; and (3) a willingness to embrace new ideas and processes. Ultimately, the success of any DT initiative rests on the ability of senior

leadership to provide the necessary guidance and leadership to steer the organisation towards a more innovative and sustainable future.

(5) Organisational Culture: While this category took its name from the study conducted by Vial (2019), it was created on the basis of the study conducted by Trenerry et al. (2021).

The Organisational Culture category as identified by Vial (2019) closely resembles the Organisational Values category delineated by Rueckel et al. (2020). The framework by Trenerry et al. (2021) is different, as it addresses the soft issues that are related to organisational culture and HR transformation. Although the Aghayari et al. (2022) framework has a Culture category, the information is relatively high-level and relates more to the individual employee than the organisation.

This Organisational Culture category consists of five enabling factors. These are organisational culture characteristics that will promote DT: (1) Learning organisation; (2) HR transformation; (3) Team communication and collaboration; (4) Workplace relationship and team identification; and (5) Team resilience and adaptability.

Learning Organisation: According to Vial's (2019) study, DT encompasses organisational culture change (Hartl & Hess, 2017). It is worth noting that some incumbent organisations have an established divide between their IT and business departments, which is deeply rooted in their culture (Haffke et al., 2017). A recurring theme among the studies is the importance of "failing fast", which means continuously learning through experiments and taking risks (Dremel et al., 2017). This approach aligns with the inculcation of an agile, learning-organisation culture that allows employees to learn continuously through iterative changes while adjusting to the evolving setting (Gust et al., 2017; Jöhnk et al., 2017).

The study by Rueckel et al. (2020) supports Vial's (2019) study. Rueckel et al. (2020) highlight that establishing a resilient corporate culture that enables an organisation to remain competitive in a rapidly changing business environment

requires espousing essential organisational values that encourage employees to think innovatively, take calculated risks and tackle challenges with an entrepreneurial mindset. These values include a receptiveness to change, agility, a continuous learning mindset, adopting a fail-fast attitude, prioritising customer satisfaction, communicating effectively, and actively participating in collaboration and engagement internally and externally to promote open innovation. In their study, Trenerry et al. (2021) also emphasised creating a conducive environment for continuous learning by suggesting that leaders create specialised experimentation units that are focused on exploring and working with new technologies in a real-life work setting, in this way fostering continuous learning (Dery et al., 2017).

HR Transformation: According to the study by Trenerry et al. (2021), organisations must ensure that their workforce possesses the necessary skills and competencies during DT. HR is considered one of the most valuable assets, so professionals in human resource development (HRD) have an essential role to fulfil. They are responsible for supporting organisational change through assigning resources and facilitating employee learning and upskilling. HRD professionals need a more strategic understanding of how technological advancements affect employment and job structures. They should focus on balancing human skills development with adopting new technology. It is also crucial for them to recognise how to manage the transition of workers into work environments with specialised skills or a digital-workforce requirement and mitigate the risk of technological unemployment.

Additionally, DT necessitates that digital technologies perform operational tasks and employees apply their higher cognitive abilities to resolve more strategic issues (Dremel et al., 2017). However, supporting workers through this evolution presents substantial obstacles that are outside the scope of traditional HR management (Singh & Hess, 2017). This implies that to perform the new strategic functions effectively, the traditional HR functions must undergo a process of upskilling and transformation. This is necessary to ensure that HR professionals

are equipped with the skills and knowledge required to meet the demands of an increasingly complex business landscape. HR departments must adapt to the changing needs of their organisations by developing a deeper understanding of emerging technologies, data analytics and other relevant tools. By embracing this transformation, HR professionals can drive organisational growth and success.

Team Communication and Collaboration: According to the study by Trenerry et al. (2021), effective communication and collaboration within a team are crucial for the success of an organisation. Good communication among team members is a critical success factor for collaboration, and its quality and frequency can be measured. As organisations move toward DT, they use various digital tools to promote collaboration and efficiently achieve shared objectives. Outdated collaboration and communication methods can thwart transformational efforts and lead to resistance. This suggests that utilising digital technologies and designating in-house digital specialists play a vital role in fostering employee engagement and providing support in overcoming employee resistance. Organisations should improve communication and collaboration for successful DT by developing cross-functional teams and digital hubs to encourage collaborative engagement and problem-solving.

Workplace Relationship and Team Identification: Trenerry et al.'s study (2021) suggests that successful DT can be influenced by the nature and quality of workplace relationships. Interactions between coworkers, including those with their supervisors and peers, are called workplace relationships. These relationships can either facilitate or hinder progress towards successful transformation. Positive relationships between supervisors and subordinates can encourage innovative work behaviours. Similarly, positive peer relationships can provide support and empowerment, improving work behaviours and performance and fostering a sense of belonging and team identity. Such relationships are especially crucial when new technologies are introduced. Employees are more likely to embrace new technologies that align with their team's established identity, and misalignment can result in resistance. While social technologies can

enhance workplace relationships by providing new opportunities for social engagement, it is essential to establish protocols around their use to avoid possible disagreements.

Team Resilience and Adaptability: According to the Trenerry et al. (2021) study, teams that have developed resilience and agility will thrive amidst challenges and adversity during DTs. This resilience stems from the way that team members interact with each other and with the environment within which they operate. Positive emotions and shared work experiences promote team resilience. Additionally, the roles and positions that individuals occupy within a team contribute to developing team resilience. Resilient teams are more resourceful and are better equipped to face challenges.

(6) Employee Attitude and Development: This category was created on the basis of the study conducted by Trenerry et al. (2021).

The categories outlined by the Trenerry et al. (2021) study differ strongly from those identified by Rueckel et al. (2020), Vial (2019) and Verhoef et al. (2021), with Trenerry et al.'s (2021) research focusing on the facilitation of DT by employee-related factors and the other studies focusing more on business and technology. These other studies deal with organisational culture and skills development factors. However, they do not address the soft issues related to employees that Trenerry et al. (2021) focus on. Since DT is a company-wide change phenomenon that affects technology, business and employees, it is imperative to have a comprehensive view of the phenomenon by including both the business and employee perspectives. To this end, this category was included in the artefact framework.

This Employee Attitude and Development category consists of six enabling factors. These are essential employee-related considerations that leaders must be cognisant of to allow a seamless DT: (1) New digital roles and skills; (2) Employee learning motivation; (3) Technology acceptance and adoption; (4)

Perceptions and attitudes towards technology; (5) Workplace resilience and adaptability; and (6) Work-related stress and well-being.

New Digital Roles and Skills: According to Vial's (2019) study, organisations undergo structural and cultural changes during the DT process, resulting in employees taking on roles beyond their usual job functions. The literature suggests that going forward, more cross-functional skills will be required. For instance, non-IT personnel lead technology-focused projects, while IT members become more involved in the business side of these endeavours (Dremel et al., 2017). As digital technologies advance automation and decision-making processes, there is a growing concern about the skills required by the current and future "digital workforce" (Colbert et al., 2016). According to Rueckel et al. (2020), a combination of ICT proficiency and creativity is crucial for the future workforce. ICT proficiency entails technical and cognitive skills, while creativity capability involves an individual's aptitude to generate and execute innovative ideas with a creative mindset. Many organisations fail to recognise that, in addition to transforming the IT function, improving digital skills in other functional areas is crucial for maximising digital value creation (Lemon & Verhoef, 2016). Moreover, when considering the future digital workforce, it is necessary to focus on attracting young talent possessing digital expertise. One significant obstacle incumbent organisations face is attracting digitally skilled professionals, as they tend to favour large tech corporations such as Google and Apple or innovative financial technology (FinTech) startups over traditional banking institutions (Deloitte, 2015).

Employee Learning Motivation: According to the Trenerry et al. (2021) study, ensuring employees possess the necessary cognitive and technical digital skills for today's digital work environments requires upgrading and retraining. However, motivating employees to engage in this process can be challenging. To address this, organisations need to consider providing tailored training programmes for employees by considering individual and group-level factors. Individual-level factors are existing skill sets, personalities and attitudes toward learning

motivation; group-level factors are supervisor and peer attitudes and support, type of training (mandatory vs voluntary) and employee involvement in the learning programme design.

Technology Acceptance and Adoption: Trenerry et al.'s (2021) study found that employers must embrace new technologies in the workplace, as they are often the foundation of DT. To accelerate the progress of DT, employers must encourage the adoption of digital technologies by ensuring that they have positive attitudes towards them. The authors' review found that employees are more likely to accept and use new technology if they believe it will be beneficial, provide ease of use and support them in enhancing their work performance. The adoption of technology varies, depending on contextual factors such as demographics, work experience and how well the technology supports the intended purpose. Resilience and training opportunities are also critical factors in adopting and accepting technology. Peer and leadership support plays a significant role in the adoption of technology at group and organisational level.

Perceptions and Attitudes towards Technology: The Trenerry et al. (2021) study highlighted that employees are generally willing to support new technologies, as they recognise the potential benefits such as improved work productivity and quality. However, perceptions and attitudes towards technology vary, based on factors such as demographics, occupational factors and technology type. In cases where technology is perceived as resulting in job losses, negative attitudes arise, creating increased psychological and emotional stress, and decreased work commitment and career satisfaction. However, negative perceptions and outcomes can be minimised by perceived organisational support. Employees who value autonomy, competence and engagement tend to be more supportive of DT.

Workplace Resilience and Adaptability: The findings of the research by Trenerry et al. (2021) indicate that in the modern workplace, the DT process is often marked by change and uncertainty for employees and organisations. However, studies have shown that resilience in the workplace is associated with high work

performance and fulfilment and a receptive attitude towards organisational change. Adaptable individuals are more likely to navigate challenges related to DT successfully by proactively taking personal responsibility for adapting to rapidly changing circumstances. Such individuals typically exhibit personality traits such as receptiveness to new experiences, good psychological health, conscientiousness and ambition.

Work-related Stress and Well-being: According to Trenerry et al. (2021), organisational leaders should be cognisant that digital technology can create technostress, upset the work-life balance, and impact the well-being and engagement of employees. To address these concerns, management should establish training and coaching programmes that promote adaptability and resilience, helping employees to cope effectively with continuous work disruption and technostress. “Technostress” refers to the stress caused by technology, which may lead to reduced well-being, work commitment and overall productivity. It is essential to note that technostress can affect lower-level employees and supervisors, who may experience it in the form of work overload and lack of control. Despite these challenges, if digital technologies are managed appropriately, they may yield positive effects on work, such as increased innovation, efficacy and value.

(7) Customer: This category was created on the basis of the study conducted by Aghayari et al. (2022).

While all the frameworks acknowledge the significance of customers, none of them has a specific category dedicated to them because they view the customer as the driver of or trigger for DT. The study by Aghayari et al. (2022) shares that view, and their research findings suggest that the DT of the customer forms a fundamental part of digital strategies in the telecom industry. For them, this means that monitoring customer perceptions and the service they receive throughout the DT process is crucial. The study suggests that the Weber customer index criteria that are most effective and important in measuring this

are customer experience, customer contact points and customer insight. Considering this, a separate customer category was included in the Framework.

(8) Metrics and Goals: This category took its name from the study conducted by Verhoef et al. (2021). According to these authors, to harness the benefits of DT fully, digital companies must be able to measure progress during the DT process and refine future performance. This is accomplished using key performance indicators (KPIs). It is worth noting that none of the other frameworks has a dedicated Metrics and Goals category such as Verhoef et al. (2021) identified. Despite this, the category was included because, in the context of an agile approach to DT, establishing metrics and goals is paramount in facilitating iterative enhancements of the final output. These metrics and goals serve as critical reference points throughout the DT process, enabling teams to evaluate progress and identify areas for improvement systematically. By leveraging this approach, organisations can achieve a higher degree of DT success (digital maturity) while remaining adaptable to changes in scope and requirements.

This Metrics and Goals category consists of three enabling factors. These factors are essential types of metrics for the different phases of DT and different kinds of organisations: (1) Metrics for different phases of digital change; (2) Digital organisation metrics; and (3) Digitally transforming incumbent organisation metrics.

Metrics for Phases of Digital Change: According to Verhoef et al.'s (2021) study, the relevance and use of KPIs may differ across the phases of DT. When a company undergoes digitisation and digitalisation, it is common for metrics to be adjusted and updated. Intermediate "digital" metrics are valuable during the DT phase since they offer more detailed insights, enabling more thorough analysis and refinement (Libert et al., 2016).

Digital Organisation Metrics: As suggested by the findings of the Verhoef et al. (2021) study, many digital companies prioritise growth metrics such as increasing the number of users, customers and sales over profitability. Their main goal is to

expand the digital ecosystem by attracting more suppliers, customers and third parties, creating a positive network effect that drives further platform growth. As their customer base proliferates, they can collect a significant amount of valuable data that can be utilised for internal purposes, such as improving their operations and refining or customising their digital offerings, and external purposes, such as selling data to third parties and gaining credibility among investors.

Digitally Transforming Incumbent Organisation Metrics: The Verhoef et al. (2021) study highlights that many incumbent organisations prioritise profitability as their primary financial metric. For traditional businesses that are undergoing DT, it is crucial to prioritise both growth and profitability (Teece, 2010). However, this can be challenging when competing against digital natives who prioritise growth over profitability. For this reason, digitally transforming incumbents must achieve two primary goals simultaneously: cost optimisation through automation and revenue growth through improved customer experience (Verhoef et al., 2015). To address the challenge of balancing two incompatible objectives, certain researchers propose that these organisations establish separate new ventures that operate similarly to digital startups, enabling the company to prioritise growth (Christensen et al., 2016).

Categories and Enabling Factors combined in Artefact Framework: After conducting a thorough analysis and review of the relevant literature, eight categories were created. Corresponding to these categories, 26 enabling factors covering technology, strategy, employees and customer perspectives were developed. These were then organised into an artefact framework, which is detailed in Table 2.8 below. To ensure a strong theoretical foundation, the factors were linked to the DDCF elements. It is important to note that DDCF is aligned with Vial's (2019) framework and the key enabling factors identified by Verhoef et al. (2021) and Rueckel et al. (2020).

Table 2.8: Artefact Framework of Key Determinants of Digital Transformation Derived from the Literature Review and aligned with the Digital Dynamic Capabilities Framework Elements

Proposed Artefact Framework derived from Literature Review				DDCF
Category	**Enabling Factor**		**Description**	**Elements**
Digital Resources	1.1	Digital assets	Digital Technologies, ICT + Platform infrastructure, Cloud storage Hardware, Software.	Improving Digital Maturity
	1.2	Digital agility	Ability to sense + seize opportunities, flexible, quick, adapt offerings.	Sensing and Seizing
	1.3	Digital networking capability	Ability to attract and collaborate with external (ecosystem partners, co-creators and customers) and internal (employees) stakeholders	Collaborative Approach
	1.4	Big data analytics capability	Invest in Big Data capability but also in Data validation and governance.	Improving Digital Maturity
Organizational Structure	2.1	Agile Organisational Forms	Flat org structure enabling cross-collaboration + ambidexterity. Autonomous team, agile self-management approach.	Innovation Ecosystems
	2.2	Cross-functional teams	Cross functional teams can create multidisciplinary competence networks to drive DT initiatives for the benefit of business units	
	2.3	Separate business units	Establish separate autonomous BU-enable innovation -experiment + rapid learning	Business model renewal and Fast decision making
	2.4	Digital Functional Areas	Transform IT -strategic role, bimodal IT structure, institutionalised innovation/digital R&D processes	Redesigning Internal structures
Strategic Embeddedness	3.1	Digital Growth Strategies	Various Digital (market development/penetration, digital product, co-creation and platform diversification) strategies underpinning the DBS which governs the DT strategy and processes within the organisation	Balancing digital portfolios
Leadership	4.1	Digital Leadership	Introduce CDO position to lead DBS and related DT implementation	Digital mindset crafting
	4.2	Digital Leadership skills	CDO should be able to inculcate a digital mindset, handle disruption resulting from technology use and engender cross-functional collaboration	Scenario planning & Collaborative approach
Organizational Culture	5.1	Learning organisation	Continuous learning through experimenting and risk-taking ("fail-fast")	Culture Renewal and Digital mindset crafting
	5.2	HR Transformation	Upgrade traditional HR skills to support employees' skills and digital workforce evolution	
	5.3	Team communication and collaboration	Collaboration and communication are essential for successful transformational efforts and for overcoming resistance.	
	5.4	Workplace relationship and team identification	Good workplace relationships are crucial for innovative work behaviours. Misalignment between new technologies & established team identities can cause resistance.	
	5.5	Team resilience and adaptability	New technology enables better team engagement, adaptability, and resilience, resulting in stronger team identification and the ability to overcome challenges during DT	
Employee Roles and Skills	6.1	New digital roles and skills	New skills such as cross-functional skills, data analytics and automation skills are needed	Culture renewal and Digital mindset crafting
	6.2	Employee learning motivation	Motivating employees to learn and improve can be challenging, but positive attitudes from coworkers and support from supervisors can help.	
	6.3	Technology acceptance and adoption	Employee tech adoption is key to DT success. Ease of use, prior experience, and support from peers and top management affect adoption.	
	6.4	Perceptions and attitudes	Employees are usually motivated to support the adoption of new technologies because they provide benefits	
	6.5	Workplace resilience and adaptability	Traits like stability, conscientiousness, ambition, and openness aid employee adaptability and resilience during DT.	
	6.6	Work-related stress and wellbeing	Employers must mitigate digital technology's negative impacts on well-being by fostering resilience and adaptability, and accepting ongoing job and digital disruption.	
Customer	7.1	Customer experience monitoring	Customer experience, insight and touch points	Digital sensing
Metrics and Goals	8.1	Metrics for different phases of DT	ROI, profitability, and revenue growth metrics + intermediate implementation metrics	Balancing digital portfolios
	8.2	Digital organisation metrics	Growth metrics	
	8.3	Digitally transforming incumbent organisation metrics	Growth + Profitability metrics	

2.5 Analytical Framework

2.5.1 Conceptual Framework

This study aims to identify the essential determinants (factors) that enable DT in South African telcos. To accomplish this objective, a literature review and comparative analysis of five primary frameworks were undertaken to derive DT's key determinants (enabling factors). These enabling factors were categorised into specific categories and aligned with the DDCF elements organised into an artefact framework, as shown in Table 8. The artefact framework was tested for validity and completeness with DT experts made up of industry consultants and professionals.

Figure 2.8 presents the conceptual framework of the study, which outlines the research process utilised to accomplish the study's goal.

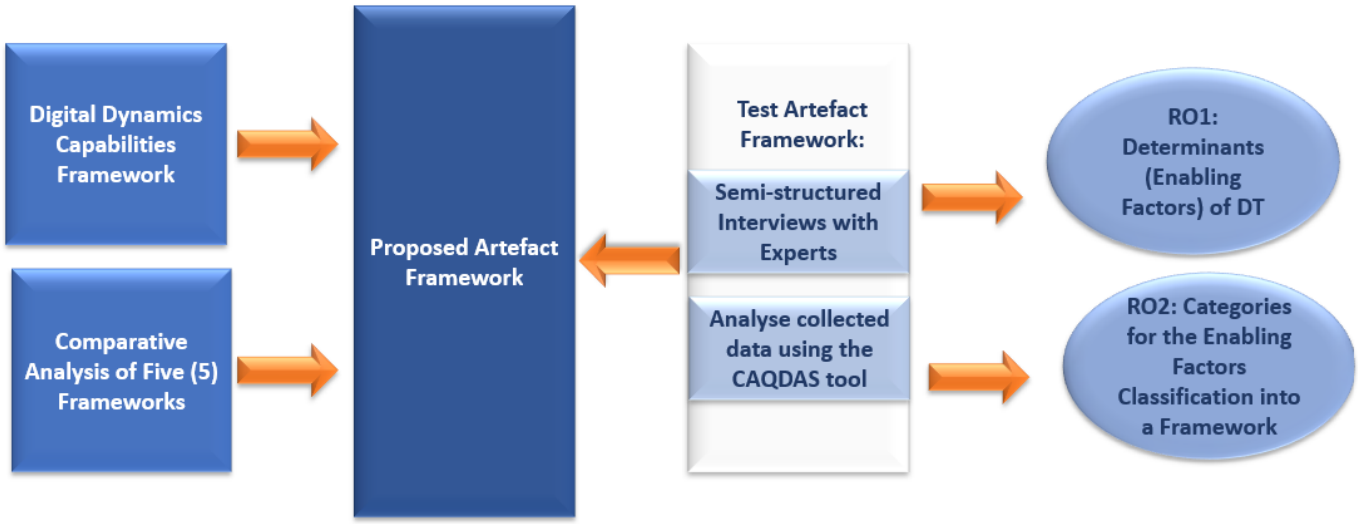

Figure 2.8: The Research Conceptual Framework

2.6 Conclusion of Literature Review

The analysis of academic literature for this research study defined DT as a crucial strategy that encompasses investing in both HR and technology to develop essential skills, capabilities, innovative organisation models, efficient processes and advanced systems. Together, these developments enable an organisation to adapt, grow and evolve, with the ultimate objective of achieving greater profitability, competitive advantage and overall efficiency in a rapidly changing digital economy.

Following the literature review conducted, the research questions set out below were formulated to achieve the research objectives of this study.

2.6.1 Research Question 1

Is the artefact framework (presented in Table 8) a comprehensive and accurate representation of crucial enabling factors of digital transformation for telecommunications organisations in South Africa?

2.6.2 Research Question 2

Do the categories of the artefact framework (as set out in Table 8) provide a thorough and precise classification for identifying the essential enabling factors?

CHAPTER 3. RESEARCH METHODOLOGY

This study aims to identify the essential determinants (factors) that enable DT in South African telcos. To accomplish this objective, a literature review was conducted, as presented in Chapter 2, which identified key determinants (enabling factors) of DT. These enabling factors were then categorised into specific categories and organised into an artefact framework. This chapter outlines the research methodology and design utilised to evaluate the effectiveness of the artefact framework by validating the identified enabling factors and categories and exploring potential modifications to these.

Figure 3.1 provides an overview of the topics covered in this chapter.



Figure 3.1: Overview of Topics covered in Chapter 3

3.1 Research Approach

It can be challenging to study rapidly evolving phenomena with conventional methods. To research these phenomena, Sarker et al. (2013) suggest that a qualitative approach is more suitable since this approach allows for the exploration of dynamic environments. DT can be considered such an environment as it involves a complex interplay between technology, organisations and people (Palvia et al., 2004; Walsham, 2006). In the current study, engaging through interviews with and gathering insights from professionals and executives within the South African telecom industry was necessary for analysing and validating the critical factors that enable DT effectively.

Given the complexity of the DT phenomenon, this study was best approached from an interpretive, inductive (Saunders & Lewis, 2018), qualitative perspective. This approach enabled process-related enquiries (interview questions) to be used in evaluating the artefact framework by exploring the study participants' perspectives. Ultimately, this facilitated the creation of a framework, based on data obtained through inductive research methods.

3.2 Research Design

This study aimed to create a framework to assist the digital transformation journeys of executives in South African telecommunications companies. The framework was developed using design science research (DSR) (cf. Gregor & Hevner, 2013; Peffers et al., 2007). DSR aims to create and continuously enhance artefacts following the research goals during the design and evaluation process (Alismail et al., 2017). The DSR design is a well-established approach in IS research (Herwix & Rosenkranz, 2018). It has proven effective in practice-oriented research (Goldkuhl & Sjöström, 2018) and is sometimes referred to as practice-design research. This encourages collaboration with industry practitioners and experts (Goldkuhl & Sjöström, 2018). The literature review recognises the necessity of clarifying the DT phenomenon and identifying its

crucial determinants (Verhoef et al., 2021; Vial, 2019). In the current research, it was appropriate to strive for both scientific rigour and practical relevance in an iterative engineering process, as DSR aims to do, according to Baskerville et al. (2019). Using this approach, the artefact framework was developed by categorising the critical enabling factors of DT identified through the literature review.

The next step in this approach was to evaluate the artefact framework, focusing on gaining an alternative perspective and exploring potential modifications to the enabling factors and categories within the framework. This was achieved by capturing field experiences through semi-structured interviews with South African telecom industry experts and executives who shared their experiences and insights relating to the various digital transformation projects they have been involved in (phenomenology). The data collected was analysed and interpreted using the computer-assisted qualitative data analysis software (CAQDAS) tool, ATLAS.ti. The results were then used to update the artefact framework and ultimately develop the final framework (cf. Graebner et al., 2012). Figure 3.2 provides an overview of the research process that was followed.

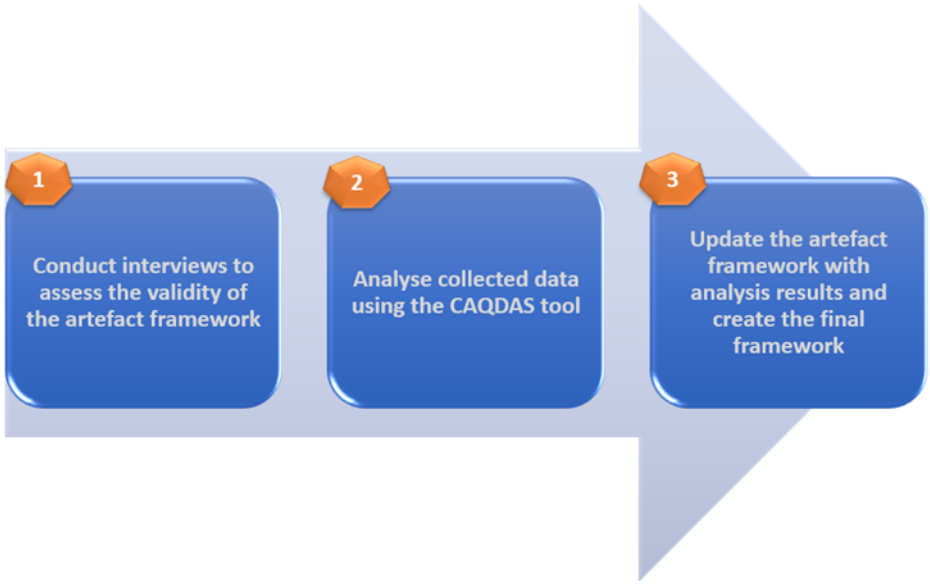

Figure 3.2: Overview of the Research Process

Furthermore, a cross-sectional research method was chosen since this research had to be completed within a limited time frame. This method involved collecting data at a particular point in time to investigate the research topic. The data collected provided a snapshot of information gathered from various participants in an inductive, exploratory, qualitative study (cf. Saunders & Lewis, 2018). To acquire more comprehensive and reliable data, a multi-faceted (literature review and semi-structured interviews) iterative approach was taken, and data was closely evaluated for validation and confirmation (cf. Palakshappa & Gordon, 2006).

3.3 Data-Collection Methods

Semi-structured interviews enhanced the depth of discussion related to the analyses and assessment of the identified determinants of DT. This approach allowed for modifying and reorganising questions to suit the context of each interview, providing greater flexibility (Saunders & Lewis, 2018). As a result, Semi-structured interviews were utilised to ensure adequate data collection, and an interview guide (Appendix C) was used. Sections 3.5 and 3.6 provide more detail on the research instrument and data collection processes utilised in this study.

3.4 Population and Sample

3.4.1 Population

The target population (Saunders & Lewis, 2018) comprised telecommunications professionals with experience in leading DT. The objective was to gain different perspectives on the subject. Therefore, the study focused on a target population that consisted of industry experts (consultants) and executives (decision makers) in the DT field responsible for driving DT within telecommunications organisations in South Africa. Owing to their experience in DT, this group possessed the necessary skills to evaluate the validity and efficacy of the identified factors

compiled in the artefact framework effectively. This evaluation was aimed at producing valuable practical insights regarding the necessary enabling factors for DT and the obstacles to achieving this transformation successfully, with the ultimate aim of addressing the study's research objectives and building on existing DT theory.

3.4.2 Sample and Sampling Method

As the population of DT experts targeted by this study could not be quantified or predicted, non-probability sampling was considered the most suitable sampling technique. Given the limited time for data collection from a small sample size and the need for thorough analysis and validation of results, a criterion purposive sampling technique was the most efficient and feasible approach (Saunders & Lewis, 2018). The participants were selected for the study based on the expert judgement of the researcher, who had 25 years of senior management experience in the South African telecommunications industry. The selected participants for this programme were chosen from the telecommunications industry in South Africa. They were selected according to their extensive experience in management or consulting roles in leading or participating in one or more DT initiatives or programmes. This made it easier to validate the study findings. A sample of 15 interviews was considered representative to ensure that the chosen purposive sampling research approach remained grounded in theory (Guest et al., 2006).

3.5 The Research Instrument

Semi-structured interviews were utilised to ensure adequate data collection, and an interview guide (Appendix C) was used. The guide served as a framework for the interviews but was adapted in accordance with any changes that arose during the process. The research questions were derived from the research objectives presented in Chapter 1 and from the literature review conducted in Chapter 2. During the interview process, the main objective was to assess the artefact

framework's validity, practicality, efficacy and comprehensiveness among industry consultants and telecom executives with DT experience. The interviews took place through online meetings using Microsoft (MS) Teams, as this method was the most convenient (cf. Creswell et al., 2007).

All interviews were recorded and transcribed using MS Teams, in each case with the participant's consent. The transcriptions ensured an accurate record of the conversation. The technology was tested before conducting and recording the interviews to prevent technical issues from wasting interview time. To guarantee correct and accurate interpretation of data, the recorded data was cross-referenced with the notes (unstructured observations) taken during the interview.

Furthermore, each factor that was suggested by a participant was examined during the interview, and its appropriateness was evaluated within the presented artefact framework. To avoid any errors in categorisation caused by miscommunication between the researcher and participant, a factor was added to the framework only if both parties agreed on its accuracy. The participant was requested to suggest modifications to the artefact framework, such as including new factors or categories, to accommodate any recommendations made by the participant. To confirm the validity of the interview, the researcher ensured that the questions asked were aligned with the research objectives. Furthermore, it was ensured that the questions were not leading or closed and did not contain excessive jargon or detail that might challenge the participants' comprehension. Before proceeding with the formal data-collection exercise, a pilot interview was conducted to ensure the viability and effectiveness of the interview instruments. The pilot interview assessed the feasibility of the question flow and format online and guaranteed acceptable recording quality (cf. Creswell et al., 2007).

3.6 Procedure for Data Collection

Qualitative research often relies on interviews as the primary method of data collection. This is because interviews provide a comprehensive and detailed

account of the participants' experience on a subject, making it the most popular approach (Polkinghorne, 2005). The data-collection process involved conducting semi-structured interviews with experts in DT on an individual basis. Interviews were conducted through online meetings on MS Teams. The individuals were identified through criterion purposive sampling (cf. Guest et al., 2006). Once a participant was identified, relevant background information about them and the organisation was gathered in preparation for the interview.

The participants were contacted for the researcher to obtain permission to interview them. Participants had the option to participate in the interviews voluntarily. A mutually convenient date, time and location/medium for the interview was arranged upon obtaining consent. Before the interview, each participant received an invitation email outlining the research objective, the purpose of the interview, an interview agenda and a consent form. Additionally, they were provided with the interview guide and an artefact framework. This allowed adequate time for preparation and to address any clarification questions related to the artefact framework and any potential uncertainties regarding confidentiality or anonymity.

To protect the privacy of all participants, their names and any identifiable information are not included in this research report. In addition, to maintain confidentiality, participants are referred to by pseudonyms. The recorded interviews were automatically transcribed by MS Teams but were promptly validated with the recordings. The transcripts were then archived for analysis and future reference.

3.7 Data-Analysis Strategies and Interpretation

To describe and comprehend complex phenomena in qualitative research effectively, it is crucial to guarantee accurate data interpretation and analysis (Palakshappa & Gordon, 2006). To this point, the CAQDAS tool ATLAS.ti was

utilised to conduct a combination of deductive and inductive analyses of the collected data.

The deductive analysis approach is based on a predefined set of codes based on theories, frameworks, and research questions. These codes are applied to data during the coding process to organise and categorise data according to established themes or concepts. This approach was used as a first level of analysis to validate and refine existing factors and categories identified in the artefact framework and research questions.

The inductive analysis approach involves generating codes directly from the data by systematically analysing the data to identify patterns, themes, and concepts that emerge organically without imposing predefined codes. This approach enables researchers to explore and uncover new insights without predefined themes or concepts. This approach was used as a second level of analysis to identify new factors, categories and insights that were not identified in the artefact framework and research questions.

The following steps were followed in the analysis process using ATLAS.ti.:

I. *Data Preparation*: this step entailed manually validating and cleaning up the interview transcripts, consolidating, converting, and importing the file into ATLAS.ti. Thereafter, the data was organised by creating a project in ATLAS.ti

II. *Familiarisation with the data*: this step entailed thoroughly reading and re-reading the validated and cleaned transcripts to gain a profound understanding of the content thereby identifying preliminary patterns and interesting insights.

III. *Code generation*: this step entailed the generating of codes based on the analysis approach – first a deductive analysis approach was used, where predefined codes based on the factors and categories that were detailed in the artefact framework were generated. Thereafter an inductive analysis

approach was employed, and codes were generated directly from the data by systematically analysing the data identifying patterns, themes, and concepts that emerged organically.

IV. *Code Application*: this step entailed the application of the generated codes to relevant sections, by going through data systematically.

V. *Review and Refinement*: this step entails the reviewing and refinement of the coded data to ensure consistency and accuracy. This involved refining the code system as needed by merging similar codes or creating new codes to capture additional themes or concepts.

VI. *Thematic Development: this step entailed the identification of sub-themes and overarching themes within the coded data. This involves grouping related codes to form sub-themes and overarching themes.*

The primary goal in utilising a CAQDAS tool (ATLAS.ti) to analyse data is to guarantee the accuracy of the results generated from the collected data. These results were crucial in validating and updating the artefact framework, ultimately leading to the creation of the final framework to meet the study's primary objective. For this reason, it was critical to ensure that the data analysis was conducted without bias to achieve this objective.

3.8 Possible Limitations and Challenges of the Study

A potential limitation of this study was that DT is a relatively new initiative in South Africa, resulting in a limited number of local experts from both managerial and consultant perspectives.

3.9 Quality Assurance

Guba and Lincoln (1994) state that to assess the quality of qualitative research, its trustworthiness and authenticity are crucial. Four indicators determine the

trustworthiness of such studies: (1) credibility (internal validity); (2) transferability (external validity); (3) dependability (reliability); and (4) confirmability (objectivity). Therefore, the quality and trustworthiness of this research study rely on its transferability, credibility, dependability and confirmability.

3.9.1 Transferability

Transferability is the extent to which qualitative research findings can be applied to other contexts or settings (Trochim & Donnelly, 2007). Since the qualitative research approach is unstructured, it can be challenging to establish transferability. However, detailed and comprehensive research-process documentation can help. On this basis, the research report provides a comprehensive description of the research process that was followed. Additional measures to enhance the transferability of this research study are elaborated on in Section 3.9.3.

3.9.2 Credibility

Trochim and Donnelly (2007) state that establishing credibility in qualitative research means ensuring that the participant agrees with the results. Qualitative research studies explore individuals' perceptions, experiences, feelings and beliefs. It is widely accepted that the participants are the most qualified to assess whether the research findings accurately reflect their opinions and emotions. For this reason, in qualitative research, credibility is determined by the agreement among the participants who took part in the study when presented with the findings for verification, consistency, validation and endorsement. The more agreement the participants express with the findings, the greater the study's validity.

All interviews were recorded and transcribed using MS Teams with the participants' consent. The transcripts were then manually validated against the recording to ensure an accurate conversation record. To guarantee correct and

accurate interpretation of data, the transcripts of the recordings were cross-referenced with the notes (unstructured observations) taken during the interview. Furthermore, each factor that a participant suggested was examined during the interview, and its appropriateness was evaluated within the presented artefact framework.

To prevent incorrect modifications or additions due to misunderstandings between the researcher and participant, the recommended changes were only included in the framework if both parties agreed on the accuracy of the proposed change. The participant was explicitly requested to suggest modifications to the artefact framework, such as including new factors or categories, to accommodate any recommendations made by the participant. Before concluding the interview, all suggestions were verified with the participant. In addition, as a token of appreciation for participating in the interview, the participants were promised that a copy of the final research report would be shared with them. The credibility of this research study was achieved by implementing these measures.

3.9.3 Dependability

Guba and Lincoln (1994) define dependability as comparable to reliability in quantitative research. Dependability focuses on whether the same outcomes could be achieved if an observation was repeated. This may be challenging to establish in qualitative research, which values flexibility and independence, unless a thorough process record is maintained for others to replicate and ensure dependability.

The semi-structured interviews conducted used an interview guide with standardised questions, which served as a framework for the interviews, ensuring dependable and effective data collection. In addition, the use of the guide confirmed the dependability of the interview. The researcher also ensured that the questions asked were aligned with the research objectives, that the questions were not leading or closed and that they did not contain excessive jargon or detail that might challenge the participants' comprehension.

Furthermore, the interviews were recorded and transcribed through MS Teams, and the transcripts were individually manually validated against the recordings. The transcripts were archived for analysis and future reference. Moreover, to guarantee accurate interpretation and analysis of data, a CAQDAS tool (ATLAS.ti) was utilised to categorise the interview data into themes and identify any patterns. This aided in evaluating and updating the artefact framework by identifying new factors and categories and refining existing ones. By implementing these measures, the dependability of this research study was ensured.

3.9.4 Confirmability

According to Guba and Lincoln (1994), confirmability ensures the objectivity and neutrality of the findings. This means that the data collected and interpretations made are not influenced by the researcher's biases or preconceptions. To achieve confirmability, the results of the study must be grounded in the data rather than the researcher's subjective perspective. To ensure transparent data collection, the researcher used MS Teams to record and transcribe the transcripts, which were then archived for analysis and future reference. Additionally, a CAQDAS tool (ATLAS.ti) was used to ensure transparent data analysis and interpretation. These measures implemented in the research process served to bolster the confirmability of the research and contributed to its overall academic rigour.

3.10 Ethical Considerations

Participants were allowed to participate in interviews voluntarily and signed a standard consent form in this regard. To protect the privacy of all participants, their names and any identifiable information are not reported in the research report. In addition, to maintain the confidentiality of the information shared, participants are referred to by pseudonyms. The researcher ensured that no information about a particular participant or organisation was disclosed to any

other participant and that none of the participants had access to any confidential information belonging to any company.

CHAPTER 4. PRESENTATION OF FINDINGS

This study aimed to identify the essential determinants (factors) that enable DT in South African telcos. To accomplish this objective, a literature review and comparative analysis of five primary frameworks were undertaken to derive DT's key determinants (enabling factors). These enabling factors were categorised into specific categories and, aligned with the DDCF elements, organised into an artefact framework, as shown in Table 2.8. The artefact framework was tested for validity and completeness with DT experts who were industry consultants and professionals. Fifteen semi-structured interviews were utilised to ensure adequate data collection, and an interview guide (Appendix C) was used. This chapter presents the findings from the analysis of the data collected through these interviews.

4.1 Analysis Tool

Thematic analysis was conducted using the ATLAS.ti 23 tool, with the primary goal of answering two research questions related to the artefact framework.

4.2 Demographic Profile of Participants

Table 4.1 provides an overview of the position and years of telco and DT experience of the 15 participants who were interviewed to evaluate the artefact framework. The participants were seasoned telecommunications professionals with experience in leading DT initiatives. They included industry experts such as consultants, as well as executives who were decision-makers in the South African telecoms industry.

Table 4.1: Demographic Profile of Participants

Participant	Position	Telco Experience	DT Experience
P1	Principal Consultant	10 -15 yrs	10+ yrs
P2	Principal Consultant	10 -15 yrs	10+ yrs
P3	Principal Consultant	3-5 yrs	5-10 yrs
P4	Executive	10- 15yrs	5-10 yrs
P5	Principal Consultant	10 -15 yrs	10+ yrs
P6	Senior Leader	20-25 yrs	10+ yrs
P7	Principal Consultant	5 -10 yrs	3-5 yrs
P8	Executive	25-30 yrs	5-10 yrs
P9	Senior Leader	10 -15 yrs	10+ yrs
P10	Principal Consultant	3-5 yrs	10+ yrs
P11	Senior Leader	20-25 yrs	10+ yrs
P12	Senior Leader	10 -15 yrs	5-10 yrs
P13	Senior Leader	20-25 yrs	10+ yrs
P14	Senior Leader	25-30 yrs	3-5 yrs
P15	Senior Leader	20-25 yrs	10+ yrs

4.3 Findings Relating to Research Question 1

The study's first research question (RQ) was, *Is the artefact framework a comprehensive and accurate representation of crucial enabling factors of digital transformation for telecommunications companies in South Africa?*

Table 4.2 provides a view of the abstraction, namely the codes, sub-themes and themes. This section of the analysis shows the sub-themes and themes that relate to this research question. From the findings related to RQ1, one theme and three sub-themes were identified. A deductive analysis approach was used for code generation relating to the Comprehensive and Valid sub-theme. An inductive analysis approach was used for the Simplify for easy communication and Recommendations to Structure Framework sub-themes.

Table 4.2: Codes, Sub-themes and Themes related to Research Question 1

Codes	Sub-themes	Themes
Appreciation	Comprehensive and Valid	Feedback on Framework
Comprehensive		
Valid		
Improve	Simplify for easy communication	
Reduce		
Simplify		
Organise Differently	Recommendations to Structure Framework	
Use Illustations		
Category label Change		
Aggregate, simplify		

4.3.1 Sub-theme 1: Comprehensive and Valid

Many participants (P) mostly or fully appreciated and agreed that the framework was comprehensive and valid; positive feedback included affirmations about the overall quality and relevance of the proposed framework. In response to whether the framework was comprehensive and valid, P1 stated:

> *"So yes, it is a very good framework, and it is pretty comprehensive. I will probably suggest a few changes, but I think, overall, you already have a valid and quite a detailed Framework." (P1)*

Other participants agreed with the validity and comprehensiveness of the framework and further believed that it made "perfect sense".

> *"No, I think all of these are valid; I guess there's a combination that I see, and all your categories are very, very valid, in fact. I think your macro-micro enablement enablers, you talk about the strategy, the CEO mandate, the budgets and then is more the HOW and that goes into these things that you've got here, which I think they all make sense. No, I think they all make perfect sense." (P2)*

> *"So, I think from a category point of view, you've captured what I would typically look at myself, and I don't think you missed anything; I think that it is comprehensive and relevant." (P3)*

Although there was general agreement among the participants about the comprehensiveness of the framework, suggestions were offered on how the framework could be improved, with an emphasis on making it practical and usable to executives.

> *"Yes, you have put a lot of thought into it, and yes, it looks comprehensive. You may want to consider just having an abstracted layer above this so it's easier for executives to consume because eight categories are quite a lot. You just may need to unpack what an abstracted layer above this would look like." (P6)*

> *"So, I think that the answer will be yes; it certainly covers all the top-level categories that make sense when looking at the dimensions and then looking at each enabling factor; I think this is definitely a comprehensive view of each of these categories, and ultimately, what this could translate nicely into is an assessment framework as well. So, if you were to do a maturity assessment on an organisation, I think you could quite easily, you know, put scales onto each of these enabling factors and assess where an organisation might be in each of these areas. So, you kind of create this kind of digital transformation index. I think this framework does very well to get to that point." (P7)*

> *"Yes, I do. I really think it's great, and it's very comprehensive. In fact, I think when it's packaged and published, it might be worth doing some additional kind of grouping to help make it more digestible at a glance for executives. But I think it's comprehensive. I think that it's got all the factors that it needs, especially with what we have discussed, But the only thought or suggestion is to find a way to package and publish it in a very digestible way." (P10)*

Many participants felt that the framework was detailed and all-encompassing as it looked at the end-to-end organisation.

> *"I think the framework is it is comprehensive, and I think one needs to understand digital when you adopt a digital framework, as it is about the end-to-end organisation. So, it's not just about one, and I think you're trying to capture that." (P11)*

> *"They are over-covering, as I explained in my answer previously. If you just change the driver enablement, they'll be perfect, but they are more; they're over-comprehensive so that they can be clubbed together or combined, and then they will exactly answer how you want. But you have got more than enough over there, with just a little re-categorisation or aggregation. I think this is a solid framework." (P12)*

"I think this framework is quite detailed and all-encompassing, so I think it does have all the things you mentioned herein are very useful. So, I don't have any comments on that." (P13)

One of the key suggestions for improvement related to the number of categories and the need to aim for a simplified, easy-to-use framework.

"Well, I reviewed the artefact framework, and I thought what you have listed as categories is valid and quite comprehensive. So, I think it's a good list that you have; I think it is complete. However, my concern is that having such a long list of categories can be quite overwhelming, and it can be intimidating for an organisation to work through such an extensive list. So, it's complete, but I would propose that one simplifies your categories or all lists of enabling factors". (P15)

4.3.2 Sub-theme 2: Simplification for Easy Communication

Participants P6, P10, P15, P12 and P13 specifically referred to the simplification of the framework, which would enable easy communication of the framework. However, their statements did not dismiss the framework as lacking in validity. In P6's words:

"Yes, you have put a lot of thought into it, and yes, it looks comprehensive. You may want to consider just having an abstracted layer above this so it's easier for executives to consume because eight categories are quite a lot. You just may need to unpack what an abstracted layer above this would look like." (P6)

In an earlier statement, P6 expressed that the framework had too many categories and suggested that the categories should be aggregated into a higher category layer, reducing the number of categories and making it easier for executives to understand. P10 shared a similar perspective.

"I think that it's got all the factors that it needs, especially with what we have discussed, But the only thought or suggestion is to find a way to package and publish it in a very digestible way. I actually had something I wanted to screen share, maybe, if that's okay." (P10)

P15 mentioned that the current table format of the framework was not suitable for effective communication. Instead, he recommended using an illustration to facilitate better understanding and easier implementation. Moreover, P15

suggested changing the “Category” label to “Pillar” because the term “Categories” was not communicative. According to P15, the framework had too many categories, and he proposed aggregating existing categories into overarching pillars to reduce the number of categories and simplify the framework. By doing so, the framework would become more concise, and it would be easier to remember its contents.

> *“So, the first takeaway is your artefact framework; I believe it is relevant, I believe it’s comprehensive, I believe it’s detailed, and I believe it’s important to drive digital transformation. Having said that, having it in a table format that looks like it’s a control sheet might not be easy to communicate to the organisation. Therefore, firstly, I would propose that you use some sort of diagram or illustration to communicate the framework to people, so it is easy to understand and, therefore, easy to implement. It’s very difficult to implement a framework that looks like a table because people are visually stimulated; they want to see how it fits together. In that regard, you remember, we went through each category, and I proposed that you rename categories to pillars, I proposed that you regroup some of them, and I proposed that you simplify the framework by consolidating them so that instead of having eight categories, you probably try and reduce it so that there are not so many.” (P15)*

P12 and P13 expressed similar views to P15, suggesting that the framework could benefit from simplification, possibly through the aggregation or consolidation of categories.

> *“They are over-covering, as I explained in my answer previously. If you just change the driver enablement, they'll be perfect, but they are more; they're over-comprehensive, so they can be clubbed together or combined, and then they will exactly answer how you want. But you have got more than enough over there, with just a little re-categorisation or aggregation. I think this is a solid framework*.” *(P12)*

> *“If there are ways to, through your interviews, find patterns of what people resonate with, if there are ways you can group them into more memorable ways of organising it – Five key factors and three sub-factors, a total of 15, like something that is simple to look at and might leave a more memorable experience for someone reading it and understanding it. Even though these are meant to be long research items, people are often attracted towards simple, memorable frameworks and artefacts rather than very complex ones.” (P13)*

4.3.3 Sub-theme 3: Recommendations to Structure the Framework

P6 believed that the framework should be structured in a manner that would enable experiences to be the central category that was linked to all the other currently existing categories. According to him, experiences drive the entire DT process. In P6's own words:

> *"Because I think the categories are as comprehensive as they are, they just need to be organised differently. I do think you should put the customer, or let's call it experience, at the centre of the framework because it is those experiences that drive the whole transformation journey." (P6)*

P4 believed that the framework should be structured into five elements:

> *"So, if you think about it, those five key elements you can really translate them into, I will put them in the chat: #1 is strategy, #2 is insights and analytics, #3 is operations, #4 is customer, and #5 is enablement. So, these five that I'm putting in the chat, I've used these to really organise my mandate around these five elements, in particular, and I've had good success with them, and I think from that perspective, it's potentially something to consider, to maybe fundamentally shift what your framework looks like." (P4)*

P15 proposed a simplification of the framework by consolidating or aggregating the categories and using the illustration of a house to facilitate better understanding, enable easier implementation and enhance the memorability of the framework. P15 provided an explanation of this proposal along with an illustration as depicted in figure 4.1.

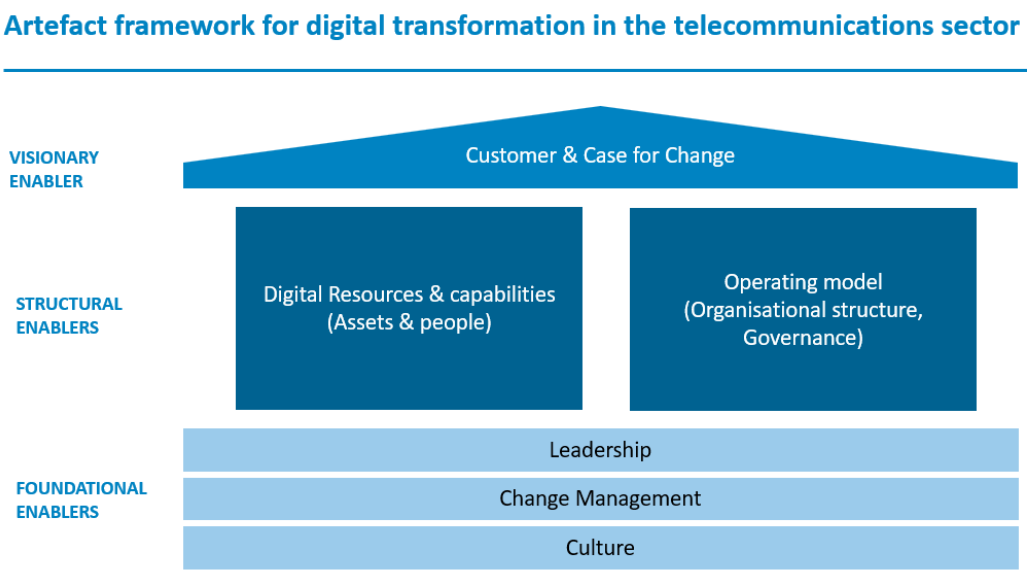

Figure 4.1: Proposed Framework Structure by P15

"When you put the framework together, I would propose that you do it in a picture format or illustrated format, and if you think about a house at the top, the roof of the house is then your ambition or your North Star your Ambition Layer, and I would propose that your focus should be the customer category that really the customer focus and ambition. I know that I said earlier that there is a separate layer which is called the Case for Change. I want you to consider even collapsing that Case for Change under Change Management or the Customer Pillars as an alternative option if you want to reduce the number of pillars…. Then, in your middle layer, if you think about that house analogy, if you think about two big pillars, put your Digital Resources and Capabilities and your Operating Model pillars as part of its structural middle layer. That Ambition Layer, the roof, rests on these two pillars, the Digital Resources, and the Operating Model, and together it must work. Then at the bottom is the last layer, which I would call the foundation. You can think of another label if it doesn't work for you, but conceptually, it is the foundation of the house, and that is the leadership that must drive this; it is the culture of the organisation and, of course, the Change Management program. What I would suggest is that I'm giving you a conceptual idea, but you may want to reorganise what I have just shared with you in a way that makes sense. Because these things can potentially be regrouped and reclassified or even relabelled. But conceptually, this is what I would propose." (P15)

4.3.4 Overall Conclusion of Findings Pertaining to Research Question 1

The information collected indicates that all participants found the framework to be mostly or completely comprehensive and valid, but many suggested that it needed simplification through the aggregation of categories into over-arching categories. Additionally, the use of an illustration rather than a table would make the framework more engaging and easier to understand, implement and remember.

Some of the participants felt that the framework was not complete and highlighted certain gaps. An in-depth discussion of these gaps is provided in the findings related to Research Question 2.

4.4 Findings Relating to Research Question 2

The study's second research question was, *Do the categories of the artefact framework provide a thorough and precise classification for identifying the essential enabling factors?* This section of the analysis presents the themes that relate to this research question.

From the findings related to RQ2, two over-arching themes were identified. A deductive analysis approach was used for the Appropriateness of Categories theme. An inductive analysis approach was used for the Recommended New Additions to the Framework theme.

Table 4.3: Codes, Sub-themes, and Themes for Research Question 2

Codes	Sub-themes	Themes
Improve - Relocate Digital Roles Factor	**Digital Resources**	**Appropriateness of Categories**
Improve - Category name Change		
Add Factor - AI prominance		
Add Factor - Include Platforms	**Organisational Structure**	
Simplify - Consolidate related Factors		
Simplify - Create Operating Model Pillar		
Improve - Category name change	**Strategy**	
Add Factor - Strategy and Vision		
Improve - Relocate Digital Roles Factor	**Employee Attitude & Development**	
Simplify - Consolidate related Factors		
Simplify - Consolidate related Factors	**Organisational Culture**	
Simplify - Create over-arching Culture pillar		
Missing factors	**Customer**	
Customer - strategic driver		
Improve - Category name Change	**Metrics & Goals**	
Governance required		
Decision Making Framework		
Decision Rights		
SEE elements		
Add Factor - Data Governance		
Data Privacy		
Regulations		
Cybersecurity		
CM - Embed Change	**Change Management**	**Recommended New Additions to Framework**
Change Agents		
People Journeys		
Project Roadmap		
SEE - Portfolio Management	**Strategy Execution Enablement (SEE)**	
SEE - Journeys		
SEE - Use Cases		
SEE - PMO		
SEE- KPIs		
Locate in Governance		
Budget needed	**Financial Investment**	
Financial investment		
Funding		
Locate in Resources		
Locate in Strategy		
CEO Mandate		
Business Processes needed	**Business Processes**	
Digital asset enablement		

Theme 1: Appropriateness of the Categories

To determine whether the categories provided a thorough and precise classification for identifying the essential enabling factors, it was necessary to verify the appropriateness of the categories. As the artefact framework features eight categories, proposed adjustments for each category were compiled under a relevant sub-theme. Apart from the Leadership category, all categories received recommendations. As a result, seven sub-themes were established for this theme.

4.4.1 Sub-theme 1: Digital Resources

Under this sub-theme, participants recommended the following changes to this category:

- Change the name of the Digital Resources category.
- Provide an enabling factor for AI to highlight its prominence.

Change the name of the Digital Resources category

While P12 generally believed that the Digital Resources category covered the related enabling factors very well, this participant suggested that the Digital Resources category be renamed as Digital Resources and Capabilities so that it also captured digital capabilities:

> *"I think you have covered the enabling factors well when you speak about leadership, culture, and the employees, I think those are the fundamental ones. The only thing that I'll suggest, and it's up to you, is what you call digital resources. I would have worded it more in the context of how you have described it as Digital resources and capabilities." (P12)*

P15 made a similar recommendation to P12 but also suggested moving the Digital Roles and Skills factor from the Employees category to the existing Digital Resources category:

"Then, rename what you currently have as the Digital Resource category to the Digital Resources and Capabilities pillar. So that deals with your resources and capabilities, and I would move the Digital Roles and Skills factor, which you currently have as 6.1, from the Employee category to the Digital Resources and Capabilities pillar. In other words, what I am suggesting is that what you currently have under the Employees category is actually a digital resource or capability, and I would, therefore, group it or put it under the Digital Resources and Capabilities pillar. OK. So, yes, the resources and the technical assets, as well as the people assets, you combine that together." (P15)

Provide an enabling factor for AI to highlight its prominence

P8 highlighted that there was a need to further drill down into the descriptions of the Digital Assets enabling factor, specifically referring to breaking down 4IR technologies into distinct components rather than looking at them as a single whole. Additionally, P8 suggested moving from the "generic" to the specific in such classifications:

"Let's look at your digital technologies; you explain in your description you have artificial intelligence, machine learning, IoT and robotics. I would recommend you maybe on your robotics just explain what you are referring to because robotics are very generic. Maybe in brackets next to your robotics, I would put in automation just to show what you mean by your robotics." (P8)

Participants P10 and P1 shared similar views by recommending that AI be highlighted more prominently. P10 suggested that a separate enabling factor be dedicated to AI, such as data analytics, since AI is currently the most pervasive digital technology and is leading the technological revolution in business.

"The one I believe that AI should be surfaced more specifically, and so I do understand that you refer to IoT and AI and data in the digital resources section. But in the same way you've surfaced analytics, I think you should surface AI. It feels to me like this is as big a revolution as the Internet and search, and I have a feeling that it's going to be caught in digital transformation; the reason for me is that your AI is not just pointed at one part of your business, it's not just for a chatbot for customers, but AI can help your employees perform better, it can help you know and make decisions more quickly. So somehow, unless you're worried it could be one of the fads, I would take the risk of putting AI as prominently, at least as big data analytics as you've done." (P10)

P1 shared similar views and believed that AI will not only drive new business capabilities but also revolutionise the nature of what telcos deliver to the market and how they deliver it. According to P1, a massive opportunity is presented for telcos to optimise costs substantially in telecom networks through the application of AI.

> *"One other element that's missing in this is AI, and the reason I'm calling it out is because I think it is going to be impossible to ignore the role of AI now as it is going to permeate probably more than any other technology, so, it may sit next to analytics, AI and Analytics. I think AI is an interesting technology because it not only drives new business capabilities, but it's going to change; I think the nature of what you deliver to your market and even how you deliver it and so even telcos, probably have a massive opportunity to reduce spending by just deploying AI inside the organisation. So, I think there are huge applications for this. If you just look at Ericsson's spending, a couple of million to convert a large part of their practice to AI and analytic space business. So, I think telcos are going to follow suit with how AI applications can be deployed in the network or in technology areas, like digital architecture, digital value cases and journeys; those are typically things you need to do in order to execute." (P1)*

4.4.2 Sub-theme 2: Organisational Structure

Under this sub-theme, participants recommended the following changes to this category:

- Include platforms as an agile structure.
- Consolidate various agile organisational structures.
- Create an over-arching Operating Model pillar.

Include platforms as agile organisational structures

P5 believed that digital agility is not only a capability but also relates to different types of agile organisational structures. Similarly, digital networking capability is related to the platform ecosystem, which is a type of agile organisational structure. For this reason, P5 recommended that platform ecosystems should also be considered as a type of agile organisational structure and be included in the category:

> *"I think digital agility will also have an organisational structure in terms of agile organisation and cross-functional teams, etc. Maybe we have the same topic here, and in the organisational structure, we can talk about it then for digital networking capability. I understand here the ability to work with external partners, including ecosystem, etc. I will maybe make it with an organisational structure." (P5)*

P12 shared similar views and suggested that cross-collaboration capability relates to platforms and ecosystems as a type of agile organisational structure and should be included in the category accordingly as an evolving future business model:

> "*When you talk about organisational structure, including ecosystems, you may want to include platforms and ecosystem partners in organisational structure because you're talking about cross-collaboration and everything. So that becomes more of an operating model challenge for an organisation. The operating model of the current business is not geared towards the evolving future business model." (P12)*

Consolidate various agile organisational structures

P13 and P15 proposed a simplification of the categories by consolidating the enabling factors for each type of agile organisation into one enabling factor. In their view, this would provide a more concise and beneficial approach. The write-up and detailed description of the new consolidated enabling factor should include information on the various types previously included in separate factors.

> *"I see separate business units there; I see cross-functional teams and digital functional areas. I mean – these are all ways of organising to achieve an outcome. There's no one way to do those things. It's a choice. So, I would have probably called it agile." (P13)*

> *"Then, when you talk about your Organisational Structure category, which I think is your category #2, I would combine all those different types of structures 2.2 to 2.4 into enabling factor 2.1, ok. Because when you think about it, whether it's a cross-functional team, a separate business unit or a functional unit, all of these are structural in nature, and they are potentially different options for agile structures. So, I would rather group them together into a single description." (P15)*

Create an over-arching Operating Model pillar

P15 believed that the current framework had too many categories, and it would be better to simplify it by creating overarching pillars to group the categories. As a result, P15 recommended combining the existing Organisational Structure category and the existing Metrics category (with the suggested name change to Governance) into a new overarching pillar called the Operating Model Pillar:

> *"I would, as part of simplifying your structure and making it more concise, because I think you've got too many categories, what you call categories, I think you have too many. I would look at ways of combining some of these categories to make it simpler and look for what groupings fit together…. Then I would take that category that you now have as Organisational Structure, which is your second category and your last category, which was Metrics and which we changed into Governance now, and I would combine those two into a new pillar which I would call the Operating Model pillar. And if you want, you can have Governance and Organisational Structure as sub-pillars, etc. So, what I'm trying to say is that we rename some of your categories, so, they got the right name convention. We have tried to simplify them, and now we are combining or consolidating them so there is a lesser or fewer number of categories or pillars." (P15)*

4.4.3 Sub-theme 3: Strategy

Under this sub-theme, participants recommended the following changes to this category:

- Change the name of the Strategic Embeddedness category.
- Add an enabling factor for strategy and vision.

Change the name of the Strategic Embeddedness category

Participants P15, P13 and P9 recommended renaming the Strategic Embeddedness category. P15 suggested that the category should be renamed the Strategic Case for Change pillar, as this would more accurately convey the category's objectives.

"I also believe that another critical factor is to have a very convincing or strong case for change; there must be a reason or a case for change that coalesces the organisation into action. When we talk about digital transformation, it often runs into hundreds of millions of rands over a long period, and therefore, it is very important to have the right leadership or sponsorship and to have a very clear case for change that will basically be used as the North Star to guide the digital transformation process.....I will start with what you currently have listed as the Strategic Embeddedness category, and I would rename that to Strategic Case for Change and this pillar…….. So, in essence, what I am saying is that you have the right ingredients under Strategic Embeddedness, but I would reframe or rename it as a Strategic Case for Change and going back to my earlier point, it is very important for an organisation to understand what is driving this digital transformation and I think that is a critical enabling factor." (P15)

P13 had a similar view and suggested that the category be renamed Strategic Clarity:

"Strategic embeddedness – Maybe to capture my first point, I would have probably called it something like strategic clarity rather than embedding it since this is the second part of it. Strategic clarity is on WHY you're doing it. Other than that, you got all the right items." (P13)

P9 also had a similar view and suggested that the category be renamed Strategic Direction:

"I would almost even call it strategic direction versus embeddedness. Yes, because I think it's just a lot more like a much higher level." (P9)

Prioritisation of strategy and vision

From participants P9, P10 and P15's perspective, a clear strategy and vision were the most critical aspects of the telco's DT and should be captured in the framework. According to P9, a clear strategy and vision provide a view of the organisation's objectives and goals and how it plans to achieve them:

"For me, the most important thing is having a clear strategy and vision. That says exactly what it is that I'm trying to achieve as a telco overall. Am I playing mainly in the telco space? Am I moving into all of these new digital platforms that I spoke about? What's my timeframe for doing that? What's the value at stake that I'm going after? So just a very clear strategy of what you're trying to do." (P9)

P10 shared similar views as P9 about the framework. P10 believed that the framework should be more explicit about having a vision and, therefore, suggested that a specific enabling factor related to the vision should be included in the Strategy category. According to P10, the vision is like a North Star that will guide the DT journey. Additionally, P10 suggested that despite the category having traditional and market growth strategies, it was crucial to have an overarching DT strategy*:*

> *"I think that there needs to be an enabling factor that I think is missing, is your vision for digital transformation that is shared, communicated, and governed. It could live in that leadership area, or it could live in strategic embedment because I think you're implying that, but for this framework to be a good comprehensive list of the enabling factors, you need a vision…and you need a North Star. You need a vision. I think it's important enough to be an enabling factor in the framework…communicated digital vision, or under strategic embedment, you've got your traditional growth strategies, you've got your platform growth strategies. But I think you need an overarching digital transformation strategy." (P10)*

P15's view was similar to those of P9 and P10. According to P15, DT is an expensive journey, and it is therefore crucial for the leadership team, including the DT sponsor, to have a strong and compelling "case for change" that brings the organisation together to take action. P15 suggested that the "strategic case for change" should encompass the vision, mandate, corporate-aligned digital strategy and funding associated with the DT change. Moreover, P15 believed that the "strategic case for change" would serve as the North Star guiding this DT journey.

> *"I also believe that another critical factor is to have a very convincing or strong case for change; … a very clear case for change that will basically be used as the North Star to guide the digital transformation process...I will start with what you currently have listed as the Strategic Embeddedness category, and I would rename that to Strategic Case for Change; …. So, this pillar will consist of a vision, the mandate, and how the digital strategy is aligned with the corporate strategy and the funding associated with that to support the digital transformation change." (P15)*

4.4.4 Sub-theme 4: Organisational Culture

Under this sub-theme, participants recommended the following changes to this category:

- Consolidation of interrelated Organisational Culture factors;
- Creation of an over-arching Culture pillar.

Consolidation of interrelated Organisational Culture factors

P15 observed that some factors within the category were interrelated as they pertained to a shared theme of communication and resilience. To streamline the category and framework, P15 proposed merging these factors, making the category more concise and simpler:

> *"Then, moving on to the organisational culture category, I would combine enabling factors 5.3 to 5.5 because all of these are very much interrelated and speak about kind of communication and resilience. Let me just look at it again. Yes, I think it speaks about communication resilience, and I would group it together like that. So, you can cover it under team communication, and resilience or something like that, I'm just giving you an idea." (P15)*

Creation of an over-arching Culture pillar

P15 suggested that the framework structure could be simplified by reducing the number of categories, which could be achieved by aggregating or combining similar categories. P15 observed that the categories of Organisational Culture and Employees both related to the concept of Culture but from different perspectives, i.e. from an organisation and individual employee perspective. Consequently, P15 recommended that these categories be renamed as Organisation and Individual, respectively, and then be combined into an overarching Culture pillar, with Organisation and Individual (employees) being sub-pillars because the nuance reflected by each sub-pillar was important and needed to be preserved.

"I would, as part of simplifying your structure and making it more concise, because I think you've got too many categories, ... I would look at ways of combining some of these categories to make it simpler and look for what groupings fit together. For example, you could combine the Organisational Culture and Employee Attitude and Development categories into a Culture pillar and then have sub-pillars named Organisation and Individuals or Employee or whatever; you can choose the labels of that. But I would combine some of these categories that you have into a single pillar." (P15)

A similar view was put forward by P9, who suggested combining the two categories Organisational Culture and Employees into one category:

"You can even maybe just call it culture and employee attitudes if that works better." (P9)

P3 also found a link between the Organisational Culture and the Employees categories, and expressed the view that maybe they should be combined:

"I'm wondering if there isn't a juncture between that and your employee attitude and development to meet, should they all be blended together. I think the employee attitude is one thing, but if the organisational culture does not support the employee attitude or the employee development, then it's not going to work." (P3)

4.4.5 Sub-theme 5: Employee Attitude and Development

Under this sub-theme, participants recommended the following changes to this category:

- Relocate the Digital roles and skills factor to Digital Resources.
- Consolidate certain Employee attitude factors.

Relocate the Digital roles and skills factor to Digital Resources

P15 suggested that the Digital roles and skills factor under the Employee Attitude and Development category related to the necessary skills and roles required for successful DT, whereas the other factors in this category focused on employee attitude and culture. With this in mind, P15 recommended

moving the Digital roles and skills factor to the Digital Resources and Capabilities pillar.

> *"I would move the Digital Roles and Skills factor, which you currently have as 6.1, from the Employee category to the Digital Resources and Capabilities pillar. In other words, what I am suggesting is that what you currently have under the Employees category is actually a digital resource or capability, and I would, therefore, group it or put it under the Digital Resources and Capabilities pillar." (P15)*

P9 shared a similar view to P15:

> *"I think that those softer issues feel more like how people work together; they almost fit under a culture you want to create versus I the skills that you want the people to have, which is a very different thing altogether. So, I wouldn't have under the Employees' Attitudes and Development category, the Roles and Skills (6.1) being in the same bucket as the attitudes." (P9)*

Consolidate certain Employee factors

P15 observed that some factors within the Employees category were interrelated as they pertained to a shared theme of perceptions and attitudes. To streamline the category and framework, P15 proposed merging these factors, making the category more concise and simpler:

> *"Then, similar to that, the Employees category, I would combine enabling factors 6.3 to 6.6, again because all of these are all interrelated and they kind of deal with perceptions and attitudes, and I would call it something similar to that." (P15)*

This view was shared by P13, who stated:

> *"Employee learning, motivation, perceptions, and attitudes are all interlinked. The resilience and adaptability, stress and well-being, I think you need to lose a few of these. My personal recommendation is you must pick which ones you lose." (P13)*

4.4.6 Sub-theme 6: Customer

Under this sub-theme, participants recommended the following changes to this category:

- Include additional enabling factors in the Customer category.
- Consider the customer as a strategic driver, not an enabler.

Include additional enabling factors in the Customer category

Participants P8 and P10 expressed that the detailed write-up pertaining to the Customer category lacked some critical information and required the inclusion of additional enabling factors. P8 further suggested that the existing three factors related to the customer category needed further elaboration to provide a more comprehensive understanding of the customer from an enabler perspective:

> *"In your framework, you've got your customer, and you've got three elements, and then, if you go to your detailed description, you have only a paragraph on the customer, but without your customer, you don't have a business…. So, I would say expand on your insights and integrate, as I said, your offline online behaviour with your first and third-party…so, you've got a holistic view of that customer. Secondly, on your channels, there's so much that it needs to talk about, like accessibility for the customer, the ease of engagement, how effortless it is, the Omni channel, the personalisation of that Channel, as well as the choice for the customer. So that's all still under your customer. Then the third one is your experience. It needs to be consistent across all channels because we are no longer competing. The norm has been set by global companies like Amazon; they've created it. It's no longer about industry industry-specific, but global acceptance standards or experience. So, I just feel you're a bit light under your customer area, and they need some work on that." (P8)*

P10 shared similar views but felt that additional enabling factors needed to be added.

> *"For me, the one that seems the most underdeveloped is the customer, and so just theoretically, at a glance, if I look at the framework, the number of measures and the descriptors, it seems to need a little more emphasis…. But I do think there actually needs to be another one, which is a deliberate and continual focus on customer understanding, customer segmentation, and customer research from many sources, not just from the data you have about your customers. I think,*

for me, it's missing a little; it could just need an extra enabling factor or two that talks about engaging your customers, researching them as well as exploring the data that you have on them, and you already have that part covered, so that's the one element of customer focus. So, it would be great if you could add one or two of those elements into your customer focus area. That'll be a good improvement." (P10)

Consider the customer as a central strategic driver

According to P12's recommendations, the customer should be seen as a strategic driver rather than an enabler. This recommendation was based on the view that the primary goal of the DT agenda was to satisfy the needs and expectations of the customer effectively. To this end, the following statement encapsulates this notion:

"I don't think that you are missing anything. It's just that I will articulate some of them slightly differently, but I think overall, it's covering quite a bit. For example, I would have expected the customer to be the only one, which I believe is a driver and not an enabling factor because it's the digital transformation that's changing the way consumer consumes services and products, and that is what is driving the digital transformation on the back of the technological advancement that's happening. So, customers are the drivers." (P12)

4.4.7 Sub-theme 7: Metrics and Goals

Under this sub-theme, participants recommended the following changes to this category:

- Change the name of the Metrics and Goals category.
- Address overall governance.
- Add an enabling factor for data governance.

Change the name of the Metrics and Goals category to Governance

P15 proposed that the name of the Metrics and Goals category be changed to the Governance pillar. The rationale underlying this proposal was that metrics and goals are closely linked to governance. Furthermore, P15 suggested that the Governance pillar should encompass the strategy execution enablement

elements, such as digital initiatives portfolio, relevant roadmaps, KPIs and decision-making frameworks:

> *"Then one of the last pillars you have, which is the metrics and goals pillar, is that metrics and goals for me speak to Governance. So, it is the governance around digital transformation and metrics and goals are just one of the important parts of it. So, I would include the relevant road maps under this category. OK, things like the digital initiative portfolio road map or the skills and capabilities road map with the decision-making framework and then the relevant KPI. I would make all of these the sub-items and rename this category as the Governance pillar because all of this ultimately speaks to how we govern transformation." (P15)*

Address overall governance

While the framework does encompass data governance in the context of big data analytics, participants P1 and P15 opined that the framework does not adequately address the overall governance aspect, which they considered a crucial element of DT. They suggested that the existing categories be expanded to include governance. It is worth noting that these statements from P1 and P15 did not dismiss the validity of the framework. P1 recommended augmenting the Leadership category to incorporate governance:

> *"One is around the Leadership category; you should probably expand this to Leadership and Governance; this talks about the right governance model relating to our discussion earlier, and with that, you need some sort of portfolio management of digital initiatives that goes across the organisation…. There are just too many powerhouses inside of the telco, and without the right governance structure and decisions being made at the right level, you're going to have transformation efforts being torpedoed unintentionally, but that is what is going to happen; that is what always happens." (P1)*

P8 expressed that ICT and cybersecurity and ICT regulation, which form an integral part of telco governance, were missing and required inclusion because the telecoms industry is highly regulated:

> *"The other thing that was missing for me in your Governance is regulations and cyber security. I see nothing around regulations because we've got so many regulations that govern telecoms." (P8)*

P9 emphasised that governance is very important during DT because to enable agility, the decision rights must be amended from a traditional telco.

> *"The third is the governance that should be put behind it because now it's a very different kind of organisation, and the decision rights need to change from the traditional telco to actually enable that agility of who makes what decisions at what levels." (P9)*

P3 and P10 also felt that governance was an important element of DT that was missing.

> *"The governance side is one of the things I'm trying to figure out; where do you put that into this structure, into these categories of yours because you need to, you need governance." (P3)*

> *"Have a clear governance framework for digital transformation." (P10)*

Add an enabling factor for data governance

Although, as mentioned above, the artefact framework accommodates data governance in the context of big data analytics, P9 expressed that the evolution of telcos in the digital era has given rise to new emerging regulatory compliance requirements and data privacy considerations. As a result, P9 suggested that the inclusion of a factor specifically dedicated to data governance would be advantageous. This would support the effort to ensure that data is governed and managed in a manner that aligns with the latest regulatory requirements and best practices.

> *"Then also the data governance, which obviously is very important when you're moving to digital given all the different regulatory requirements. So that's like a for me, a fourth, a clear one. Then there's data privacy and protection, which I think probably falls a bit more under regulatory that is critical. Then I'll say, finally, you had something on insights; I think it's beyond just your own data that you're able to gather on the customer, but also being very open and clear around third-party data also and infusing that into a whole data ecosystem so you get an even better understanding of the customer." (P9)*

Theme 2: Recommended New Additions to the Framework

This theme relates to the inclusion of entirely new categories and enabling factors, as proposed by the participants, to address the gaps or deficiencies in the artefact framework. The proposed additions aim to enhance the accuracy and completeness of the framework.

4.4.8 Sub-theme 8: Add a Change Management Category

Participants P9, P15 and P3 felt that the existing framework failed to acknowledge the pivotal role of change management and suggested augmenting the framework with a new category. According to P15, change management is an indispensable enabler in embedding change related to DT, and, without it, DT may not yield the desired outcomes. Change management is a discipline in its own right and requires due recognition. The proposed Change Management category was set to encompass various elements, including change leaders or agents, people journeys and project plans. As put forward by P15:

> *"Then I would suggest that you add a new pillar dealing with Change Management, and my logic for that is that digital transformation, unless you've got changed management as an enabling pillar, will not succeed because digital transformation is all about change, and that is a discipline on its own. Because it touches all parts of a business, you must have a dedicated Change Management programme that enables the digital transformation and this pillar could include some enabling factors like change leaders or agents, the people journey and the project plan, for example. But all I am saying is it may be important to have a Change Management pillar, and it's an enabling factor because often people want to sustain change, but they don't embed that change, and it gets lost. So, Change Management is a very focused effort, and it includes, for example, communication, onboarding of people, onboarding of teams and preparing the organisation for this change. As I spoke about communications, all of this is communicating the decision-making framework as an example, communicating governance as an example of these things are being addressed as part of your change management program." (P15)*

P9 expressed a similar view to P15, maintaining that change management is often overlooked, but is a critical enabler to sustain the change in traditional telcos.

"So, I think overall, you had most of those elements; maybe there is one or two that I touched on that you just want to consider either under your first buckets of categories or maybe in the detail factors. But then one that I've seen, which sometimes gets overlooked, is just the Change Management, especially when you have the traditional telco operating separately, and you've created these separate digital functions, you almost have very different organisations, and so how do you run these two in parallel and what's the type of culture you want to have across the entire business? Therefore, what Change Management is required, especially if you want the entire organisation to behave in an agile way; how do you get people's mindsets to shift to working very differently?" (P9)

P3 expressed similar views to P9 and P15:

"I think the other one you might need to touch on is an enabling factor or category, which is Change Management – people are used to doing things one way, but now you are giving them something brand new, you're doing something brand new, and people are resistant to that kind of change. You need to have specific enabling factors to deal with that as well." (P3)

4.4.9 Sub-theme 9: Add Strategy Execution Enablement (SEE)

"Strategy execution enablement" is the term used to refer collectively to the management of portfolios (digital initiatives or use cases), journeys and the project management office (PMO) (roadmaps). Participants P1, P8 and P15 considered these elements to be missing from the artefact framework. P1 believed portfolio management (selection of digital initiatives or use cases) and related journeys, in particular, to be critical for enabling strategy execution:

"So, I think that governance is one element and then portfolio management, which is a specific skill which includes selecting the right initiatives, knowing why you are selecting those initiatives, what returns you are going to get out of it, and how they are measured, so portfolio management is really important…. So, you need a very well-thought-out portfolio management, which basically means the selection of initiatives management needs to be rock solid…. Then, depending on what your strategy is, determine what the key journeys are that you need to implement, business journeys, customer journeys and then that's how you organise and your execution. So, each telco, in order to be successful, has to develop what these journeys are from a first principles approach and link to the strategy." (P1)

P8 considered the PMO function as crucial to DT strategy execution and believed that it should be an added enabling factor in the existing Strategy category.

"The strategies are only as good as their implementation. So, you've got the strategic element that's the phase one. The second phase is the implementation framework road map and support. The skill that you require is not just about the strategies; it is about understanding the strategy and the requirements to support the strategy and then translating that into implementational building blocks, and that is where things can fall flat. The implementation is key; we use the skill and the PMO element of the implementation, like the implementation road map and the project implementation framework, but also have a dedicated person with the relevant support to drive the implementation." (P8)

P15 saw all SEE elements as essential for governing DT execution and enablement. Hence, an additional enabling factor was suggested in the proposed Governance category:

"Then one of the last pillars you have, which is the metrics and goals pillar, is that metrics and goals for me speak to Governance. So, it is the governance around digital transformation and metrics and goals are just one of the important parts of it. So, I would include the relevant road maps under this category. OK, things like the digital initiative portfolio road map or the skills and capabilities road map with the decision-making framework and then the relevant KPI. I would make all of these the sub-items and rename this category as the Governance pillar because all of this ultimately speaks to how we govern transformation." (P15)

P4 highlighted the need for various journeys to enable DT strategy execution:

"I think one that could be added to this framework to really do the work of fundamentally redesigning what those journeys are, and in those journeys, you've got elements of what these transformational elements should look like." (P4)

P9 felt that SEE was lacking in the framework but that the Metrics and Goals category partially covered it. Additionally, she emphasised the importance of determining use cases (digital initiatives) to enable DT strategy execution:

"But once the vision is clear, you are then able to say what are all the key use cases that I want to put in place to enable the strategy. Those use cases then also help you to prioritise and create a road map, which I think may be something that may be missing a bit in the framework. Like how do you prioritise all the strategic levers so that you can enable all the use cases that enable your strategy? How do you figure out what is most important, right? That determines your road map because I think your last line on the metrics then informs exactly what you measure under each of those things." (P9)

4.4.10 Sub-theme 10: Add Financial Investment as an Enabling Factor

According to P2, it is crucial to include a budgetary aspect in the chief executive officer's (CEO) directive to cover the expenses linked with the implementation of DT. As DT entails substantial and profound changes, it can prove to be quite expensive, and a monetary commitment is indispensable for its successful execution. Depending solely on the CEO's mandate may not be sufficient to facilitate the DT process.

> *"No, I think they make sense. The only thing again that I would add over and above the CEO mandate is the budget allocation. Clear budget allocation on both the Opex and the Capex levels, and because these initiatives are not free and they're not cheap, so if they are not budgeted for with a clear objective, they're not going to happen as well." (P2)*

P2 suggested that the funding should reside in the Strategic enablement.

> *"So, I would make sure that when you talk about a strategic mandate from the CEO, that needs to come from leadership or strategic enablement, and I think strategic enablement is definitely where the budget is sitting there. Both the Opex and Capex budget to do this sit in strategic enablement, but metrics are different, in my opinion." (P2)*

During the interview, P4 recommended the inclusion of a financial investment factor as a matter of priority in the existing framework. The rationale behind this suggestion was that the realisation of DT is contingent upon securing financial resources. Therefore, the proposed addition aimed to address this critical aspect and ensure the successful implementation of DT. Furthermore, the recommendation was made to place the financial investment factor under the Resources category, given its fundamental significance as a financial resource:

> *"I think firstly what you could add in is the investments. So that's one option… but if a company or an organisation is thinking about transforming, you've got to think about money and investment. I mean, it's just very simple in terms of what, so maybe there is some way to add that in, I think, in terms of priority…I will put it in resources because money is a resource. Resources are humans, as in people to do the work, money is how to invest in it, and then technology is the IT assets, systems, etc., so that's the way I think about resources." (P4)*

P15's view was aligned with P2 in recommending that funding should be placed in the Strategic Case for Change pillar, which includes the CEO mandate.

> *"I will start with what you currently have listed as the Strategic Embeddedness category, and I would rename that to Strategic Case for Change and … this pillar will consist of a vision, the mandate, and how the digital strategy is aligned with the corporate strategy and the funding associated with that to support the digital transformation change." (P15)*

4.4.11 Sub-theme 11: Add Business Process as an Enabling Factor

P11 recommended that business processes be integrated into the framework. Business processes, as an essential enabler of the communication thread that interconnects an organisation's internal and external stakeholders, holds significant value. P11 stated:

> *"I think there are two things that I may want to add in, you may want to reflect on; one is the process which I didn't see, and it is a crucial part of the one thread that connects the rest of the organisation, how the leadership is talking to employees, employees talking to customers, customers talking to leadership and what you enable it." (P11)*

P11 highlighted the significant role that business process enablement plays in the development of digital asset environments.

> *"For those within that digital asset space, I think business process enablement plays a key role." (P11)*

4.4.12 Overall Conclusion of Findings Pertaining to Research Question 2

The findings related to RQ2 covered two key themes: (1) the appropriateness of the categories provides a thorough and precise classification for identifying the essential enabling factors, and (2) the proposed additional categories and enabling factors aimed at addressing the identified gaps enhance the accuracy and completeness of the framework.

The artefact framework consists of eight categories. Following the critical findings, there were only three categories for which a name change was recommended:

a) Three participants recommended that the Strategic Embeddedness category be renamed in order to reflect its objectives more accurately and align it more closely with its intended purpose.
b) Two participants recommended that the Digital Resources category be renamed as the Digital Resources and Capabilities category because the New digital roles and skills enabling factor was moved to this category from the Employee Attitude and Development category, and the new name needed to reflect this change.
c) Two participants suggested renaming the Metrics and Goals category as the overall Governance category. According to them, metrics and goals are closely related to governance, and since the existing framework did not have an overall Governance category, it would be the most suitable category in which to accommodate metrics and goals.

The name changes proposed for the Digital Resources category and the Metrics and Goals category were a result of changes recommended by participants. Apart from the Strategic Embeddedness category, the remaining categories of the artefact framework appropriately offer a comprehensive and precise classification for identifying the essential enabling factors.

4.5 Summary of the results and findings

Although the artefact framework was widely acknowledged to be comprehensive and valid, it was not complete since some of the participants highlighted certain essential categories and enabling factors that were missing from the framework. These have been listed in Table 13.

Table 4.4 provides a summary of the findings related to RQ1.

Table 4.4: Findings related to RQ1

Sub-theme	Findings
1. **Framework comprehensiveness and validity**	All participants mostly or fully appreciated the framework's comprehensiveness and validity. Ten of the 15 participants provided very favourable feedback regarding the framework.
2. **Simplification for easy communication**	Certain participants specifically highlighted the need for simplification of the framework to facilitate better communication. They all felt that the framework was too detailed since it had too many categories, which could be intimidating and overwhelming for organisations to work through. It was, therefore, worth aggregating or consolidating these categories not to only simplify the framework but also to make it more memorable. It is worth noting that their feedback did not challenge the comprehensiveness and validity of the framework.
	P15 expressed that the table format of the framework was not conducive to effective communication since it appeared to be a tick sheet and suggested that a diagram be used instead to facilitate better understanding, easier implementation and enhanced memorability of the framework.
3. **Recommendations for structuring the framework**	Three participants provided recommendations for how to structure the framework.
	P4 suggested that the framework should be structured into five elements: 1) Strategy, 2) Insights, 3) Operations, 4) Customer and 5) Enablement.
	P6 proposed that the artefact framework should be restructured, with experiences as the central category linked to all other existing categories since experiences play a crucial role in driving the entire DT process.
	P15 suggested changing the "category" label to "pillar" and using an illustration of a house to structure the framework. To simplify the framework, P15 proposed aggregating categories into pillars. These pillars would be further grouped into three main types of "enablers": Visionary Enablers, Structural Enablers and Foundational Enablers. P15 provided an illustrative view of the proposal, which is depicted in Figure 15.

The findings related to RQ2 have been categorised into two groups: A) Critical findings and B) Minor findings. The critical findings are divided into two subcategories: 1) Essential categories or enabling factors that are missing from the framework (Table 4.5), and 2) Simplification of categories (Table 4.6). The

minor findings (Table 4.5) mainly consist of suggested improvements or modifications to existing enabling factors within the current categories.

Table 4.5: Findings related to RQ2: Missing Essential Categories or Enabling Factors

Category / Factor	Findings: Missing essential categories or enabling factors	DDCF Elements
1. Change Management	Add Change Management category.	Improving Digital Maturity
2. The Metrics & Goals and Governance	Add Governance category.	Strategic Agility
	Change the existing Metrics & Goals category name to Governance.	Balancing Digital Portfolios
3. Strategy, Vision and SEE	Change the Strategy Embeddedness category name.	Digital Mindset Crafting
	Add a clear DT strategy and vision.	
	Add Strategy Execution Enablement (SEE).	
4. Financial Investment	Add Financial Investment as an enabling factor.	Balancing Digital Portfolios
5. Business Processes	Add Business Process as an enabling factor.	Improving Digital Maturity

Furthermore, there were critical findings also related to the simplification and aggregation of categories with the ultimate aim of simplifying the framework. These have been captured in Table 4.6.

Table 4.6: Findings related to RQ2: Simplification of Categories

Category/ Factor	Findings: Simplification of categories
1. Digital Resources Category	Move digital roles and skills from the Employees category to the Digital Resources category.
	Rename the Digital Resources category as the Digital Resources and Capabilities category to reflect the above change.
2. Organisational Structure Category	Simplify the Organisational Structure category by consolidating the enabling factors for each type of agile organisation into one enabling factor to provide a more concise and simplified view of the category.
3. Overarching Operating Model Pillar	To reduce the number of categories, create an overarching Operating Model pillar that will encompass the existing Organisational Structure category and the existing Metrics category (with the suggested name change to Governance) into a new overarching pillar called the Operating Model Pillar.
Category/ Factor	**Findings: Simplification of categories**

4. Employee Attitude & Development Category	Consolidate Employee Attitude factors that are interrelated through a shared theme of perceptions and attitudes into one enabling factor to provide a more simplified view of the category.
5. Organisational Culture Category	Consolidate Organisational Culture factors that are interrelated through a shared theme of communication and resilience into one enabling factor to provide a more simplified view of the category.
6. Overarching Culture Pillar	To reduce the number of categories, create an over-arching Culture pillar since categories of Organisational Culture and Employees both relate to the concept of Culture but from different perspectives, i.e. from an organisation and individual employee perspective.

Lastly, there were minor findings that mainly consisted of improvements or additions to existing enabling factors within the current categories. These have been captured in Table 4.7.

Table 4.7: Findings related to RQ2: Minor Findings Additional Enabling Factors to Existing Categories

Category	Minor Findings per Category
1. Digital Resources category	Add a specific enabling factor for AI to highlight its prominence.
2. Organisational Structure category	Include platform ecosystems as an agile structure.
3. The Customer category	Address the missing aspects related to the Customer category.
	The customer is a central strategic driver.
4. Governance category	Add a specific data governance enabling factor.

4.6 Overall Conclusion of Findings

The overall conclusion for RQ1 is that the artefact framework was comprehensive and valid but not complete since there were essential categories and enabling factors missing.

Regarding RQ2, the name changes indicated for the Digital Resources and the Metrics and Goals categories were changes recommended by participants. This indicates that, apart from the Strategic Embeddedness category, for the participants the remaining categories of the artefact framework offered a comprehensive and precise classification of the essential enabling factors.

The following chapter discusses and interprets these findings in the context of the literature review presented in Chapter 2.

CHAPTER 5. DISCUSSION OF THE FINDINGS

This chapter provides a comprehensive discussion and interpretation of the findings from Chapter 4 within the context of the literature review presented in Chapter 2. The discussion is structured around the research questions designed to validate the artefact framework developed from the literature review.

5.1 Discussion of Findings for Research Question 1

RQ1: Is the artefact framework a comprehensive and accurate representation of crucial enabling factors of digital transformation for telecommunications organisations in South Africa?

The artefact framework comprises eight categories derived from a literature review of five frameworks (Aghayari et al., 2022; Rueckel et al., 2020; Trenerry et al., 2021; Verhoef et al., 2021; Vial, 2019). RQ1 aimed to determine whether the artefact framework provided a comprehensive and accurate representation of the crucial enabling factors of DT for telecommunications organisations in South Africa. The following section discusses each finding in relation to the literature review.

5.1.1 Framework Comprehensiveness and Validity

Establishing the Academic Validity of the Framework

The artefact framework was developed to identify the necessary prerequisites and key determinants, such as enabling factors and dynamic capabilities, that can improve an organisation's ability to transform digitally. To achieve this goal, a comparative analysis of five frameworks with similar objectives was conducted to articulate the key enabling factors that support DT.

The literature review presented in Chapter 2 served as the foundation to establish the academic validity of the categories, the associated enabling factors and, as a result, the framework. It is important to note that Section 2.4.7 in Chapter 2 offers a comprehensive explanation of the development of the categories and their corresponding enabling factors according to the literature review. For this reason, this section does not reiterate the details of the enabling factors.

The artefact framework consists of eight categories: (1) Digital resources; (2) Organisational structure; (3) Strategic embeddedness; (4) Leadership; (5) Organisational culture; (6) Employee attitudes and development; (7) Customer; and (8) Metrics and goals.

(1) Digital Resources: This category was derived from the study conducted by Verhoef et al. (2021).

The Digital Resources category as identified by Verhoef et al. (2021) is similar to Rueckel et al.'s (2020) Organisational Infrastructure category, Vial's (2019) Digital Technologies category and Aghayari et al.'s (2022) Technology category.

The Digital Resources category developed for the study consists of four enabling factors as essential digital assets and capabilities required for DT: (1) digital assets; (2) digital agility; (3) digital networking capability; and (4) big data analytics capability.

The participants unanimously agreed on the validity of the category and the related enabling factors in question. However, two participants proposed Digital Resources and Capabilities as a more fitting name for the category. This recommendation is further discussed as part of the findings regarding RQ2.

(2) Organisational Structure: This category also took its name from the study conducted by Verhoef et al. (2021). This category includes having a flexible organisational structure that can accommodate digital change.

The Organisational Structure category used in the study consists of four enabling factors, which are essential types or forms of organisational structures that will promote the DT: (1) agile organisational forms; (2) separate business units; (3) digital functional areas; and (4) cross-functional teams. Enabling factors one to three take their names from the study conducted by Verhoef et al. (2021). Enabling factor four takes its name from the study conducted by Vial (2019).

All participants unanimously supported the validity of the category and its related enabling factors. However, two participants proposed consolidating all the factors as they all pertained to an agile organisational structure. These recommendations are further discussed as part of the findings for RQ2.

(3) Strategic Embeddedness: This category was derived from a category presented in the study conducted by Rueckel et al. (2020). These authors reviewed DT literature that suggested that adopting a strategic approach to DT is a fundamental prerequisite for organisations to ensure that their DT initiatives are sustainable. Ensuring sustainable DT initiatives will ultimately lead to tangible business benefits (Bharadwaj et al., 2013; Matt et al., 2015).

The Strategic Embeddedness category, as identified by Rueckel et al. (2020), is similar to the Strategic Response category described by Vial (2019) and the Growth Strategy category identified by Verhoef et al. (2021).

The Strategic Embeddedness category is made up of one enabling factor called Digital Growth strategies, which incorporates Traditional growth strategies; Platform-based growth strategies; DBS; and DTS.

All participants agreed regarding the category's validity and the significance of its associated enabling factors. However, three participants recommended renaming the category to reflect its purpose better. They also suggested including separate enabling factors for the DT strategy and vision, as these factors were currently not visible within the category. These recommendations are further discussed as part of the findings for RQ2.

(4) Leadership: This category was derived from the study conducted by Trenerry et al. (2021), who consider strong leadership during DT as critical for the performance of the organisation and its employees.

The Leadership category, as identified by Vial (2019), is similar to the Digital Leadership category outlined by Rueckel et al. (2020) and the Leadership factor identified by Aghayari et al. (2022). All of these three frameworks relate more to leadership skills, in contrast to Trenerry et al.'s (2021) framework, which addresses the soft issues related to employees and leadership and presents views on leadership styles.

The Leadership category consists of two enabling factors: (1) Digital leadership style and (2) Digital leadership skills.

All participants agreed regarding the category's validity and the significance of its associated enabling factors.

(5) Organisational Culture: While this category derived its name from the study conducted by Vial (2019) its focus was based on the study conducted by Trenerry et al. (2021).

The Organisational Culture category as identified by Vial (2019) is very similar to the Organisational Values category discussed by Rueckel et al. (2020). The category as defined by Trenerry et al. (2021) is different as it addresses the soft issues related to organisational culture and HR transformation. The Aghayari et al. (2022) framework also has a Culture category; however, the information is relatively high-level and relates more to the individual employee than the organisation.

This Organisational Culture category consists of five enabling factors, which are organisational culture characteristics that promote the DT. These are: (1) Learning organisation; (2) HR transformation; (3) Team communication and collaboration; (4) Workplace relationship and team identification; and (5) Team resilience and adaptability.

All participants agreed regarding the category's validity and the significance of its associated enabling factors. To streamline the categories and framework and make them more concise, two participants suggested consolidating interrelated Organisational Culture enabling factors. These recommendations are further discussed as part of the findings for RQ2.

(6) Employee Attitude and Development: This category was created in accordance with the study conducted by Trenerry et al. (2021).

Trenerry et al.'s (2021) categories differ substantially from those presented by Rueckel et al. (2020), Vial (2019) and Verhoef et al. (2021). Trenerry et al.'s (2021) study focuses on employee-related factors facilitating DT. In contrast, Rueckel et al. (2020), Vial (2019) and Verhoef et al. (2021) focus more on business and technology. The category was included to provide a comprehensive view of DT that included both business and employee perspectives.

This Employee Attitude and Development category consists of six enabling factors: (1) New digital roles and skills; (2) Employee learning motivation; (3) Technology acceptance and adoption; (4) Perceptions and attitudes towards technology; (5) Workplace resilience and adaptability; and (6) Work-related stress and well-being.

All participants agreed regarding the category's validity and the importance of its associated enabling factors. However, the following changes were recommended by the participants: (1) relocate the Digital roles and skills factor from the Employee category to the Digital Resources category; (2) consolidate interrelated Employee enabling factors; and (3) create an overarching Culture Pillar, with two sub-pillars dedicated to the organisation and the individual perspectives. These recommendations are further discussed as part of the findings for RQ2.

(7) Customer: This category was created in accordance with the study conducted by Aghayari et al. (2022).

According to the Aghayari et al. (2022) study, the DT of customers plays a vital role in the digital strategies developed within the telecom industry. As such, it is essential to monitor customer perceptions and the service they receive throughout the DT process. Aghayari et al.'s (2022) study also recommends that the customer experience, customer contact points and customer insight criteria of the Weber customer index are the most effective and important metrics in measuring this.

All participants, apart from one, agreed on the validity of the category and the importance of its associated enabling factors. The participant who did not see the category as valid misconstrued the context and objective of this category owing to their preconceived ideas about the customer's role. This feedback will be further discussed as part of the findings for RQ2.

(8) Metrics and Goals: This category took its name from a similar category discussed in the study conducted by Verhoef et al. (2021). These authors found that to leverage the advantages of DT effectively, it is imperative for digital organisations to monitor and evaluate their progress throughout the DT process and make the necessary adjustments to enhance performance in the future. This can be achieved by implementing and analysing KPIs, which serve as valuable metrics in assessing the success of a DT strategy.

This Metrics and Goals category consists of three enabling factors, which are used to measure for the different phases of DT and different kinds of organisations: (1) Metrics for different phases of DT; (2) Digital organisation metrics; and (3) Digitally transforming incumbent organisation metrics.

All participants found the Metric and Goals category to be valid and agreed on the importance of its associated enabling factors. One participant suggested renaming the Metrics and Goals category as the Governance pillar. This proposal is examined in greater detail as part of the findings for RQ2.

Conclusion on the Validity of the Framework

The findings discussed above establish the academic validity of the categories and the associated enabling factors and, as a result, the framework. This was confirmed through the interviews as most participants expressed positive views about the comprehensiveness and validity of the framework. Specifically, 10 of the 15 participants provided highly favourable feedback on the framework. Nonetheless, a few participants felt that the framework needed to be completed owing to the absence of specific key categories and enabling factors. These concerns are further addressed in the critical findings section related to RQ2.

5.1.2 Simplification for Easy Communication

A recurring theme throughout the interviews was the importance of a more streamlined version of the framework to improve its communication to organisations. Participants expressed concern that the current framework was overly complex since it contained an excessive number of categories, which could prove daunting for organisations to navigate. The participants recommended aggregating or consolidating the categories to achieve a simplified and more memorable framework.

P15 expressed that there might be a more effective means of communicating the framework than its current table format. Specifically, it was suggested that the table format might be perceived as a tick sheet, which could hinder the effective communication of the framework. As an alternative, it was suggested that an illustration be used to facilitate better understanding, more straightforward implementation and enhanced memorability of the framework. Given the close relationship between this recommendation and the subsequent set of recommendations (Section 5.1.3), they are addressed in conjunction.

5.1.3 Recommendations for Structuring the Framework

Three participants provided recommendations on how to structure the framework.

P4 suggested that the framework should be structured into five elements: 1) Strategy; 2) Insights; 3) Operations; 4) Customer; and 5) Enablement. P6 proposed that the current framework should be restructured, with “Experiences” as the central category linked to all other existing categories since experiences play a crucial role in driving the entire DT process. P15 suggested changing the “category” label to “pillar” because the label “categories” is not communicative. Additionally, they suggested using an illustration of a house to structure the framework and, to simplify the framework, proposed aggregating categories into pillars. These pillars would be further grouped into three main types of enablers: Ambition enablers, Structural enablers and Foundational enablers. P15 also provided an illustrative view of the proposal, as depicted in Figure 4.1 in Chapter 4.

To evaluate the proposed simplifications and restructuring recommendations for the framework, an assessment was conducted of the figures used to present the DDC model (Theory Base) and the five frameworks that were utilised to derive the artefact framework. These models and frameworks are depicted in Figures 6 to 11 in Chapter 2 and are summarised below:

a) ***Building Digital Dynamic Capabilities for Digital Transformation: A Process Model (Warner & Wäger, 2019)****:* The framework introduces a process model that comprises seven essential elements and 18 sub-elements. Despite its complexity, the model is designed to be readily comprehensible and relatable, given its process-oriented depiction. This approach facilitates a clear understanding of how the various elements interrelate and contribute to the overall process.

b) ***Managerial Relationship among Categories: Structure and Framework (Rueckel et al., 2020)****:* A straightforward illustration outlines the managerial relationship between the four normative layers and

categories and their interrelationships. This illustration is accompanied by a framework that is presented in table form and that showcases the four normative layers, four categories, and nine enabling factors, each with a brief description.

c) ***Inductive Framework – Foundational Components of Digital Transformation (Vial, 2019)****:* The framework is visually presented as an illustration featuring eight essential building blocks within the DT process flow. On average, each block contains three key elements. Despite the number of components, the framework is visually engaging and straightforward to comprehend. Its organised structure presents the DT process as a cohesive whole, making it easy to understand the interrelationship between the various building blocks.

d) ***Flow Model for Discussion on Digital Transformation Process (Verhoef et al., 2021)***: This framework is demonstrated through a widely recognised flow model that consists of three essential blocks in the process flow: (1) Drivers of DT; (2) Phases of DT; and (3) Strategic Imperatives of DT, along with their interconnectedness. Each block encompasses approximately three elements. The model's simplicity makes it easily comprehensible.

e) ***A Multi-level Framework for Workplace Digital Transformation (Trenerry et al., 2021)****:* This framework is exemplified as a straightforward illustration that showcases three essential blocks, representing the three distinct levels of the framework: Individual, Group and Organisational. Each level comprises an average of four factors, making the model comprehensible and user-friendly.

f) ***Effective Factors of Digital Transformation Strategies in the Telecom Industry of Iran (Aghayari et al., 2022)****:* The study's outcomes are depicted in a clear and concise graphical representation that effectively presents the importance weightings of the top six categories.

Conclusion on the Simplification and Restructuring of the Framework

The assessment of the presented models and frameworks showed that each of them was depicted as a visually engaging illustration. This approach significantly aided in comprehending the interconnections between the different components of the model, rendering the information more accessible and simpler to remember. The visual representation of the model components facilitated a better understanding of complex ideas and concepts.

Considering this view, the recommendation by P15 to use an illustration was invaluable and, therefore, was accepted. The proposed illustration presented by P15 is a well-established and widely accepted strategy template that executives are accustomed to using. Using this template as a basis for the framework could be a highly effective approach for conveying information and concepts to a diverse audience in both business and academic settings. This could be expected to enhance the framework's understanding, implementation and memorability notably.

5.2 Discussion of Findings for Research Question 2

RQ2: Do the categories of the artefact framework provide a thorough and precise classification for identifying the essential enabling factors?

RQ2 was intended to establish whether the categories that were derived from the literature review of five frameworks (Aghayari et al.,2022; Rueckel et al., 2020; Trenerry et al., 2021; Verhoef et al., 2021; Vial, 2019) provide a thorough and precise classification for identifying the essential enabling factors of DT.

During the interviews, the primary focus concerned two key areas related to RQ2. In the first key area, the aim was to ascertain whether the categories within the artefact framework provided a comprehensive and precise method of classifying the essential enabling factors. In the second key area, the aim was to identify any

crucial categories or enabling factors that the framework might not encompass and needed inclusion.

The findings related to RQ2 have been categorised into two groups: A) Critical findings and B) Minor findings. The critical findings group is divided into two subcategories: 1) Essential categories or enabling factors missing from the framework and 2) Simplification of categories. The minor findings group mainly consists of improvements or insignificant additions to existing enabling factors within the current categories.

The section below discusses each finding in relation to the literature review.

A. Critical Findings: Essential categories or enabling factors that are missing from the framework

Table 5.1: Missing Essential Categories or Enabling Factors

Category /Factor	Missing essential categories or enabling factors	Contributors
1. Change Management	Add Change Management Category.	P3, P9, P15
2. The Metrics & Goals and Governance	Add Governance Category.	P1, P3, P8, P9, P10, P15
	Change the existing Metrics & Goals category name to Governance.	P15
3. Strategy, Vision and SEE	Change the Strategy Embeddedness category name.	P9, P13, P15
	Add a clear DT strategy and vision.	P9, P10, P15
	Add Strategy Execution Enablement.	P1, P4, P8, P9, P15
4. Financial Investment	Add Financial Investment as an enabling factor.	P2, P4, P15
5. Business Processes	Add Business Process as an enabling factor.	P11

5.2.1 Add Change Management Category

According to three participants, the existing framework needs to recognise the importance of change management. This is an essential enabler in embedding change associated with DT, as, without it, DT may not yield the desired outcomes. Change management is a discipline in its own right and requires due recognition.

The participants suggested adding a new category to the framework that encompasses change leaders, people journeys, project plans and other elements related to change management.

The comprehensive literature review presented in Chapter 2 revealed that change management was not included as an enabling factor in any of the five frameworks (Aghayari et al., 2022; Rueckel et al., 2020; Trenerry et al., 2021; Verhoef et al., 2021; Vial, 2019) analysed. It is worth noting that the limited coverage of DT and change management in the five frameworks could be attributed to the authors' perception of these two disciplines as distinct and separate processes that are related but not necessarily integrated. This may reflect a broader academic debate on the relationship between DT and change management and the extent to which they should be integrated or treated as separate fields of study.

This finding is of significant academic and practical importance as it highlights the crucial need for organisations to recognise the pivotal role of change management in embedding the fundamental change resulting from DT. Considering this view, change management was integrated into the framework as it incorporates practitioners' viewpoints and promotes a holistic approach to the DT process. This approach encompasses various stages, including planning, implementation and the assimilation of DT-related changes.

5.2.2 Add Governance Category

While the framework does encompass data governance in the context of big data analytics, six participants opined that it needs to address the overall governance aspect adequately, as they consider this to be a crucial element of DT. P1 believed that there were too many powerhouses inside of the telco, and without the proper governance structure and decisions being made at the right level, DT efforts could be unintentionally torpedoed.

In terms of the literature review, the study conducted by Aghayari et al. (2022) incorporated the Governance category in its list of categories. According to the study's findings, implementing DT in regulation-intensive industries such as the telecom industry necessitates a robust framework of governance and legislation.

It is worth noting that the other four frameworks (Rueckel et al., 2020; Vial, 2019; Verhoef et al., 2021; Trenerry et al., 2021) did not cover all the factors identified in the Governance category by Aghayari et al. (2022). As a result, when preparing the artefact framework, only the common factors (Leadership and Data Sovereignty (Governance)) were considered. At the time, the lack of coverage of governance factors was attributed to the fact that the study was conducted from the perspective of the Iranian Telecom Ministry rather than from an organisation's viewpoint. For a comprehensive perspective, Table 7 in Chapter 2 furnishes a detailed view of the Governance category, and the shared elements present among the frameworks.

Following the review of the relevant literature, it was determined that a Governance category was warranted within the framework.

5.2.3 Change the Existing Metrics & Goals Category Name to Governance

P15 proposed that the name of the Metrics and Goals category be changed to the Governance pillar. This proposal's rationale was that metrics and goals are closely linked to governance. Furthermore, P15 suggested that the Governance pillar should encompass the digital initiatives portfolio, relevant roadmaps, decision-making frameworks and KPIs.

Verhoef et al.’s (2021) study identified four categories of strategic imperatives for DT: (1) Digital resources; (2) Organisation structure; (3) Digital growth strategies; and (4) Metrics and goals. According to Verhoef et al. (2021), to harness the benefits of DT fully, digital organisations must be able to measure progress and refine future performance. This is accomplished using KPIs.

Verhoef et al. (2021) were not prescriptive regarding which category should encompass the Metrics and Goals, which resulted in the creation of a separate category in the artefact framework. However, to enhance the framework's efficiency and coherence by minimising the number of categories, it would be beneficial to accept P15's suggestion of renaming the Metrics and Goals category as Governance.

It is worth noting that Metrics and Goals (KPIs) should be viewed as a crucial component of the recommended Strategy Execution Enablement (SEE) factor within the Strategy category or the proposed Governance (see Section 5.2.6). This is because of their vital role in monitoring progress and providing valuable insights into the effectiveness of different approaches. This suggestion is supported by the findings of Verhoef et al.'s (2021) study.

According to Verhoef et al.'s (2021) study, metrics are vital for all phases of DT, but the KPIs used may vary across these phases. As an organisation undergoes digitisation and digitalisation, it is common for metrics to be adjusted and updated. Intermediate "digital" metrics are particularly valuable during the DT phase since they offer more detailed insights, allowing for more thorough analysis and refinement.

5.2.4 Change the Strategy Embeddedness Category Name to Strategic Case for Change

Three participants suggested renaming the Strategic Embeddedness category as it only applied to the implementation phase of DT and did not address the strategic objective of the category. P13 suggested changing the name to Strategic Clarity, while P9 recommended changing it to Strategic Direction. P15 suggested that the category be renamed Strategic Case for Change Pillar, as this would more accurately convey its objectives.

The Framework's Strategic Embeddedness category derives its name from Rueckel et al.'s Digital Transformation Enabling Framework (2020), which

highlights the importance of incorporating DT into an organisation's overarching strategy.

To assess the validity of the suggestion, a thorough examination of the nomenclature utilised for the Strategy category in other frameworks was conducted. Vial's (2019) research refers to this category as "Strategic Response", while Verhoef et al.'s (2021) work denotes it as "Growth Strategy".

Upon careful consideration of the information reviewed, it became evident that a renaming of the category was imperative. The decision was made to adopt the name "Strategic Case for Change" for the category as it best encapsulates the strategic reasoning and objectives associated with it.

5.2.5 Add Digital Transformation Strategy and Vision

Participants P9, P10 and P15 believed a clear strategy and vision to be the most critical aspects of a telco's DT. According to them, a clear strategy and vision provide a view of the organisation’s objectives and goals and how they plan to achieve them. They suggested that the vision should be included in the Strategy category and be the North Star guiding the DT journey. Additionally, they suggested having an overarching DT strategy and a strong and compelling "case for change" that encompassed the vision, mandate, corporate-aligned digital strategy and funding associated with the DT change.

In relation to the literature presented in Chapter 2, Section 2.4.7, specifically with respect to the discussion on the Strategy category, Rueckel et al. (2020) and Vial's (2019) studies provide evidence for the necessity of a clear and well-defined DT strategy. Their studies discuss using a DBS and DTS, which leverage technologies to achieve the organisation’s vision.

It is worth noting that the study by Aghayari et al. (2022) highlighted the crucial role played by senior executives in shaping and communicating their organisation's digital vision. However, the other four frameworks used to develop

the artefact framework did not account for the importance of a clear DT vision. While it is plausible that these frameworks were more focused on planning rather than implementation, it is essential to consider the perspective of practitioners to create a more comprehensive framework that covers both aspects. For this reason, the recommendation to include separate enabling factors for both the DT strategy and vision within the framework was accepted.

5.2.6 Add Strategy Execution Enablement (SEE)

The term "Strategy Execution Enablement" encompasses portfolio management, journeys KPIs and the PMO. Participants P1, P4, P8, P9 and P15 considered that these elements were missing from the current framework. P1 believed that portfolio management and journeys are crucial for enabling strategy execution. P8 suggested that the PMO function is vital for DT strategy execution, and P15 considered all strategy execution elements to be essential for governing DT execution and enablement. Therefore, an additional enabling factor was suggested in the Strategy or proposed Governance categories.

The literature review revealed that the five frameworks (Aghayari et al., 2022; Rueckel et al., 2020; Trenerry et al., 2021; Verhoef et al., 2021; Vial, 2019) that were used to develop the artefact framework did not account for the importance of having strategy execution enablement in place. While it can be inferred that the frameworks primarily focused on planning rather than implementation, the practitioner perspective is deemed essential in augmenting the comprehensiveness of the frameworks. Therefore, the recommendation to incorporate a separate enabling factor for strategic execution enablement within the framework was accepted.

5.2.7 Add Financial Investment as an Enabling Factor

Three participants believed that while the framework is robust, it is imperative to incorporate a budgetary component in the CEO mandate to account for the costs associated with implementing DT. Given the extensive and fundamental nature of the change, DT can be costly, and a financial commitment is essential to bring it to fruition. One participant suggested that the funding should be placed in the Resources category because it is a financial resource. In contrast, two other participants recommended that the funding be placed in the Strategic Case for Change Pillar.

The literature review indicated that the five frameworks (Aghayari et al., 2022; Rueckel et al., 2020; Trenerry et al., 2021; Verhoef et al., 2021; Vial, 2019) used to develop the artefact framework did not account for the importance of having financial investment as an enabling factor. It is imperative to note that financial investment or funding is a crucial yet practical element of facilitating DT. Furthermore, the five frameworks focus on general organisations globally, which may only partially apply to South African telcos. For example, the challenge of electricity load shedding in South Africa vastly increases the cost of operations for local telcos, which leaves them with significantly less capital to invest in competing demands. This stands in stark contrast to the situation of their global peers.

Overall, the review underscores the need for this study to create a framework that considers the unique challenges faced by South African telcos and accounts for financial investment as a crucial component of DT. This makes the practitioner perspective critical for enhancing the comprehensiveness of the frameworks as it will cover the unique challenges that South African telcos face regarding DT, thus providing a holistic framework tailored to them. Hence, the recommendation to incorporate a separate enabling factor for financial investment (budget) under the Strategic Case for Change Pillar in the framework was accepted.

5.2.8 Add Business Processes as an Enabling Factor

One participant recommended that business processes be integrated into the framework. As business processes are an essential enabler of the communication thread that connects an organisation's internal and external stakeholders, this participant also highlighted the critical role of business-process enablement in developing digital-asset environments.

The literature review found that three frameworks discussed business processes in the context of digital platform infrastructure (Rueckel et al., 2020) or using digital technologies to optimise processes (Verhoef et al., 2021; Vial, 2019). However, none of these studies specifically categorised business processes as an enabling factor. Possible reasons for the lack of academic substantiation may be attributed to the adoption of either a highly granular or domain-specific approach. Given the available information, business-process enablement was captured as part of the digital asset enabling factor within the Digital Resources and Capabilities category.

B. Critical Findings: Simplification of Categories or Enabling Factors

Table 5.2: Simplification of Categories or Enabling Factors

Category/ Factor	Simplification of categories or enabling factors	Contributors
1. Digital Resources Category	Move digital roles and skills from the Employee to the Digital Resources category.	P9, P15
	Rename the Digital Resources category to the Digital Resources and Capabilities category to reflect the above change.	P12, P15
2. Organisational Structure Category	Simplify the Organisational Structure category by consolidating the enabling factors for each type of agile organisation into one enabling factor to provide a more concise and simplified view of the category.	P13, P15
3. Overarching Operating Model Pillar	To reduce the number of categories, create an overarching pillar called the Operating Model Pillar, which will encompass the existing Organisational Structure category and the existing Metrics category (suggested name change to Governance).	P15

Category/ Factor	Simplification of categories or enabling factors	Contributors
4. Digital Resources Category	Move digital roles and skills from the Employee to the Digital Resources category.	P9, P15
	Rename the Digital Resources category to the Digital Resources and Capabilities category to reflect the above change.	P12, P15
5. Organisational Structure Category	Simplify the Organisational Structure category by consolidating the enabling factors for each type of agile organisation into one enabling factor to provide a more concise and simplified view of the category.	P13, P15
6. Overarching Operating Model Pillar	To reduce the number of categories, create an overarching pillar called the Operating Model Pillar, which will encompass the existing Organisational Structure category and the existing Metrics category (suggested name change to Governance).	P15

5.2.9 Simplifications related to the Digital Resources Category

During the interviews, two participants, P9 and P15, proposed relocating the enabling factor of digital roles and skills from the Employee category to the Digital Resources category. P12 and P15 then suggested that, subsequently, the Digital Resources category should be renamed Digital Resources and Capabilities to reflect this change accurately.

In terms of the literature presented in Chapter 2, Section 2.4.7, specifically with respect to the discussion on the Digital Resources category, the category encompasses both assets and capabilities. Considering the literature review, the recommendations hold merit. As a result, the proposal to relocate the digital roles and skills enabling factor from the Employee category to the Digital Resources category and subsequently renaming it the Digital Resources and Capabilities category was accepted.

5.2.10 Simplifications related to the Organisational Structure Category

During the interviews, two participants suggested streamlining the Organisational Structure category by merging the enabling factors for each type of agile organisation into a single enabling factor. This approach would offer a more succinct and simplified perspective of the category. The reasoning behind this suggestion was that not all these factors are enabling factors. Some are illustrations or variations of organisational structure that can be employed to support DT. Thus, it could be misleading to present them as distinct enabling factors.

The category of Organisational Structure as developed for the framework draws heavily from the research conducted by Verhoef et al. (2021). These authors highlight the importance of making necessary organisational changes to adapt to DT (Eggers & Park, 2018). They also discuss the different forms of flexible organisational structures that can support this change. As such, it is accurate for participants to view having a flexible organisational structure as the sole enabling factor for DT. The various forms discussed are examples of what constitutes a flexible structure. Therefore, the recommendation was accepted.

5.2.11 Create an Overarching Operating Model Pillar

To reduce the number of categories, two participants suggested encompassing the existing Organisational Structure category and the existing Metrics category (with the suggested name change to Governance) under a new overarching pillar called the Operating Model Pillar.

The presentation of the artefact framework in a table of categories and enabling factors was adapted from Rueckel et al.'s initial study: "The Initial Enabling Factors Framework" (Muehlburger et al., 2019). In a later study (Rueckel et al., 2020), the table was enhanced by adding a normative or aggregated layer, which effectively captures multiple categories or enabling factors. This update has

improved the framework's efficiency and clarity, making it more user-friendly. Furthermore, from a strategic standpoint, the organisational structure and governance of an organisation are essentially part of the Operating Model, making it logical to aggregate these two categories into the Operating Model Pillar.

According to the aforementioned perspective, the proposed recommendation to aggregate the categories pertaining to organisational structure and governance into an overarching Operating Model pillar with the aim of streamlining and simplifying the framework was accepted.

5.2.12 Simplifications related to the Employee Attitude and Development Category

Two participants recommended consolidating Employee Attitude enabling factors (6.3 to 6.6 in the artefact framework in Table 8) interrelated by a common theme of perceptions and attitudes into a single enabling factor. This recommendation aimed to streamline the categories and framework and make them more concise.

Enabling factors 6.3 to 6.6 were derived from Trenerry et al.'s (2021) study. With reference to the literature presented in Chapter 2, Section 2.4.7, specifically with respect to the discussion of these enabling factors within the Employee Attitude and Development category, the individual factors were assessed to determine the validity of the recommendation. The Trenerry et al. (2021) study found the following regarding enabling factors 6.3 and 6.4:

(6.3) Technology Acceptance and Adoption: Employees are more likely to adopt new technology if they believe it will be beneficial and support them in improving their work performance. The adoption of technology depends on contextual factors such as demographics, work experience and how well the technology supports its intended purpose. Resilience and training opportunities are critical factors in employees' adoption and acceptance of technology.

(6.4) Perceptions and Attitudes towards Technology (6.4): Employees are generally willing to support new technologies, but attitudes and perceptions towards technology vary according to factors such as demographics, occupational factors and technology type. Negative attitudes arise when technology is perceived as causing job losses, resulting in increased psychological and emotional stress, decreased work commitment and reduced career satisfaction. Negative perceptions and outcomes can be minimised by perceived organisational support. Employees who value autonomy, competence and engagement tend to support DT more.

Drawing upon the related literature review, it can be inferred that the enabling factors Technology Acceptance and Adoption (6.3) and Perceptions and Attitudes towards Technology (6.4) are interrelated. As per the findings of Trenerry et al.'s (2021) study, employees exhibit a willingness to embrace new technologies. However, their decision to accept and adopt such technology is influenced by their perceptions and attitudes towards the potential benefits or drawbacks of the technology in question. Given this perspective, it would be appropriate to consolidate 6.3 and 6.4 into a single enabling factor.

The Trenerry et al. (2021) study found the following regarding enabling factors 6.5 and 6.6:

(6.5) Workplace Resilience and Adaptability: The research by Trenerry et al. (2021) highlights that DT in the workplace can bring about change and uncertainty for both employees and organisations. However, studies suggest that individuals who possess resilience and adaptability are more likely to succeed in navigating such challenges. Such individuals typically exhibit personality traits such as receptiveness to new experiences, good psychological health, conscientiousness and ambition. Overall, the ability to adapt to rapidly changing circumstances is crucial for high work performance and fulfilment.

(6.6) Work-related Stress and Well-being: According to Trenerry et al. (2021), the use of digital technology can cause technostress, which can negatively impact

employees' well-being, work commitment and productivity. Organisational leaders should establish training and coaching programmes to promote adaptability and resilience and help employees cope with continuous work disruption and technostress. Despite the challenges, if digital technologies are managed appropriately, they may yield positive effects on work, such as increased innovation, efficacy and value.

From the analysis of relevant literature, it can be deduced that Workplace Resilience and Adaptability (6.5) and Work-related Stress and Well-being (6.6) are interrelated enabling factors. Trenerry et al.'s (2021) research highlights that the introduction of DT in the workplace can lead to uncertainty and change for employees, resulting in technostress, which can adversely impact their productivity, work commitment and overall well-being. However, studies suggest that individuals with resilience and adaptability are more likely to navigate such challenges successfully. Hence, leaders should create training and coaching programmes that promote resilience and adaptability, and in this way help employees to cope with continuous work disruption and technostress. Despite the difficulties, if digital technologies are managed effectively, they can yield positive outcomes for work, such as increased innovation, efficacy and value. Considering this perspective, it would be appropriate to merge 6.5 and 6.6 into a single enabling factor.

After evaluating the four factors, it was observed that the enabling factors Technology Acceptance and Adoption (6.3) and Perceptions and Attitudes towards Technology (6.4) are interrelated. Therefore, enabling factors 6.3 and 6.4 were consolidated into a single enabling factor. Additionally, the enabling factors Workplace Resilience and Adaptability (6.5) and Work-related Stress and Well-being (6.6) are also interrelated. Thus, 6.5 and 6.6 were consolidated into a single enabling factor.

5.2.13 Simplification related to the Organisational Culture Category

To streamline the categories and framework and make them more concise, one participant suggested consolidating Organisational Culture enabling factors (5.3 to 5.5 in the artefact framework in Table 8) that are interconnected by a common theme of communication and resilience into a single enabling factor. This approach would offer a simplified perspective of the category and the framework.

Enabling factors 5.3 to 5.5 were derived from Trenerry et al.'s (2021). In terms of the literature presented in Chapter 2, Section 2.4.7, specifically with respect to the discussion on the Organisational Culture category, the individual factors were assessed to determine the validity of the recommendation. The Trenerry et al. (2021) study found the following regarding enabling factors 5.3, 5.4 and 5.5:

(5.3) Team Communication and Collaboration: Effective communication and collaboration are considered crucial for organisational success. Collaboration depends on good communication among team members. Digital tools can be used to improve collaboration and achieve shared objectives. A lack of collaboration or outdated collaboration and communication methods can thwart transformational efforts and lead to resistance. Using digital technologies and in-house digital specialists can help foster employee engagement and overcome resistance. Developing cross-functional teams and digital hubs can improve communication and collaboration for successful DT.

(5.4) Workplace Relationship and Team Identification: Workplace relationships play a crucial role in the success of DT as they can facilitate or hinder progress towards successful DT. Positive relationships between supervisors and subordinates can encourage innovative work behaviours, and positive peer relationships can provide support and empower, improving work behaviours and performance and creating a sense of belonging and team identity. These relationships are particularly important when new technologies are introduced. Employees are more likely to embrace new technologies that align with their team's established identity, and misalignment can result in employee resistance.

While social technologies can enhance workplace relationships, it is important to establish protocols concerning their use to prevent possible disagreements.

(5.5) Team Resilience and Adaptability: Teams that have developed resilience and agility will thrive despite challenges and adversity during DT. This resilience stems from how team members interact with each other and the environment they operate in. Positive emotions and shared work experiences encourage team resilience. The roles and positions that individuals occupy within a team also contribute to developing team resilience. Resilient teams are more resourceful and are better equipped to face challenges.

By analysing the literature review related to each enabling factor, it was found that the three enabling factors: Team Communication and Collaboration (5.3), Workplace Relationship and Team Identification (5.4), and Team Resilience and Adaptability (5.5) are interrelated since they are all integral in facilitating the successful implementation of DT in the workplace.

According to the literature review, Trenerry et al.'s (2021) research highlights that teams that manage to be resilient and adaptable are more likely to succeed during times of DT. This resilience comes from the way in which team members interact with each other and their environment. This makes it crucial to establish strong workplace relationships and foster effective communication and collaboration among team members. This is particularly important when new technologies are introduced. By developing cross-functional teams and digital hubs that promote communication and collaboration, team members can improve their relationships with peers and supervisors. These positive peer relationships provide support and empowerment, which can improve work behaviours and performance and can create a sense of belonging and team identity. When new technologies align with their team's established identity, employees are more likely to embrace and adopt them.

After careful consideration of relevant literature, the recommendation was accepted, and the three enabling factors of Team Communication and

Collaboration (5.3), Workplace Relationship and Team Identification (5.4), and Team Resilience and Adaptability (5.5) were consolidated.

5.2.14 Create an Overarching Culture Pillar

During the interviews, three participants (P9, P3 and P15) noted a connection between the Organisational Culture and Employee Attitude and Development categories. P9 proposed combining these categories, while P15 highlighted that they both covered the concept of culture but from different perspectives – one from the perspective of the organisation and the other from that of the individual employee. As a result, P15 suggested renaming these categories as Organisation and Individual, respectively, and integrating them into an overarching Culture pillar, with Organisation and Individual (employees) serving as sub-pillars. This approach was necessary to maintain the nuances of each sub-pillar, which were crucial. P15 believed that this proposal would simplify the framework structure by consolidating or merging similar categories.

The Organisational Culture and Employee Attitude and Development (Employee) categories were created on the basis of the study conducted by Trenerry et al. (2021). The key objective of the Trenerry et al. (2021) study was to identify the fundamental factors that could strengthen DT in the workplace. To achieve this aim, the authors integrated digitalisation and DT research with established organisational behaviour and management frameworks (Ployhart, 2015; Robbins & Judge, 2019). In doing so, the study aimed to draw on a well-established literature base and examine the interplay between digitalisation, organisational behaviour and management frameworks. Trenerry et al.’s (2021) study then developed a “Multi-Level Factors Framework” that identified critical enabling factors to support workplace DT for the three levels of the organisation: (1) the Individual level; (2) the Group level; and (3) the Organisational level.

After evaluating Trenerry et al.'s (2021) multi-level framework, it is apparent that it shares similarities with the proposal put forth by P15; notably, the creation of a Culture pillar that encompasses both the Organisation and Individual

(employees) sub-pillars is an effective approach. This consolidation of similar categories simplifies the framework structure, while still maintaining the necessary nuances of each sub-pillar. After careful consideration, it was determined that this proposal is well-constructed and it was therefore accepted.

C. Minor Findings: Essential categories or enabling factors that are missing from the framework

Table 5.3: Minor Findings

Category	Minor Findings per Category	Contributors
1. Digital Resources category	Add a specific enabling factor for AI to highlight its prominence.	P1, P10
2. Organisational Structure category	Include platform ecosystems as an agile structure.	P5, P12
3. The Customer Category	Address the missing aspects related to the Customer category.	P8, P10
	The customer is a central strategic driver.	P12
4. Governance Category	Add a specific data governance enabling factor.	P9

5.2.15 Add an Enabling Factor for Artificial Intelligence to Highlight its Prominence

During the interviews, two participants expressed similar views regarding AI. One suggested that AI should be given greater prominence by dedicating a separate enabling factor to it, in a similar way to data analytics. This is because AI is currently the most prevalent digital technology and the leading technological revolution in the business sector. The other participant agreed with this view and added that AI has the potential not only to drive new business capabilities but also to revolutionise the nature of what telcos offer and how they deliver it. This participant also believed that AI presents a significant opportunity for telcos to optimise telecom network costs.

The literature review (see Section 2.4.7) highlights that AI is a critical digital technology. However, it is often grouped with other technologies. Verhoef et al. (2021) have emphasised the need to establish a big data analytics capability, as many organisations face difficulties acquiring the skills necessary to analyse and effectively utilise big data. However, it is essential to note that during Verhoef et al.'s study in 2021, AI technology was a relatively new digital technology and had gained less traction than big data analytics. Consequently, their study emphasised AI less than big data analytics.

Since technology evolves rapidly and AI technology is becoming pervasive, this merited accepting the recommendation to highlight AI capability as a separate enabling factor under the Digital Resource and Capabilities category to keep abreast of the changing technology and competitive landscape.

5.2.16 Include Platform Ecosystems as a Form of Agile Organisational Structure

P5 expressed the view that digital agility is a capability related to different kinds of agile organisational structures. Similarly, digital networking capability is related to platform ecosystems, a type of agile organisational structure. With this in mind, P5 recommended that platform ecosystems be considered as a type of agile organisational structure and included in the Organisational Structure category. P12 shared similar views and suggested that cross-collaboration capability relates to platforms and ecosystems as a type of agile organisational structure and should be included in the category accordingly as an evolving future business model.

According to the literature review, digital platforms are enablers in various contexts. Rueckel et al. (2020) suggest that digital platforms are an organisation's digital infrastructure, which helps to achieve scale and efficiency. On the other hand, Vial (2019) views platforms as a form of technology. Following this view, the artefact framework classifies digital platforms as digital assets. Verhoef et al. (2021) found that organisations that adopted the platform business model and

applied platform growth strategies became real digital native organisations that dominated multiple industries. The artefact framework captures this view of platforms under strategy. However, platforms are also a type of business model, which makes it beneficial to consider them as a type of organisational structure. Hence, the recommendation to include platforms as a form of an agile organisation was accepted.

5.2.17 Address the Missing Aspects related to the Customer Category

During their interview discussions, two participants (P8 and P10) expressed their concerns regarding the Customer category. They suggested that the write-up required further elaboration to enhance its clarity and provide a more comprehensive understanding of the customer from an enabler perspective. They also recommended the inclusion of additional enabling factors.

With reference to the literature review presented in Section 2.4.7 in Chapter 2, the Customer category was included in the artefact framework based on the study conducted by Aghayari et al. (2022).

The rationale behind incorporating the customer as a category in the framework was to ensure that customer perceptions and service processes were monitored throughout the DT using three criteria: customer experience, customer contact points and customer insight. Therefore, the ultimate goal of this category was to ensure that a monitoring capability was implemented to guarantee that all digital initiatives yielded the anticipated value for customers.

The feedback from the interviews was invaluable as it revealed that the nomenclature of this category was confusing, and its description was not effectively conveying its intended purpose. As a result, two participants who specialised in customer management misunderstood the category's intended application, potentially the result of their preconceived notion of the customer. Considering this feedback, it was decided that instead of maintaining a distinct

“customer” category, this capability would be integrated as an enabling factor within the Digital Resources and Capabilities category, specifically as a customer-experience monitoring capability.

5.2.18 Address the Concern that the Customer is a Strategic Driver, not an Enabler

According to P12, the customer should serve as a strategic driver rather than an enabler. This point was based on the view that the DT agenda's primary goal was to satisfy the customer's needs and expectations effectively.

The literature review, as set out in Chapter 2, established that customers indeed play a crucial role in driving DT. However, as elaborated on in Section 5.2.17, the incorporation of the Customer category in the framework was intended to establish a robust monitoring mechanism that ensured the delivery of expected customer value across all digital initiatives. This stemmed from the paramount importance of customers in the success of DT.

Notwithstanding, the insights gathered from the interviews proved to be very helpful, as they highlighted a potential issue with the naming convention of this category. The confusion stemmed from the participants' preconceived ideas about the customer's role and the category's description needing to communicate its intended use more effectively. As a result, the participants were at risk of misinterpreting the category's intended purpose. Considering this feedback in conjunction with input discussed in 5.2.17, it was decided to integrate the customer-experience monitoring capability as an enabling factor into the Digital Resources and Capabilities category instead of maintaining a separate category.

5.2.19 Add a Specific Data Governance Enabling Factor

While the current framework covers data governance within the realm of big data analytics, one participant (P9) noted that the emergence of digital-era telecommunication organisations has introduced new regulatory compliance

requirements and data privacy concerns. As a result, P9 proposed the establishment of a dedicated factor solely focused on data governance. This would guarantee that data is consistently governed and managed in accordance with current regulatory mandates and best practices.

The study by Aghayari et al. (2022) suggests that developing a suitable strategy for DT requires a comprehensive data strategy that encompasses data management and governance, data access and a data-driven vision. This view of the importance of data governance is supported by the study by Verhoef et al. (2021). In addition, according to an Accenture survey published in 2018, 71% of executives acknowledge that their essential systems and strategies depend on data. However, many of these executives still need to invest in ensuring data accuracy and dependability (Accenture, 2018). For this reason, to achieve sustainability in a digital economy, organisations must invest in data validation and prioritise the development of big data capabilities. This can be achieved by investing in teams with expertise in analytics, data management, data governance, data visualisation and business skills (Verhoef et al., 2016).

On the basis of the literature reviewed, the recommendation was considered valid, and a separate enabling factor for data governance under the Governance category was incorporated into the framework.

5.3 Conclusion

After comprehensive discussion and interpretation of the findings from Chapter 4 within the context of the literature review presented in Chapter 2, a proposed framework of essential determinants (key enabling factors) for facilitating DT in South African telecommunication organisations was prepared. This framework is depicted in Figure 16 below, with Table 19 providing support to the framework with greater detail regarding the sub-pillars and factors.

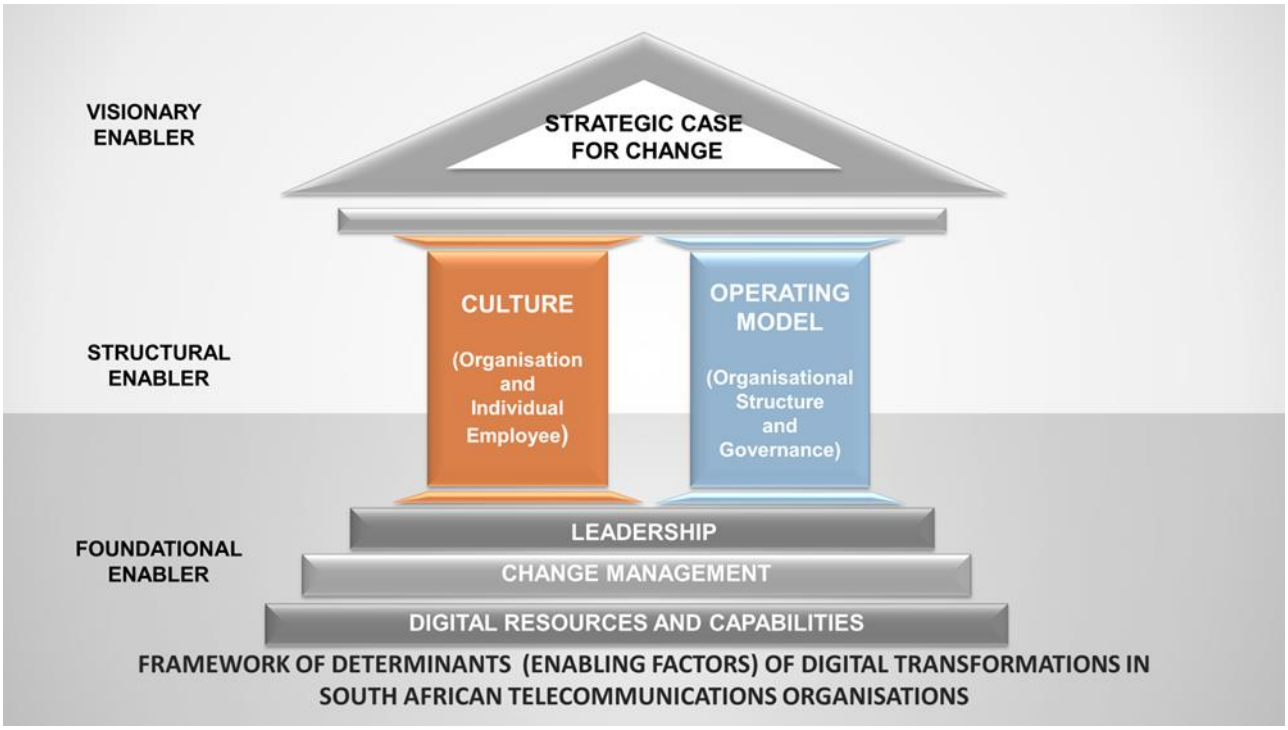

Figure 5.1: Proposed Framework of Key Determinants of Digital Transformation in South African Telecoms Organisations

Table 5.4: Support to the Proposed Framework

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Support to the Framework: Details of Enablers, Pillars, Sub Pillars and Factors				
Enabler	**Pillar**	**Sub Pillar**		**Factor**
Visionary Enabler	**Strategic Case For change**	**DTS Strategy and Vision**	1	Vision
			2	CEO Mandate for DT
			3	Funding (Financial Investment)
			4	DTS and DBS
		Growth Strategies	1	Traditional Growth Strategies
			2	Platform-base Growth Strategies
Structural Enabler	**Culture**	**Organization**	1	Learning Organisation
			2	HR Transformation
			3	Team Collaboration, Identification & Resilence
		Individual Employee	1	Employee Learning Motivation
			2	Technology Adoption and Perceptions
			3	Workplace Resilience and Wellbeing
	Operating Model	**Organizational Structure**	1	Flexible Organisational Forms
			2	Digital Platforms
		Governance	1	Governance (Decision-Making Framework)
			2	Data Governance (Data & Cyber Security Regulations & Compliance)
Foundational Enablers	**Leadership**		1	Digital Leadership Style (Transformational and Responsive)
			2	Digital Leadership skills
	Change Management		1	Change Agents
			2	Journeys
			3	Strategic Execution Enablement (Portfolio of initiatives, PMO, Metrics & Goals)
	Digital Assets and Capabilities	**Digital Assets**	1	Digital Technologies
			2	Digital Storage Infrastructure Assets
			3	Digital Platform Infrastructure
			4	Bimodal IT Infrastructure and Systems
			5	Institutionalised Innovation Process
			6	Business Process Enablement for Digital Assets
		Digital Capabilities	1	Digital Roles & Skills (ICT literacy, individual innovation creativity, cross-functional skills, analytics skills)
			2	Digital Agility
			3	Digital Networking Capability
			4	Big Data Analytics Capability
			5	Institutionalised Innovation Capability
			6	AI Capability
			7	Customer Experience Monitoring Capability

CHAPTER 6. CONCLUSIONS & RECOMMENDATIONS

6.1 Introduction

In today's gig economy, organisations are under increasing pressure to adapt and remain relevant through DT. Research has shown that successful DTs not only enhance performance and competitive advantage but also enable organisations to become more digitally savvy, which contributes to their long-term sustainability. Furthermore, companies that lead in digital growth earn 1.8 times more than their digitally laggard counterparts, resulting in double the growth in total enterprise value (Forth et al., 2020).

Implementing a DT can be intimidating, however, as it requires more than just adopting new technologies. This transformation involves fundamentally altering corporate culture and organisational structures, as well as making significant investments to facilitate the transformation. Despite it being a strategic imperative, a DT is not easy to execute, and success rates remain low as a result of the complexity of the factors that influence it. This research study aimed to develop a framework of key factors that drive DT within South African telcos. Industry leaders can utilise this framework as a best practice guide to foster the necessary capabilities, mindsets and structural conditions required to facilitate and support their organisation's DT journey.

This research had two primary research objectives:

1. To determine the key factors that enable digital transformation in telecommunications organisations in South Africa.

2. Based on the above, to develop a framework that details the critical enabling factors that telecommunications organisations may apply as a guideline to facilitate digital transformation.

To achieve the second primary objective, five sub-objectives were specified:

I. To derive key enabling factors from a structured literature review.

II. To ensure that these factors are grounded in theory, categorised into categories and organised into an artefact framework.

III. To evaluate the identified factors with industry experts through semi-structured interviews.

IV. To update the artefact framework with the insights from the interviews.

V. To develop the framework of determinants (enabling factors) of digital transformation for South African telecommunications organisations.

This chapter sets out the conclusions reached by the study in meeting these research objectives and makes recommendations for telecoms businesses on the basis of the conclusions. It outlines the limitations of the study, lists the study contributions and concludes with suggestions for future research.

6.2 Conclusions regarding Research Objective 1 (RO1)

The first primary research objective was to determine the key factors that enable DT in South African telcos. To facilitate this objective, the following research question was formulated: Is the artefact framework a comprehensive and accurate representation of crucial enabling factors of digital transformation for telecommunications organisations in South Africa?

The interview findings revealed that, although the framework was widely acknowledged by the participants to be comprehensive and valid, it was not complete since some of the participants highlighted certain essential categories and enabling factors that were missing from the artefact framework. The key categories that were missing from the framework and were subsequently included in the proposed framework (Figure 16) were (1) Change Management and (2) Governance (originally the existing Metrics and Goals category, which was converted to Governance), with metrics and goals (KPIs) included as an enabling factor within it. The additional enabling factors that were included in the proposed framework were (1) Strategy and Vision; (2) Strategy Execution Enablement; (3) Financial Investment (Funding); and (4) Business Process Enablement. For more details on the inclusion of these enabling factors, refer to Chapter 5, Sections 5.2.1 to 5.2.8.

Furthermore, there were minor findings that mainly related to adding separate enabling factors for capabilities that were captured as a group within an existing category of the artefact category. These included a separate enabling factor for (1) AI capability; (2) Platforms and (3) Data Governance. Refer to Chapter 5, Sections 5.2.15, 5.5.16 and 5.2.19.

In addition, the participants provided valuable feedback on the artefact framework, proposing a more streamlined version that would facilitate communication. They expressed that the artefact framework was overly complex and potentially overwhelming owing to the extensive list of categories. To simplify implementation, they recommended consolidating the categories into pillars and incorporating an explanatory illustration of the framework. In accordance with the rationale discussed in Chapter 5, Sections 5.1.3 and 5.2.9 to 5.2.14, the recommendations were accepted, resulting in the proposed framework, as depicted in Figure 5.1 in Chapter 5.

The proposed framework was created by streamlining and supplementing the artefact framework with additional categories and enabling factors to furnish a

robust, all-inclusive, valid and accurate list of enabling factors to achieve RO1 effectively.

A noteworthy fact was that categories and enabling factors that were identified as “missing” by participants were predominately not found in the frameworks utilised to develop the artefact framework. An interesting example that stood out was that the frameworks consulted did not have financial investment as an enabling factor (see Section 5.2.7). Although financial investment may not have been included in the foundational frameworks, it is a critical enabler for South African telcos because of the unique challenges that they face. These challenges include the burden of load shedding in South Africa, which significantly increases operational costs, making it difficult for telcos to invest in multiple competing initiatives, unlike their global counterparts. This illustrates the importance of this study in creating a framework that acknowledges the distinct challenges faced by South African telcos. Incorporating the local practitioner perspective was fundamental for enhancing the accuracy and completeness of the artefact framework (Table 2.8) and providing a holistic, robust proposed framework (Figure 5.1 and supporting Table 5.4) adapted to their unique challenges.

6.3 Conclusions Regarding Research Objective 2 (RO2)

The subsequent objective of the research was to develop a framework that details the critical enabling factors that telecommunications organisations may apply as a guideline to facilitate DT. To enable this objective, the following research question was formulated: Do the categories in the artefact framework (as set out in Table 8) provide a thorough and precise classification for identifying the essential enabling factors?

The artefact framework comprises eight distinct categories. From the findings obtained from the interview process regarding RQ2, it was found that the Customer category caused confusion among participants (discussed in Chapter 5, Sections 5.2.17 and 5.2.18). As a result, it was determined that it would be

beneficial to integrate the customer-experience monitoring capability into the Digital Resources and Capabilities category, instead of having a separate category. Additionally, three categories were recommended for a name change. Participants recommended changing the names of the Digital Resources category (Section 5.2.9) and the Metrics and Goals category (Section 5.2.3), based on additional changes they had recommended that related to these categories. Therefore, apart from the Strategic Embeddedness category (Section 5.2.4), which had its name changed to Strategic Case for Change, all of the other artefact framework categories provide a comprehensive and precise classification for identifying essential enabling factors.

6.4 Recommendations

Some key insights gathered from the research process that describe practices and strategies worth recommending to leaders and decision-makers who are planning to implement DT are set out below.

***Development of New Skills and Capabilities**:* The concept of DT emphasises the importance of digital technologies performing operational tasks while employees focus on solving more strategic issues (Dremel et al., 2017). Therefore, it is recommended that businesses prioritise investing in their human capital by developing new digital skills and dynamic capabilities. This can be accomplished by retraining and upskilling current employees and strategically hiring individuals with the necessary skill sets. Additionally, leaders should consider implementing talent management programmes that foster the development of cross-functional skills and dynamic capabilities. By taking these actions, organisations can stay competitive and relevant in today's fast-paced digital economy.

Governance: Governance is a critical but often overlooked aspect of DT programmes. Some individuals may consider governance as an impediment to the agile approach that characterises DT programmes and thus opt not to

implement it. However, governance is essential and should not be disregarded. Its role in decision-making frameworks ensures that decisions are made at the right level, preventing practical power struggles among leaders that could potentially lead to a DT project's failure. Thus, it is recommended that leaders of DT projects see governance not as a hindrance but rather as an indispensable aspect that must be integrated into DT programmes to guarantee their success.

Change Management: In the context of DT, it is common for change management to be overlooked, despite its being a fundamental component of embedding the changes implemented. This oversight can have significant implications for the success of the transformation initiative and the organisation as a whole. Therefore, it is strongly recommended that organisations recognise the criticality of change management and ensure that it is given due attention throughout the DT process.

Digital Ethics: As digital technologies continue to pervade various industries, particularly cognitive technologies such as AI, leaders have an obligation to take into account the development of a digital ethics capability. Interestingly, during the interviews conducted on this subject, two participants placed significant emphasis on the importance of AI; however, none of the participants discussed the significance of digital ethics. This highlights the need for businesses and organisations to prioritise the development of ethical frameworks to guide digital technology usage, particularly in cases involving AI. It is, thus, recommended that the development of digital ethics capability should be approached proactively to ensure that the impact of these technologies is aligned with the values and ethical principles of the organisation.

6.5 Limitations of the Research Study

The study had certain limitations related to time constraints and a restricted pool of local experts available for the research. Furthermore, the participants were

restricted to consultants from prominent consulting firms and industry leaders solely from the three incumbent operators.

6.6 Contributions of the Research Study

The development of a best practice framework of key enablers that can be used by industry leaders to drive DT within South African telcos carries immense academic advantages. These include: (1) contribution to literature; (2) advancement of knowledge; (3) empirical research opportunities and validation; (4) interdisciplinary insights and collaboration; and (5) educational impact. The proposed framework's value as a resource for scholarly literature and potential impact on educational pursuits emphasises its value within the academic community, fostering a deeper understanding of DT in the unique context of the South African telecommunications field. The five advantages are explored in more detail below.

***Contribution to Literature*:** The framework is a noteworthy addition to the current body of research on DT in telecommunications, with a particular emphasis on the South African context. Its structured and comprehensive set of enabling factors elevates scholarly discourse and serves as a valuable resource for those studying the dynamics of DT in developing economies, including researchers, practitioners and policymakers.

***Advancement of Knowledge*:** The proposed framework contributes to the academic community by advancing the knowledge base in the field of DT within the specific context of South African telecommunications. Its structured approach not only offers a comprehensive understanding of the challenges faced by telcos in the region but also provides a comprehensive view of the key enabling factors that need to be developed and nurtured from multiple perspectives (strategy, business, technology, culture and employee). In this way, it expands the theoretical foundation of DT.

Empirical Research Opportunities and Validation: The framework offers academic scholars an opportunity to conduct practical research and put the framework into action by building capabilities, mindsets and structures within telcos. This provides an opportunity to explore real-world applications of theoretical concepts and gain a deeper understanding of the complexities and nuances of DT in South African telcos. Furthermore, it serves as a foundation for empirical validation and enables researchers to refine the framework's effectiveness in actual scenarios. This empirical research not only enhances the academic integrity and rigour of the framework but also provides valuable insights for industry practitioners looking for evidence-based DT strategies.

Interdisciplinary Insights and Collaboration: The proposed framework fosters interdisciplinary insights and collaboration by bridging the gap between telecommunications management and other relevant academic disciplines, including technology, business, strategy, human resources, psychology and policy studies. This approach enriches academic discourse, offering a robust and holistic understanding of the multifaceted nature of DT in the telecoms industry.

Educational Impact: The proposed framework can be integrated into academic curricula, thereby enriching educational programmes related to telecommunications management, digital business management, DBS, technology management and digital workforce management. This approach guarantees that the academic community stays abreast of the latest insights and tools, enabling it to educate the next generation of professionals in the rapidly evolving landscape of DT.

6.7 Suggestions for further research

The insights gleaned from this research study have important implications for future research. Consequently, this study has identified several areas that merit continued investigation to further our understanding and contribute to knowledge

advancement: related to DT. These future research opportunities are discussed below.

Develop an integrated Digital Transformation and Change Management Framework for South Africa

While South Africa is currently undergoing a significant DT much like many other countries in the world, the successful implementation of this transformation requires a nuanced approach that takes into account the country's unique cultural, economic and social factors. To achieve this nuanced approach, it would be beneficial to investigate existing frameworks for DT and change management, compare their effectiveness across different industries and organisational contexts, and propose a novel integrated Digital Transformation and Change Management framework that aligns with South Africa's unique needs.

This proposed framework should foster a holistic multi-faceted approach that addresses technology, strategy, culture and employee engagement components. The research should be conducted with a practical orientation, aiming to provide actionable insights for organisations that are navigating the complexities of DT and change management.

To enhance the depth and applicability of the research outcomes, it is essential to combine theoretical frameworks with real-world examples and interdisciplinary perspectives. This will ensure that the proposed framework is not only theoretically sound but also practically feasible and effective in the South African context.

Adapt Change Management for the Digital Age

The digital age introduces unprecedented speed and complexity to organisational change. To enhance the relevant body of research on this topic, it is important to explore how traditional change management models (e.g., Kotter’s 8-Step Model, see Kotter, n.d.) require adaptation to accommodate the rapid pace of technological advancements. By examining case studies of organisations that

have successfully transitioned into the digital age, it will be possible to identify key strategies that facilitate change and best practices for managing resistance, communication and employee engagement during digital transitions. Additionally, understanding how employee roles and expectations shift in response to DTs is crucial.

Develop a Comprehensive Framework for Digital Ethics

As technology continues to evolve, the way we interact, communicate and conduct business is changing. However, this transformation has given rise to a range of ethical challenges that need to be considered. Further research could focus on examining the ethical implications of digital technologies, such as AI, ML and big data. The study could explore ethical dilemmas arising from data privacy, AI and automation and propose ethical guidelines for DT projects. The ultimate goal is to develop a comprehensive framework for digital ethics that can guide ethical decision-making in the digital age and ensure responsible use of these technologies. To achieve this, the research would benefit from considering the perspectives of various stakeholders, including individuals, businesses and policymakers. Collaboration with experts from different disciplines, such as ethics, law and technology, will be essential to creating a holistic and robust framework.

Measure Digital Transformation Success

Organisations that invest in digital initiatives seek to understand the impact of these transformations on their overall success. Developing effective metrics is crucial for evaluating the return on investment. Exploring the challenges of quantifying qualitative impacts involves identifying KPIs for the financial, operational and customer-centric aspects of the organisation. To gain a comprehensive view of success and sustainability, longitudinal studies that track the evolution of digital initiatives over time are crucial. Therefore, it is essential to develop a robust framework of metrics to assess the impact of DT initiatives.

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APPENDIX A (Participant Information Sheet)

Dear Sir / Madam,

My name is Taazmin Tar-Mahomed. I am pursuing a Master's in Management with a specialisation in Digital Business at Wits Business School (WBS), a part of the University of the Witwatersrand, Johannesburg. Dr. Manessah Alagbaoso is my supervisor.

I am researching the critical factors for promoting Digital Transformation in South African telecommunication organisations. The study's title is "Determinants of Digital Transformation in South African Telecommunication Organizations." I aim to understand better the enabling factors required to foster digital transformation in this industry.

I want to invite you to participate in an interview that will last approximately an hour as part of a research study. The interview can be conducted online via Teams or at a location and time that is convenient for you. These interviews are scheduled to take place between September and October of 2023.

With your consent, our interview will be audio recorded. The recording will be saved securely on OneDrive, a cloud storage solution, with restricted access for five years, after which it will be permanently deleted. Please note that only I will have access to this data.

During the interview, I will need to inquire about your personal information, such as your qualifications, current position in the organisation, and experience with Digital Transformation initiatives.

Rest assured that the interview will remain completely confidential and anonymous. To protect your privacy, I will ensure that no personal information, including your name, will be included in the research study report.

Participation in the research study is voluntary and should only be undertaken if you wish to volunteer. You are free to withdraw from the study at any point and are not obligated to answer any questions you are uncomfortable with.

Participating in the research study will not provide you with any direct benefits. However, you will not lose any services, benefits, or rights you would typically have if you chose not to join. There will be no cost associated with participating in the study, and you will not receive payment for your involvement. As a gesture of appreciation for participating, you will receive a copy of the final research report upon completion.

Please do not hesitate to reach out if you have any inquiries about this research study. You can contact either me or my supervisor using the listed details. If you have any concerns or complaints regarding the ethical procedures of this study, you are encouraged to contact the University Human Research Ethics Committee (Non-Medical) via telephone at +27(0) 11 717 1408 or email at hrecnon-medical@wits.ac.za

Yours sincerely,

Taazmin

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APPENDIX B (Participant Consent Form)





INTERVIEW PARTICIPANT CONSENT FORM

DETERMINANTS OF DIGITAL TRANSFORMATION IN SOUTH AFRICAN TELECOMMUNICATIONS ORGANISATIONS

Researcher: Taazmin Tar-Mahomed, master's in management (Digital Business) student at the Wits Business School (WBS), University of Witwatersrand

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 may be audio recorded.	YES	NO
I agree that the researcher may use direct quotations from my interview in their research report.	YES	NO
I agree that my participation will remain anonymous (my name or other identifying data will not be used by the researcher in their research report.	YES	NO
I agree that other researchers may use the information I provide in my interview (depending on their own ethics clearance being obtained). However, my name and personal information will not be used or shared.	YES	NO

…… (signature)
…… (name of participant)
…… (date)

APPENDIX C (Interview Guide)

No	Questions
1	What is your perspective on digital transformation within the telecommunications sector.?
2	What is your perspective on the significance of digital transformation for telecommunication providers?
3	In your experience, what are the most crucial factors that enable digital transformation for telecom organisations?
4	Regarding the artefact framework shared with you, do you require any clarification on the enabling factors and categories identified?
5	What are your thoughts on the validity, comprehensiveness, and completeness of the enabling factors listed in the framework? Please elaborate on your answer, whether it is a yes or no.
6	Which factors or categories in the framework do you disagree with or require modification? Please identify the factors or categories and explain your view.
7	What additional factors would you recommend adding to this framework? Additionally, please explain the reasons you consider them to be significant.