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# THE IMPACT OF COVID-19-DRIVEN DIGITAL TRANSFORMATION ON PROJECT MANAGEMENT IN SOUTH AFRICA


By

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A minor dissertation presented to the Department of Construction Economics and Management in partial fulfilment of the requirements for the degree MSc in Project Management.

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## ABSTRACT

The purpose of this exploratory study was to contribute to the existing knowledge base of digital transformation within the domain of project management. This was achieved through investigating the impact of COVID-19-driven digital transformation on project management practices and processes within project-based organisations in South Africa.

The research was based on an interpretivist paradigm using a qualitative research approach and interview method to collect data from the project leaders in various companies based in South Africa. A comprehensive review of the impact of the digital transformation driven by the COVID-19 pandemic on project management practices and processes was conducted. This was followed by a thematic analysis prescribed by (Braun & Clarke, 2006; Creswell & Creswell, 2018) and a presentation of themes that emerged from the analysis. The empirical findings were discussed in relation to existing literature to develop a deeper understanding of the data.

The findings demonstrated that the project leaders understand the notion of digital transformation and view it as the adoption of digital technologies into business domains and their impact on various elements of the business and work practices. Moreover, they view the COVID-19 pandemic as an accelerator towards the adoption of digital technologies. The accelerated digital shift impacted project management in many ways and some of the key aspects that were identified include the emergence of remote work, effective project team communication and collaboration, enhanced access and information sharing, the relevant project manager skills in the digital era and the project approaches adopted for project delivery.

The rapid digital transformation provides advantages for project management teams, but it also poses potential challenges that require proactive planning. Some of the opportunities associated with the adoption of digital technologies identified include enhanced project team performance, potential cost and time efficiency, improved accessibility to project information, increased customer satisfaction, fostered remote work capabilities, enhanced communication, and collaboration.

The findings of the study have significant implications for project leaders and organisations in South Africa. Understanding the impact of digital transformation on project management practices can assist leaders in adapting their strategies and processes to maximise the benefits and overcome

the challenges associated with digital technology adoption. Organisations can utilise the presented opportunities to enhance innovation, accelerate decision-making, optimise business processes, increase productivity, improve communication, and cultivate a favourable organisational culture. This will enable them to maintain a competitive advantage in the dynamic digital economy. However, it is also crucial to address challenges such as a lack of competencies, trust issues, and cybersecurity concerns to ensure successful digital transformation.

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| | |
|---|---|
| **AI** | Artificial Intelligence |
| **CAQDAS** | Computer-Assisted Qualitative Data Analysis Software |
| **4IR** | Fourth Industrial Revolution |
| **ICT** | Information and Communication Technologies |
| **IoT** | Internet of Things |
| **PMI** | Project Management Institution |
| **R&D** | Research & Development |
| **SMACIT** | Social, Mobile, Analytics, Cloud, and Internet of Things |
| **WHO** | World Health Organisation |

# CHAPTER 1 INTRODUCTION

## 1.1 Introduction

This chapter provides a contextual background for the study and describes the research problem. Following that, the research aim, objectives, and expected contribution are outlined, as well as any limitations in scope relevant to the research. The chapter concludes with a presentation of the structure of the dissertation.

## 1.2 Research background

The COVID-19 pandemic impacted business operations as well as people's daily lives. Consequently, forcing businesses to quickly adjust to the abrupt changes in how employees performed their work and ushered in the use of digital technologies both within and across organisations. Organisations across industries were already actively pursuing a diverse range of measures to take advantage of digital technologies such as social media, big data, Artificial Intelligence (AI)), and mobile telephony and incorporating them into their business models (Vial, 2019). However, COVID-19 accelerated this digital movement.

In addition to that, the new paradigm of the Fourth Industrial Revolution (4IR), emerging from Industry 4.0, has also altered the way we do things in general, including how we work, live, interact, and manage projects, among other things (Marnewick & Marnewick, 2020:315). The terms Industry 4.0 and the Fourth Industrial Revolution tend to be used interchangeably, although they possess distinct areas of focus. According to Marnewick & Marnewick (2020), the core focus of Industry 4.0 is on cyber-physical systems and the Internet of Things (IoT), with a strong emphasis on the technological dimension. Whereas the 4IR places increased significance on the transformative effects of emerging disruptive technologies and their influence on the broader environmental context, specifically in relation to project management and implementation approaches.

Undoubtedly the digital transformation of companies has now emerged as the new wave of the future due to the high rise in the adoption of digital technologies. However, its implementation and implications have yet to be completely explored (Hai, Van & Tuyet, 2021:21). Business leaders are not well acquainted with the processes of implementing digital transformation as a means of staying competitive. Despite business leaders' efforts to adapt to the digital era, they are

unable to grasp the impact of adopting new technologies and the challenges and benefits of working digitally (Kozarkiewicz, 2020).

In the context of project management, Kozarkiewicz (2020:237) conducted a study that focused on investigating the impact of digital transformation on processes, tools and outcomes of project management. In addition to identifying the dimension and scope of the impact of digital transformation on the area of project management, the author confirmed that digital shift results in both positive and negative impacts however the positive effects outweigh the negative effects. Summarising the findings of the author one can conclude that project management is a multidisciplinary hybrid field in which digital transformation affects not only the process and tools at a project level but also organisational operations. Consequently, it is essential to comprehend how the rise of digital transformation has affected project management practices.

Kozarkiewicz (2020) posits that project management is undergoing a quick and intense evolution as a result of digital innovation, resulting in the transformation of project delivery models and strategies to embrace digitalization. Wu (2022) further emphasises that the COVID-19 pandemic accelerated the digitalization of project management by enforcing the adoption of digital tools and technologies, the adoption of an agile approach to project implementation, collaborative work in remote teams, and the elimination of traditional geographical, time zone, and fundamentally collaborative project team barriers.

## 1.3 Problem statement

With the rapid and unprecedented changes brought about by the COVID-19 pandemic, there is a lack of comprehensive research on the specific phenomenon of digital transformation in project management during this crisis in the context of South Africa. Studies conducted in South Africa have focused on topics related to policy implementation, the use of 4IR technologies in the education sector during the COVID-19 pandemic and leadership styles appropriate for adoption of new technologies (Backhouse & Manda, 2017; Marnewick & Marnewick, 2020; Mhlanga & Moloi, 2020). As a result, more research is required to examine the key aspects of project management that have been impacted by the COVID-19-driven digital transformation.

## 1.4 Research question

To guide this thesis through an empirical investigation of the impact of the COVID-19 accelerated digital transformation on aspects of project management, the following research question is posed.

- *How has the digital transformation driven by the COVID-19 pandemic impacted the project management practices and processes in South Africa?*

## 1.5 Aims of the study

The purpose of this exploratory study is to investigate the impact of digital transformation driven by the COVID-19 pandemic on project management practices and processes within South African project-based organisations. The study aims to contribute to the knowledge of digital transformation in the field of project management in South Africa.

## 1.6 Objectives of the study

The research aim will be achieved through the following objectives:

1. *Assess project leaders' understanding of digital transformation.*
2. *Evaluate the impact of the COVID-19 pandemic-driven digital transformation on the key aspects of project management.*
3. *Determine the impact of COVID-19 on the adoption of digital technologies from the perspective of project leaders.*
4. *Identify the opportunities and challenges related to the COVID-19 pandemic-driven digital transformation.*

## 1.7 Limitations of the research

There is a limitation on the size of the sample. The research findings were derived from a limited sample of 5 project management professionals or leaders and did not encompass all industries in which project management is employed. The limitation on the sample size can have an impact on the ability to generalise the findings and may restrict the ability to draw broader conclusions about project management practices across different industries.

## 1.8 Dissertation structure

The dissertation is structured into six chapters presented as follows:

Chapter One: Provides the background of the study and problem. Thereafter, the research aim, objectives, and expected contribution are stated, together with any scope limits.

Chapter Two: Provides a literature review on project definition, project management, and digital transformation. It reviews the influence of COVID-19 on digital transformation. Additionally, it discusses how digital transformation affects project management. The Opportunities and Challenges of digital transformation are also explored.

Chapter Three: Discuss the research methodology employed in the study and explain why particular approaches were chosen to answer the research question. The study used semi-structured interviews for qualitative data collection.

Chapter Four: Outlines the results acquired through the semi-structured interviews and document data analysis.

Chapter Five: Presents the discussion of the empirical findings in relation to the theoretical frameworks and existing literature outlined in Chapter 2.

Chapter Six: Concludes the research based on the empirical data and provides recommendations.

# CHAPTER 2 LITERATURE REVIEW

## 2.1 Introduction

This chapter provides the existing literature that serves as the basis for addressing the research question. As the purpose of the study is to investigate how the digital transformation accelerated by the COVID-19 pandemic impacted areas of project management, it is essential to find the proper lens through which to examine the phenomenon. Therefore, it was essential to decode the concepts of project management and digital transformation.

The first section defines and discusses project management concepts such as project, project management, and project management methodologies. The second section explores digital transformation, including related concepts such as digitalization, and discusses the challenges and advantages associated with it. Thirdly, the influence of the COVID-19 pandemic on the adoption of digital technology was investigated. The final section summarises existing research on the impact of digital transformation on various aspects of project management.

## 2.2 Project management overview

Project management is one of the fields that has been practised for many years (Seymour & Hussein, 2014) and that its visibility has increased, and it has evolved with time. To comprehend project management in its entirety, it is vital to first understand what a project is and how it is viewed through the lenses of various researchers.

### 2.2.1 Project defined

A project is defined as a time-bound endeavour that has a clear start and end points and is intended to produce a unique and well-defined outcome that satisfies the desires and requirements of the project's stakeholders (Steyn et al., 2016: 3). The most popular definition was conquered by the Project Management Institute (2017:4) where they defined a project as "a temporary endeavour undertaken to create a unique product, service, or result." The Project Management Institute (2017) emphasise that projects are typically temporary in nature, with a start and an end and a period ranging from short to long.

From the perspective of corporate strategy, a project is defined as a complex phenomenon that enables the realization of corporate strategy using a specific and temporary organisation that

operates under a time and cost limitation and has the objective of producing a specified result (Blaskovics, 2018:26). From the literature it is evident that projects have always been important for companies in terms of realising their corporate strategy. And it is undeniable that as the business world evolves, so do projects, as they are an integral component of company strategies.

Currently, the advancement of digital technology is altering corporate strategies and establishing new realities within distinct organisations. When businesses are discussing endeavours, we often hear the term "digital projects" in addition to the more generic "projects." The online platform is the digital project's domain, where the company has direct contact with its customers. According to Hassani, El Bouzekri El Idrissi & Abouabdellah (2018), a digital project uses internet and web technologies to deliver anything from a website to mobile apps, videos to games, e-commerce to emails, social media campaigns to search engine optimization, media advertising, and so on.

According to Tommasi (2018), projects account for one-third of the global economy. Summarizing the definitions from prior research, one may infer that initiatives are carried out with the purpose of creating business value and driving productivity and innovation rather than merely completing the work on time and within budget. Consequently, achieving successful project outcomes becomes imperative, necessitating the implementation of effective project management strategies and processes.

### 2.2.2 Project management

Project management is a specialised approach to managing projects. The Project Management Institute (2017:10) defines project management as “the application of tools, skills, knowledge, and techniques to project activities to meet project requirements”. Project management, as stated by Project Management Institute (2017), often comprises managing several moving aspects of the project, such as meeting the project's requirements as outlined by the stakeholder, completing the process of planning, executing, tracking work progress, communicating, managing risks, resources, and budget.

Project management has processes which are categorised into five logical groups referred to as project management process groups. The following are the groups representing the inception to completion process: Initiating, Planning, Executing, Monitoring, Controlling and Closing (PMI, 2017). Currently in this digital era projects have emerged as a popular approach for companies to attain their objectives of providing customers with valuable services and products. Consequently,

that has resulted in project management progressively becoming more of a science than art as the discipline continues to innovate and standardise processes, enhance concepts, and develop digital projects such as software and mobile applications (Seymour & Hussein, 2014).

### 2.2.3 Project management methodologies

Lang & Müller (2021) highlight the importance of project management methodology as one of the important factors influencing project success. Gemino, Reich & Serrador (2021) argue that research on project management approaches has not been extensively explored, highlighting the need for companies to adopt suitable methodologies for project advancement.

Lang & Müller (2021) argue that agile project management approaches challenge existing theories and practices, particularly for digital projects. They describe agile as the highest level of abstraction, providing principles and guidelines for managing projects. This approach is crucial for businesses dealing with digital projects.

Project management methodologies have evolved, with some being more suitable for specific industries or projects. The study focuses on traditional waterfall and agile methodologies, which are used across software development, construction, product development, and R&D. The researcher also investigates hybrid methodologies, emerging due to the rapid change in digital technologies.

#### Waterfall or traditional project management methodology

For decades, projects have been managed using traditional methodology. The traditional methodology follows linear and predictable project planning practices designed to achieve well-understood, achievable set objectives (Gemino, Reich & Serrador, 2021). It is comprised of five distinct non-overlapping phases, as demonstrated in Figure 2.2 below and the flow of these predetermined logical phases is rigid from one to the next, giving rise to the term "waterfall" approach.

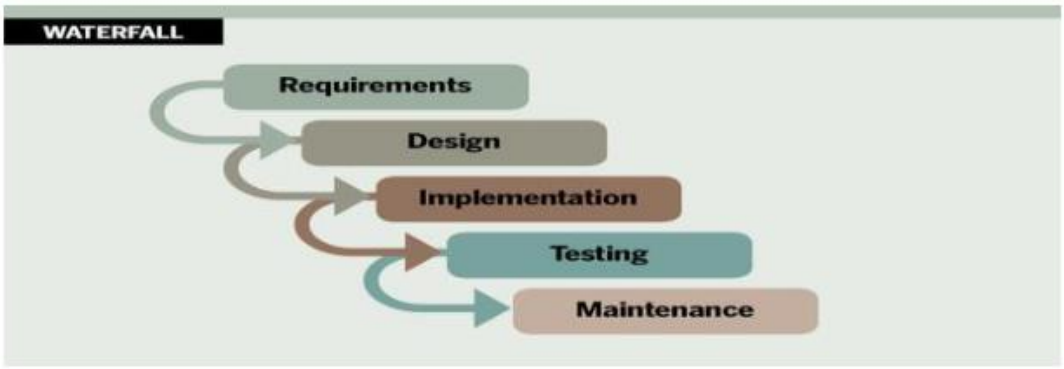


Figure 2. 1: Waterfall methodology (Hassani, El Bouzekri El Idrissi & Abouabdellah, 2018)

The waterfall project management methodology has been criticised due to its rigidity and inadequacy for the management of projects with significant volatility and uncertainty (Dvir et al., 1998; Picciotto, 2019). It is worth noting the waterfall method is not very efficient for managing IT or digital projects where the technology changes very frequently due to the constant unpredictable changes in customer's requirements (Corejova & Bielik, 2020).

Agile project management methodology

Over the past two decades, agile methods have gradually become popular in the field of project management (PMI, 2017). In the software industry, the Agile approach was developed as a strategy to deal with projects that have a high amount of uncertainty in requirements. It was designed to allow modifications since uncertainty contributes to high rates of change in either the scope or the needs of a project (PMI, 2017). According to Corejova & Bielik (2020), the agile project management approach is based on iterative delivery over the project lifecycle it is known for its ability to create changes and react, and it is regarded as the best in dealing with the unknown and uncertain environment.

The agile methodology is founded on principles of customer satisfaction and effective distribution of responsibility to team members (Gemino, Reich & Serrador, 2021). PMI (2017) noted that frequent collaboration between the project team and customer, in both formal and informal communications around the project is essential as a form of establishing a closer relationship between all stakeholders.

This approach permits the team to manage a project by splitting it into phases and establishing short-term objectives. Agile has been demonstrated to be the optimal project management approach, particularly for projects involving a high degree of uncertainty. A review of the

available literature reveals that, as compared to more conventional methods, agile strategies significantly increase stakeholder success without compromising on cost, schedule, scope, or quality.

Hybrid project management methodology

Hybrid models of project management combine elements of a waterfall and agile or combine elements of two agile frameworks (Hassani, El Bouzekri El Idrissi & Abouabdellah, 2018; Gemino, Reich & Serrador, 2021; Jamous et al., 2021). Hybrid models emerged in response to the industrial rapid changes, continuously changing customer expectations and project requirements (Hassani, El Bouzekri El Idrissi & Abouabdellah, 2018). Jamous et al. (2021) emphasize the importance of the hybrid approach as being the most versatile and can be tailored and altered according to the project's needs and requirements. This allows the organisation to develop project management methodologies that best fit their particular context.

Belling (2020) in their study argues that most organisations find themselves somewhere on a continuum between the plan-drive approach and the iterative-driven approach which is the waterfall project management approach and the agile project management approach. Belling (2020) emphasises that when developing hybrid project management practices, it is critical for a business to understand where their organisation falls on the continuum and why. Although there are many more reasons why companies would adopt a hybrid approach Hassani, El Bouzekri El Idrissi & Abouabdellah (2018) postulate that digital transformation gives rise to digital projects which require exponential evolution and improvement. The authors recognise that there are gaps between the agile and waterfall approaches which can be reconciled by a hybrid approach.

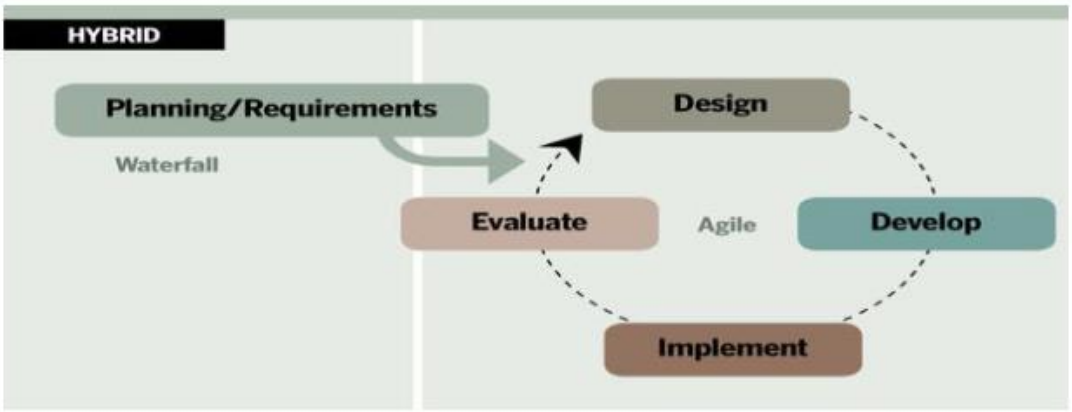


Figure 2. 2: Hybrid methodology (Hassani, El Bouzekri El Idrissi & Abouabdellah, 2018)

## 2.3 Digital transformation

Companies operating in any industry today are striving to make digital adoption a central tenet of their core business strategy to compete successfully in the modern marketplace. As a result, terms such as digital, digitalization and digital transformation have emerged at the forefront of discussions and are being used more frequently. There are various expectations and perspectives associated with these terms (Brennen & Kreiss, 2016; Vial, 2019), which is one of the reasons why understanding the phenomenon is critical.

According to Morakanyane, Grace & O'Reilly (2017) both in the academic and business world, there has been a major increase in interest in researching digital transformation; however, there is evidence that there is a lack of common understanding of this concept. The concept of digital transformation is divided into "digital" and "transformation" (Gebayew et al., 2018). For this reason, it is crucial to understand the terms digital technologies and digitalization before diving into the meaning of digital transformation.

### 2.3.1 Digital technologies and digitalization

Companies are increasingly embracing digital transformation to capitalize on the potential of digital technologies. However, a clear understanding of digital technologies and their specific meaning is crucial for businesses to move forward (Dörner & Edelman, 2015). The term "digital" refers to the rapid adoption of technology, which generates, stores, and processes data in bits or bytes (Salmons & Wilson, 2009). Digital technology, also known as SMACIT, encompasses social, mobile, analytics, cloud, and Internet of Things (IoT) technologies (Vial, 2019). These technologies present three main types of fundamental disruption: customer behaviour and expectations, the competitive landscape, and data availability.

Digitalization encompasses three key objectives: creating value at the cutting edge of business, optimizing procedures directly impacting the customer experience, and developing foundational capabilities to support the broader business strategy (Dörner & Edelman, 2015). Being digital involves leveraging data for better decision-making, delegating decision-making to smaller teams, and embracing iterative and rapid processes. The significance of digital is viewed in terms of its ability to unlock growth.

Dörner & Edelman (2015) argues that by having a common understanding of digital, business leaders can develop a shared vision for how digital can be used to capture value in their

organisations, leading to digitalization within the organisation. From the perspective of social life, Gimpel & Röglinger (2015) define digitalization as the process by which digital technologies penetrate society and alter relationships between individuals as well as their behaviours. Brennen & Kreiss (2016) add by emphasising that, numerous and varied spheres of social life are becoming organized around digital media and communication infrastructures. Communication is the foundation of all types of business and is a good example of why businesses cannot ignore the phenomenon of digitalization because it affects performance, either directly or indirectly.

### 2.3.2 Digital Transformation

Although it has become an accepted term in the business world, "digital transformation" is not entirely transparent (Palfreyman & Morton, 2022). Both practitioners and researchers still pose the question of "What do we know about digital transformation?" (Vial, 2019). From a business perspective, digital transformation is viewed by leaders as the key element in securing an organisation's survival and success in this "digital Era". According to Gebayew et al. (2018), digital transformation involves integrating digital technologies into many or all business domains that significantly impact customer value creation. Additionally, it may apply to the concept of "going paperless" in a narrower sense, which in return impacts both individuals and businesses (Al-Ruithe, Benkhelifa & Hameed, 2018).

Vial (2019:121) has defined digital transformation as: "*a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies.*" While Morakanyane, Grace and O'Reilly (2017:9) define it as "*An evolutionary process that leverages digital capabilities and technologies to enable business models, operational processes and customer experiences to create value*".

Based on these two definitions, the researcher concludes that digital transformation is the process through which digital technologies are incorporated into an organisation to enhance its value-generating capabilities. Frequently, organisations view digital transformation as a final result and question what it should entail and how long it will take to complete. Perusing the literature and examining the offered definitions, it is evident that digital transformation should be viewed more as a continuous dynamic evolution. It is not about a definitive, unchanging destination, but rather a continuous journey.

There is a significant change that occurs when a company decide to embark on a digital transformational journey. As postulated by Lang & Müller (2021), digital transformation is responsible for a significant shift in both society and the economy, and its progression is significantly influenced both by the development of information and communication technology (ICT) and the effective completion of change projects. Lang & Müller's (2021) findings show that digital transformation is inextricably linked to change management because it alters the way business models and processes operate.

Hassani, El Bouzekri El Idrissi & Abouabdellah (2018) concur with Lang and Müller (2021) adding that digital transformation refers to more than just the implementation of new technologies; rather, it has evolved into a significant management challenge that calls for the development of new management practices. It initiates change inside organisations, which necessitates effective change management.

### 2.3.3 The opportunities associated with digital transformation

Digital technologies have become a vital part of both individuals' and organisations' daily lives, making it critical to understand the opportunities and challenges that come with them. This is critical for organisations to be able to capitalise on benefits connected with digital technologies and plan strategies to tackle the challenges posed. One of the most significant advantages of digital transformation is the way it modifies the processes through which companies create appropriate value (Correani et al., 2020).

Morakanyane, Grace & O'Reilly (2017) highlight the following as the key impact of, digital transformation within an organisation: operational efficiency, improved customer experience, enhanced business models, strategic differentiation, competitive advantage, improved stakeholder relationships, and cost saving. Vial (2019) emphasizes that the new reality afforded by digital technologies offers tremendous potential for innovation and performance in organisations. Furthermore, the author propounds with the view of Morakanyane, Grace & O'Reilly (2017) highlighting operational efficiency and organisational performance as key impacts of digital transformation. Organisational performance houses benefits such as innovativeness, financial performance, firm growth and competitive advantage (Vial, 2019).

The innovative opportunities afforded by the adoption of digital transformation and the expansion of data they generate could stimulate robust economic growth. According to Trierveiler, Sell &

dos Santo (2019), companies adopt digital technologies with an interest in gaining financial benefits from the general decrease in the cost of technological components, improved computing performance, and enhanced global communication. As a result, these companies are transitioning to new business models through the implementation of projects that have the potential to either revolutionize or optimize their operations (Kozak-Holland & Procter, 2020).

### 2.3.4 The challenges associated with digital transformation.

Despite the benefits highlighted, the research demonstrates that adopting digital transformation activities is not always a simple road; it sometimes presents challenges. Amongst other things, digital transformation initiatives are hampered due to a lack of key digital skills in key areas. According to Guinan, Parise & Langowitz (2019), the digital project team is a crucial framework for achieving successful digital transformation, although the composition of the team is difficult due to the demands of digital transformation in terms of skills required.

The success of any company in this digital age is dependent on the workforce that has the required skills to manage the implementation of the technologies. Shakina, Parshakov & Alsufiev (2021) concur with the views of Guinan, Parise & Langowitz (2019), highlighting the key areas that have high demand in terms of digital skills such as big data (data science, Analytics), artificial intelligence (IoT deployment and development), cloud solutions and data manufacturing.

Vial (2019:131) draws attention to the issue of security and privacy, which poses a significant risk to individuals and society. Security and privacy concerns have emerged as a result of the massive amounts of data generated and kept facilitating digital transformation. Al-Ruithe, Benkhelifa & Hameed (2018) propound the view of Vial (2019) in a study conducted in Saudi Arabia on the adoption of cloud computing revealing that security, privacy, and loss of governance remain the most significant barriers to adopting cloud computing technology, despite the fact that some organisations acknowledged their lack of expertise in the subject.

According to Nurhas et al. (2021), identifying and comprehending issues associated with the implementation or adoption of digital transformation has become essential as businesses aspire to be digitally savvy to remain competitive in the global marketplace. It enables the executive leadership of diverse organisations to better technical initiatives and strategic decisions.

## 2.4 The impact of the COVID-19 pandemic on digital transformation

When the World Health Organisation (WHO) announced in the first quarter of 2020 that COVID-19 had emerged across the world and restrictions were imposed on social, business, economic, and educational activities, life as we knew it changed. Companies were forced to adapt how they do business, and business strategies had to be redefined (Gabryelczyk, 2020). It has become evident that the COVID-19 pandemic had a significant impact on the development of organisations, societies, and global economies.

Research conducted during and after the COVID-19 pandemic showed that the acceleration of the trend toward the use of digital technology is one of the consequences that can be attributed to COVID-19 (Dwivedi et al., 2020; Amankwah-Amoah et al., 2021; Hantrais et al., 2021). The restrictions imposed by COVID-19 necessitated a shift in business strategy that relied heavily on technological advancements (Kudyba, 2020).

According to Battisti, Alfiero & Leonidou (2022) and Kudyba (2020) the trend of working from home, also known as "remote work," became increasingly prevalent consequently impacting the demand for the development of Information and Communication Technologies (ICT) to enhance the implementation of remote work. Although remote work as a work practice was there before COVID-19 it became widely used by many organisations as one of the actions to maintain work continuity. Kudyba (2020) further clarified that businesses had to come up with novel strategies to survive the disruption forces since they could not rely on face-to-face interactions with employees, clients, and suppliers.

These factors ignited the development of virtual teams, which are still used by many organisations today and stand as a symbol of the workforce of the future; consequently, many businesses are allowing their employees to work remotely, and others are shifting to a hybrid model of workforce organisation. Wu (2022) presented a paper that demonstrated that when the world first started to limit in-person work in offices around the world in March 2020, PMO Advisory, a project management consulting and training firm headquartered in New Jersey, conducted a survey to understand the impact on project management. According to the survey, nearly half of project teams were collocated prior to the abrupt closure of offices to allow for social distancing. The closure of offices during the COVID-19 pandemic resulted in an almost immediate drop in the percentage of colocation teams from 47 percent to 15 percent.

Research has been done to look at the impact of this drastic change and the rise in remote work as a new trend. Battisti, Alfiero & Leonidou (2022) argue that its economic and financial impacts on the workforce are yet to be known. In their study where they sampled 976 workers, the authors revealed that the majority of workers experience a negative economic financial impact owing to the additional cost incurred for digital technology and platforms amongst other things. However, Wu (2022) contends that, despite the challenges that can occur from working remotely and collaborating on virtual teams, the benefits are enormous.

Hantrais et al. (2021) conducted a study that highlighted the COVID-19 outbreak as an accelerator towards the adoption of digital solutions and expediting unforeseen opportunities for scaling up alternative approaches to both social and economic life. However, the results of the study reveal the digital shift has also brought digital risks and threats that placed new demands on policymakers. Similarly, Amankwah-Amoah et al. (2021) in their study perceived COVID-19 as the "catalyst" towards adoption and increase in the use of digitalization in work organisation. The author found that although the adoption of emerging technologies presents new opportunities it also poses risks that may be hard to mitigate and prepare for.

In the South African context digital transformation after COVID-19 demonstrated to be the major area of focus for business and government. Dell Technologies (2020) published a report 'Digital Transformation Index' providing a global view of how organisations are accelerating and leading digital transformation projects post-COVID-19 pandemic (ITWeb, 2021). Their report revealed that 84 percent of South African organisations surveyed are aware that as a result of disruptions that occurred due to the COVID-19 pandemic, more adaptable and scalable IT infrastructure is required to accommodate unforeseen circumstances. Furthermore, the findings show that they are far more likely than the global average surveyed to invest in emerging technologies in the next one to three years in order to become digital enterprises of the future.

According to the literature, COVID-19 played an important role in expediting the adoption of digital technology within various organisations, resulting in the transformation of various business areas.

## 2.5 Digital transformation in project management

Project management has widely become much more accepted within various industries such as banking, utilities, retail and automobile just to name a few. The widespread use of project management in various industries exposes it to the unfolding digital transformation and disrupts

the relationship between current capabilities and the demands of emerging digital technologies. Zin, Nang and Kham (2018) posit that project management in implementing Industry 4.0 projects is becoming more and more challenging because of different elements of that and emerging new technologies.

The repercussions of the accelerated adoption of new technologies are far-reaching, affecting the way projects are managed in many ways and demanding innovative thinking to kick in within organisations. This perspective is consistent with empirical research conducted by Kozarkiewicz (2020), which indicated that digital transformation has had a substantial impact not only on the transition of technology, but also on the transition of strategies, business models, organisational structures, and competencies.

The author conducted a survey on 100 project managers and analysed their perception of the most important aspects of digital transformation in the context of project management. The following are the top six most important aspects of digital transformation in project management, as identified by Kozarkiewicz (2020):

- Project data accessibility regardless of location.
- IT tools supporting project management processes.
- Communication within project teams
- The methodology of project management, or more precisely, its evolution toward the adoption of agile approaches
- Possibilities of achieving a higher degree of customer orientation
- Optimization of processes

Organisations that make the transition to modern technology experience a surge in innovation and growth, while their project managers benefit from the ready availability of data for making informed decisions, producing accurate reports, and keeping all stakeholders informed and involved. Another benefit of transitioning to modern technology is the ability to share dashboards that provide stakeholders with real-time information on budgets, progress and more (Lieberson, 2021).

According to researchers and practitioners, project management elements such as communication models, project management methodologies, project team location and project managers' roles are being redefined because of the digital transformation occurring within organisations (Guinan,

Parise & Langowitz, 2019; Whyte, 2019; Marnewick & Marnewick, 2021). Previous research by Sycheva, Chernova & Evdokimova, (2021) highlights the importance of automating routine tasks, creating centralized repositories, and fostering open communication in project management. Additionally, Lieberson (2021) suggests that process automation and workflow technology have already been widely adopted by project managers for tasks like reporting and scheduling.

Panenkov et al. (2021) concur with Sycheva, Chernova & Evdokimova (2021) adding that digital information is also changing how projects are delivered enabling greater sharing, remote access, searching, and updating of information with visibility across supply chains and with owners, operators and end users. The perspectives and findings of the researchers bring to light different aspects of project management impacted by the digital shift and some of them appear to be common such as communication, data-driven work practices, the use of IT tools and collaborations. Highlighting these aspects makes it abundantly evident that a new landscape of skills and competencies for project managers will be required to meet the changing needs of the sector. The transition to digital technologies creates new cultural practices, which calls for new approaches to leadership, communication, and collaboration processes (Papadonikolaki, Krystallis & Morgan, 2022).

### 2.5.1 Remote work and virtual teams

COVID-19 has triggered an undeniable radical shift in work habits by mandating remote work, which the vast majority of businesses have decided to retain. Some companies have adopted a hybrid model of work in which employees work from the office on some days and from home on other days. In the context of project management, the concept of working remotely is not new, but the COVID-19 pandemic has increased its prevalence. It is mostly referred to as virtual work performed by a virtual project team.

Drawing from prior research before the COVID-19 Pandemic Guss (1998:23) defines a virtual project team as “a temporary group of trained people separated by geographic, temporal or psychological distance, who work across organisational forms, depend on face-to-face and remote communication with the intent of satisfying business requirements of sharing skills and working toward common team and client goals.” In the earlier literature virtual teams used to be characterised by a high level of geographical dispersion which mostly included internationally located individuals. However, that is different in the COVID-19 context leading us to define a

virtual team as a group of people that are primarily local, involving the same members who used to work together in the office (Chamakiotis, Panteli & Davison, 2021).

The future of work will be shaped in large part by virtual teams, therefore it's crucial to understand which factors will determine their success. According to prior literature, the most critical variables for project success in the virtual team are trust, clear communication, technical support, strong leadership, an adequate level of technology, and the company's overall support (Bergiel, Bergiel & Balsmeier, 2008; Verburg, Bosch-Sijtsema & Vartiainen, 2013).

The current literature has demonstrated that the success of virtual teams is based on the collaboration tools and technology deployed, the cultural diversity of the team, effective resource planning, trust between team members, effective leadership, and well-defined communication guidelines and training (Swart, Bond-Barnard & Chugh, 2022). Prior and current literature offer similar virtual team success criteria. However, the well-being of the virtual team is identified by Chamakiotis, Panteli & Davison (2021) as a new emerging critical variable for virtual teams.

Virtual teams provide both the team and their organisations with benefits such as the eradication of geographical location constraints, increased team productivity, promotion of effective communication and management, information accessibility regardless of geographical location and cost reduction (Blaskovics, 2018). In contrast, Battisti, Alfiero & Leonidou (2022) argue that remote work has a negative economic-financial impact on the majority of workers due to the additional cost incurred for digital technology and platforms and for utilities as well as non-payment of overtime and meals which are higher than the saving in commuting cost. This opens up a debate between employers and employees on whether remote work has a financial benefit attached to it or not.

Despite the positive effects of a virtual team identified in the prior literature, the literature also considers the possible challenges associated with the geographical dispersion of the team. The lack of personal presence, the absence of direct interaction with other stakeholders, and the difficulty in establishing trust within the team, work-life balance, and technical issues are some of the challenges encountered, and these challenges hinder communication and lead to inefficient collaboration (Blaskovics, 2018). To mitigate these challenges, it is highly recommended that training should be provided for the team to adjust to the new virtual working methods (Swart, Bond-Barnard & Chugh. 2022).

The shift from traditional face-to-face interactions to virtual work prompted a spike in the adoption of digital communication and management tools that facilitate distant interactions. A well-built Information and Communication Technology (ICT) infrastructure and a mature project team are mandatory requirements to achieve effective team communication and collaboration which contribute to project success (Blaskovics, 2018). The most popular communication tools currently used to interface and coordinate virtual teams include Video conferencing (e.g., Teams, Zoom) electronic mail (email), and collaboration systems (e.g., Asana, Trello, Slack).

### 2.5.2 Project team communication

One of the most crucial aspects of project management is the ability to communicate effectively with stakeholders (Blaskovics, 2018; Subramaniam et al., 2021). The rapid growth towards digital transformation initiatives has a substantial effect on project activities in general, and project team communication falls within the broad spectrum of such effects (Guinan, Parise & Langowitz, 2019). This is supported by Kozarkiewicz (2020), who postulates that the current discussions on digital transformation focus on new technology and changes in communication, innovation, and organisational competencies.

Although the adoption of digital communication was already underway before the global COVID-19 outbreak, the pandemic expedited it. The pandemic created a shift from face-to-face engagement to virtual engagement as discussed in the previous chapter and forced industries to rework their existing project communication and management practices (Subramaniam et al., 2021; Swart, Bond-Barnard & Chugh, 2022). The shift to virtual teams resulted in the massive adoption of digital technologies that radically transformed project roles and project delivery as well as how project teams are led and engaged.

Recent studies confirm that some adjustments in how project teams or employees are used to communicate will have to occur to achieve and maintain effective communication (Kozarkiewicz, 2020; DeFilippis et al., 2022; Swart, Bond-Barnard & Chugh, 2022). DeFilippis et al. (2022) conducted a study to explore the impact of COVID-19 on employees' digital communication patterns in 16 large metropolitan areas in North America, Europe and the Middle East. The study revealed that the formal communication patterns in terms of (meeting frequency and email activities) have changed in the face of a global pandemic, evidently showing an increase in the number of meetings among employees.

The digital transformation has both advantages and disadvantages for project team communication. One major drawback is the lack of face-to-face interaction (Blaskovics, 2018), which can impact conflict management and work delegations. Virtual work uses "lean" channels like emails and videoconferences, and some in-person information may be lost when translated into digital mediums (DeFilippis et al., 2022). To maintain effective communication, Swart, Bond-Barnard, and Chugh (2022) recommend using clear communication guidelines, training, and an agile communication framework for regular interaction, collaboration, and task allocation in virtual teams.

### 2.5.3 Project manager competencies and skills in the digital era

Project managers are responsible for maintaining an organisation's efficiency and productivity by using their management and leadership abilities to oversee various projects. Pressure is exerted on them to successfully manage their respective projects and be capable of adapting to any changes that may occur inside their respective organisations. Because of this growing need, project managers need to work on improving their leadership styles and skills in the digital world of today.

This aligns with the perspectives of Marnewick & Marnewick (2021), who argue that the competence of project managers, which encompasses a range of skills and behaviours acquired through practical involvement, has become a pivotal factor in the advancement of project management. The authors further clarify that the acquisition of certification is not considered to be, nor should it be interpreted as, being competent; rather, competency is interpreted as the combination of knowledge, skills, and behaviours developed through experience.

The views of Marnewick & Marnewick (2021) are in line with the Project Management Institute (PMI) report that focuses on the project managers of the future, emphasizing developing digital-age project management skills to thrive in disruptive times (PMI, 2018). They postulate that for businesses to succeed in today's increasingly digital world, they will need to recognise the importance of a wide range of skills required to carry out their projects and programmes. The PMI (2018) goes into more detail about the digital skill sets that help individuals succeed in today's digital environment. These include data management and analytics; an innovative mindset; security and privacy knowledge; legal and regulatory compliance knowledge; collaborative leadership; and data-driven decision-making.

With the introduction of new project management tools such as collaboration software, cloud storage systems, and online project management software, project managers are under increased pressure to be internet savvy and digitally skilled, necessitating the development of a new type of intelligence "digital intelligence" (Marnewick & Marnewick, 2021).

Marnewick & Marnewick (2021) conducted a study on South African project managers to investigate the digital intelligence competencies required by project managers to manage 4IR-related projects and to identify the digital intelligence competencies considered most important by those project managers. The findings of the study are consistent with the report of PMI (2018), which provides evidence to support the proposition that the shift in digital technologies calls for the development of novel technical, personal, and social skills. More importantly, the author established that project managers need to have digital competence and that having digital competence will require "digital intelligence".

The following were identified as the most important skills for the future project workforce (Marnewick & Marnewick, 2021):

- Online communication and collaboration,
- Digital empathy,
- Public and mass communication,
- Balanced use of technology,
- Data literacy and AI Literacy
- Content and cyber-risk management.

### 2.5.4 Project Management methodology in the digital era

Digital transformation is frequently considered to have a significant impact on traditional project management approaches. The decision by organisations or businesses to embark on a digital migration journey demands project leaders to be adaptable to the change and respond with new approaches that will close the organisational capability gap. Similarly, in practice, most organisations use a variety of project management methodologies such as traditional (waterfall), Agile, Kanban, Scrum etc., depending on the projects they are working on.

However, the traditional (waterfall) project management approach is being criticised by for its inability to foster project success, especially in digital projects. According to Hassani, El Bouzekri El Idrissi & Abouabdellah (2018), digital transformation has become a critical issue in many organisations, accelerating the development and introduction of new and improved managerial thinking. In an attempt to answer the question of what the most suitable method is for managing digital projects, the authors analysed the existing literature and made a thorough comparison between traditional and agile methodologies. In their conclusion, they proposed a new hybrid methodology that will support digital companies in executing and achieving success with their digital projects, adding that a distinct project management methodology is required to manage digital initiatives.

A hybrid methodology combines the elements of agile and waterfall methodologies, and it can also be a combination of two different agile methodologies. The hybrid methodology has the advantage of combining the functionalities of the two methods; the waterfall method is used in the initial phase of the project and the agile method is used in the execution phase. Agile methodologies are widely used in industries such as consulting, custom product development, software development, and others. However, Belling (2020) argues that in cases where a clear definition of the project's scope is required, agile teams can benefit from incorporating traditional (waterfall) methodologies.

The waterfall methodology is suitable for defining project requirements, but due to its rigidity, it fails to achieve success in the execution of projects that are fraught with constant change. The literature further indicates that incorporating practices such as agile project management, process flexibility, lean start-up, design thinking, continuous deployment, and integrated development and operations are all essential for any organisation to achieve agility (Gimpel et al., 2018:42).

Practitioners and researchers are advocating for agile methodology over traditional waterfall methods for digital project implementation (Corejova & Bielik, 2020). This is due to the challenges of digital migration and the need for flexible project management. Khoza & Marnewick's (2020) study found that Agile projects are more successful than waterfall ones in South Africa, indicating the need for rethinking project management approaches to accommodate digital migration initiatives. This shift in methodology aligns with the alarming failure rates of some software projects.

The digital transformation journey presents challenges for both private and public sectors due to increased complexity levels. Nerurkar and Das (2017) suggest using flexible project management methodologies like agile for large-scale projects, requiring a revaluation of traditional methodologies for effective digital migration management.

Kudyba (2020) emphasise that it is paramount for businesses to consider more rapid and dynamic project-based frameworks to be successful in the process of becoming a more intensively digitized organisation. The author recommends using adaptable project management strategies such as the agile approach, which is more versatile and well-suited to the management of projects that involve strategic change, novelty, and innovation. The accelerated transformation presented organisations with an opportunity to quickly adapt to new and more efficient ways of implementing projects.

## 2.6 Conclusion

The chapter provides a view that the process of digital transformation encompasses the integration of digital technologies and the deliberate utilization of these technologies to bring about transformative changes in various aspects of a business. This integration of digital technologies has necessitated substantial changes in traditional project management methodologies. Hybrid and agile project management methodologies are commonly preferred due to their iterative nature, which allows for effective adaptation to the dynamic and fast-paced nature of digital projects. Furthermore, it has necessitated that project managers possess a well-balanced combination of relevant skill sets to achieve project success (PMI, 2018; Marnewick & Marnewick, 2021).

Overall, the COVID-19 pandemic has served as a catalyst for digital transformation across various industries, resulting in significant changes to company practices. As a result, organisations across diverse sectors have implemented remote work, hybrid work arrangements, and virtual teams. The literature illustrates the significance of adapting communication patterns within the realm of virtual work, notwithstanding the advantages it offers, such as cost reduction, enhanced communication, and increased team productivity. Nevertheless, persistent challenges include limited opportunities for face-to-face interactions, technological constraints, and economic and financial concerns.

The perspectives of the authors regarding project management aspects affected by digital transformation demonstrate shared characteristics across various industries. These include communication, collaboration within project teams, engagement with stakeholders, utilization of

project management methodologies, management of resources, and the use and accessibility of data.

The literature suggests that transforming business processes through digital solutions can increase revenue, customer engagement, and data access, but IT security and privacy issues must be addressed. Other issues included digital project management skills, change resistance, and top management support. Despite the challenges, digital transformation shows that digital technologies will continue to change how businesses do business and that companies must adapt to digitization.

# CHAPTER 3 METHODOLOGY

## 3.1 Introduction

This chapter provides an overview of the research approach and strategy. The significance of the research design was described and elaborated on, followed by a discussion of the study's research approach, including the research philosophy and the fundamental beliefs or paradigms that informed data collection, analysis, and interpretation.

## 3.2 Significance of research design

The research design is a comprehensive plan for the research project that includes the methods, techniques, and procedures that will be employed to collect and analyse the data. It depends on how the researcher perceives the problem and how it can be studied, meaning that the researcher's perspectives, beliefs, and assumptions, which social scientists refer to as "paradigms," inform the research approach (Kawulich, Garner & Wagner, 2012; Rahi, 2017).

Asenahabi (2019) emphasise that carefully outlining how the research will be organised to find the results of the research enquiry can help researchers avoid setbacks. Research is conducted in a methodical manner to effectively address research problems (Patel & Patel, 2019). This methodical approach provides structure ensuring that the researcher obtains accurate and reliable results. Mishra and Alok (2017) add by stating that the research process consists of a sequence of activities or processes that are necessary to successfully carry out research. The process flow can be modified based on the researcher's perspective and philosophical stance. As an illustration of the systematic flow of research, a typical flowchart is presented in Figure 3.1.

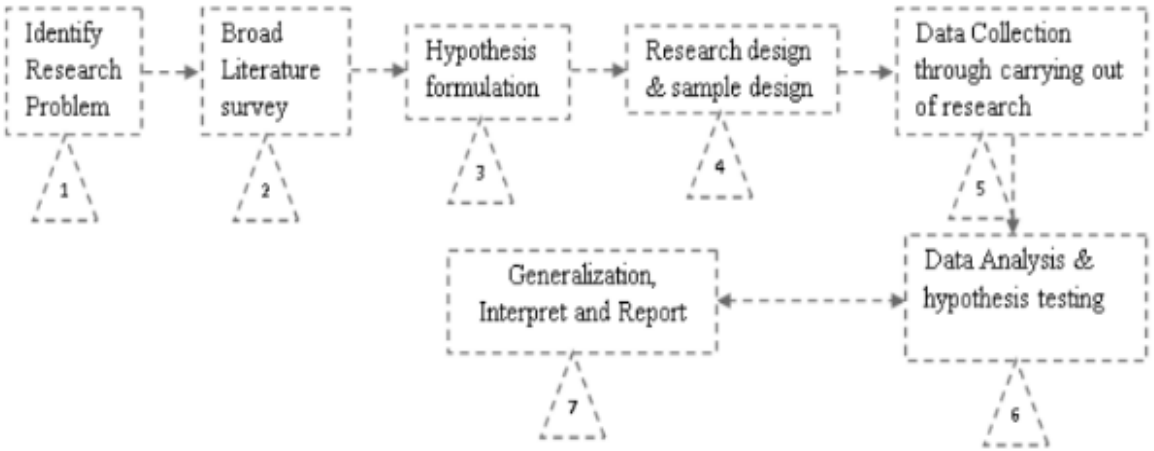


Figure 3. 1: Typical flow chart of the research process (Alok & Mishra, 2017)

## 3.3 Research approach

According to Kumar (2019), research studies can be classified based on their objectives, which include descriptive, correlational, explanatory, or exploratory. Descriptive research aims to provide an elaborate portrayal of a specific phenomenon, answering questions about its "what" and "how" (Kawulich, Garner, & Wagner, 2012). On the other hand, explanatory research seeks to identify the causes and effects of a phenomenon, aiming to provide a deeper understanding of why it occurs (Kawulich, Garner, & Wagner, 2012). Lastly, exploratory research is undertaken in situations where there is limited knowledge about the phenomenon, existing findings are inconclusive, or the subject matter is complex (Bougie & Sekaran, 2020).

Explanatory research is an approach that seeks to identify the causes and effects of a particular phenomenon, aiming to provide a deeper understanding of why something occurs (Kawulich, Garner, & Wagner, 2012). This research approach addresses the ‘why’ and ‘how’ questions (Kumar, 2019) Contrary to descriptive research, which focuses on describing a particular phenomenon without explaining its underlying reasons, explanatory research aims to provide explanations for the occurrence of a phenomenon.

Exploratory research is undertaken in situations where there is limited knowledge regarding the phenomenon under investigation, existing findings are inconclusive, or the subject matter is characterised by a high degree of complexity (Bougie & Sekaran, 2020). The primary objective of exploratory research is not to offer definitive and conclusive responses to research inquiries. Rather, it seeks to address the existing gaps and areas of limited investigation within specific academic domains. Exploratory research often involves diverse methodologies for data collection, such as grounded theory, group discussions, the Delphi method, individual interviews, ethnography and case studies, narrative, and observation (Haydam & Steenkamp, 2020).

The study aims to explore the phenomenon of COVID-19-driven digital transformation in project management. Haydam & Steenkamp (2020) maintain that any strategy for gathering data that contributes to understanding a situation, phenomenon, group, or individual falls under the umbrella of exploratory research design. The decision to use an exploratory strategy was made because the phenomenon of COVID-19-driven digital transformation in project management has not been extensively studied. By adopting an exploratory approach, the researcher aims to gain a deeper understanding of this phenomenon and generate insights that can inform future research and practice.

To guide this research through an exploratory investigation of the impact of the COVID-19-driven digital transformation on project management, the following research question was posed.

- *How has the digital transformation driven by the COVID-19 pandemic impacted the project management practices and processes in South Africa?*

The following objectives were considered to answer the research questions that have been presented:

1. *Assess project leaders' understanding of digital transformation.*
2. *Evaluate the impact of the COVID-19 pandemic-driven digital transformation on the key aspects of project management.*
3. *Determine the impact of COVID-19 on the adoption of digital technologies from the perspective of project leaders.*
4. *Identify the opportunities and challenges related to the COVID-19 pandemic-driven digital transformation.*

## 3.4 Paradigm

The presented paradigm in the previous section provided the researcher with a vantage point from which it was determined that a qualitative research strategy, as opposed to a quantitative one, was necessary to fully understand and explore the topic at hand. The study was positioned within an interpretivist paradigm (Kawulich, Garner & Wagner, 2012; Gephart, 2018; Rosenthal, 2018). In the view that there are multiple realities through which one can make sense of the world, the study intended to interpret reality based on the knowledge and experiences of those who are in project-related roles.

A paradigm can be defined as a basic belief system and theoretical framework that has assumptions about ontology, epistemology, and methodology (Guba & Lincoln, 1994; Kawulich, Garner & Wagner, 2012, Abdul Rehman & Alharthi, 2016). Various paradigms exist within the field of research, encompassing a range of perspectives and approaches. These paradigms include but not limited to, positivism, interpretivism, transformative, postcolonial indigenous, and critical theory (Kawulich, Garner, & Wagner, 2012; Abdul Rehman & Alharthi, 2016). It is emphasised that choosing a philosophical outlook to investigate a phenomenon should be guided

by the needs and requirements of a research study, not by an obstinate commitment to one philosophical outlook over others.

Positivism asserts that the scientific method is the sole means for determining truth and objective reality (Kawulich, Garner, & Wagner, 2012). According to Park, Konge & Artino (2020) the positivist paradigm is based on the underlying belief that there is a single, tangible reality that can be comprehended, defined, and quantified. Positivists adopt an ontological stance characterised by realism, positing the existence of a singular, objective reality that exists independently of human perception (Tracy, 2019). Kawulich, Garner, and Wagner (2012), adds that positivists believe that authentic knowledge is obtained through scientific investigation and that the application of methods derived from the natural sciences provides the most efficient framework for examining social phenomena.

Positivists adopt an epistemological stance rooted in objectivism, wherein researchers assume the role of impartial observers who investigate phenomena that exist autonomously from their own subjective experiences (Abdul Rehman and Alharthi, 2016). Therefore, researchers make efforts to minimise any potential impact or disturbance on the observed phenomena, ensuring that the personal background and biases of the researcher do not compromise the objectivity of the findings (Tracy, 2019). Positivist researchers utilise a variety of methods, such as quantitative, experimental, correlational, quasi-experimental, and causal comparative approaches (Kawulich, Garner, & Wagner, 2012). Additionally, qualitative approaches may also be incorporated into the research methodology (Tracy, 2019).

Interpretive research is defined by Gephart (2018:34) as “research that systematically constructs scientific theory and concepts (knowledge) as ‘second order’ interpretations based on inductive and abductive analysis of members’ actual common sense or ‘first order’ concepts and actions and meanings”. The interpretive stance gives primacy to the account of understanding from multiple perspectives of participants from which the researcher can extract meaning from patterns to arrive at certain inferences. Bhattacherjee (2012:103) defines the interpretivist paradigm as “a research paradigm that is based on the assumption that social reality is not singular or objective but is rather shaped by human experiences and social contexts (ontology) and is, therefore, best studied within its socio-historic context by reconciling the subjective interpretations of its various participants (epistemology).” Rosenthal (2018:15) substantiated this by stating that within the interpretive paradigm, meanings are constructed in a dynamic, interactive process. In contrast to positivism,

which assumes a single "social reality," interpretive research recognises the existence of multiple perspectives and experiences. It acknowledges that social phenomena are complex and cannot be reduced to a singular objective reality.

Interpretivists employ methodologies that yield qualitative data as a means to direct their research endeavours. While it is possible for numerical data to be incorporated, interpretivists do not heavily depend on such data, in contrast to positivists, who place greater reliance on qualitative data (Abdul Rehman & Alharthi, 2016). According to Welman, Kruger & Mitchell (2005:8), quantitative research often involves numbers and focuses on examining and measuring relationships between variables and it seeks to abstract reality and categorise it using numbers and percentages. Rahi (2017) asserts that the quantitative method prioritises the collection of new data that is relevant to the problem at hand, typically from a large population. This approach disregards individual emotions and environmental context, prioritising objective measurement over interpretation. The methodologies employed in quantitative research are typically grounded in the postpositivist paradigm and have predominantly originated from the discipline of psychology (Creswell & Creswell, 2018). The author highlights three primary methodologies of investigation commonly employed in qualitative research: experimental design, non-experimental design, such as surveys, and longitudinal design.

Contrary to quantitative research, which uses numerical data, qualitative research primarily relies on non-numeric data from interviews and observations (Welman, Kruger & Mitchell, 2005; Kawulich, Garner & Wagner, 2012). The qualitative approach seeks to understand the lifeworld and processes, as well as the social construction of reality. Otani (2020) adds that qualitative research acquires data through linguistic data such as interviews and observations, which are analysed in various scientific ways. In qualitative research, the focus is on learning about and describing the unique experiences and motivations that drive real people in the real world (Liamputtong, 2019). Fundamentally the foundation of any qualitative study is the participants' interpretations and meanings.

Researchers employ a diverse range of qualitative methodologies to comprehend and analyse human experiences and behaviors, including but not limited to ethnography, narrative research, and case study (Creswell et al., 2007; Kawulich, Garner & Wagner, 2012). However, the researcher needs to have a clear understanding of which qualitative approach meets their research

needs the best, based on the nature of the research problem and the focus area of the research. Although these methods are all qualitative approaches the differ in their focus and methods.

According to Kumar Mohajan (2018) the narrative method is a framework that examines textual attributes and interpersonal dynamics within social, historical, and cultural frameworks. This approach places emphasis on the portrayal of characters and the chronological progression of a narrative. Creswell & Creswell (2018) asserts that subsequently, the researcher frequently recounts or reconfigures this data into a narrative sequence. Frequently, the culmination of the narrative entails the integration of perspectives derived from the experiences of both the participant and the researcher, resulting in a collaborative narrative. In narrative research observations, diaries, letters, interviews, artifacts, and photographs collect data (Kumar Mohajan, 2018).

Creswell & Creswell (2018) defines ethnography as a research methodology with roots in anthropology and sociology. Cultural anthropology is the study of a cohesive cultural group's behavior, language, and actions in their natural environment over time. Understanding others entails inquiring about the context in order to comprehend events and cultural activities (Kawulich, Garner & Wagner, 2012). The author further states that data collection in ethnography entails participant observation, in-depth interviews, and document analysis.

According to Creswell & Creswell (2018), case studies are a type of inquiry found in many fields, particularly evaluation, in which the researcher develops an in-depth analysis of a case, which is often a program, event, activity, process, or one or more individuals. Case studies are valuable for providing detailed and contextualised information about a specific phenomenon, allowing researchers to explore complex and unique situations in depth. They often involve collecting multiple sources of data, such as interviews, observations, and documents, to provide a comprehensive understanding of the case under investigation. According to Rahi (2017), a case study is the preferred research method when the researcher has limited control over the events being studied.

The case study approach was chosen for this research because it allows for an in-depth analysis of the phenomenon. Unlike ethnography, which focuses on understanding cultural groups, or narrative research, which emphasises textual attributes and interpersonal dynamics, a case study provides a comprehensive understanding of a complex and unique situation. In this research, the

case study design was preferred as the research question is exploratory in nature and the researcher has limited control over the events being studied. By adopting a case study methodology, the researcher can investigate the phenomenon within an authentic, real-world setting and gain contextualised insights.

## 3.5 Case study

As stated in the previous section this research was conducted in the form of a case study through the analysis of multiple cases, with the researcher adopting the views of (Eisenhardt, 1989; Flyvbjerg, 2006; Crowe et al, 2011; Mills & Birks, 2017) as the pivotal researchers in the field of case study methodology. The case study approach is a type of qualitative analysis in which single or multiple numbers of units (Individuals, groups, and institutions) are analysed and intensively explored (Welman, Kruger & Mitchell, 2005).

Crowe et al. (2011) define a case study as "a research approach that is used to generate an in-depth, multi-facet understanding of a complex issue in its real-life context". Creswell et al. (2007) add that it investigates a particular issue by analysing people, groups, programmes, or actions that have been selected to provide clarity on that issue. Asenahabi (2019) further explain that a case study is an in-depth examination of a topic that provides personal perspectives rather than statistical data. Although case study research is one of the most widely used qualitative research methods, it is still the subject of debate in academic and research communities. It receives criticism for its inability to provide generalizable results (Lee & Saunders, 2017; Reiter, 2017).

Purists in the field of social research are adamant that only quantitative data can be used to make broad generalisations, and that individual case studies are unfit to serve as a foundation for the development of theories (Flyvbjerg, 2006). However, despite the criticisms, some researchers maintain that it is beneficial for the creation of new theories (Eisenhardt, 1989), while others applaud its ability to conduct in-depth research on a specific institution or phenomenon (Lee & Saunders, 2017).

In an in-depth examination of the main objections to this type of research, Flyvbjerg (2006) provided compelling evidence that case study research can be useful, especially in situations where quantitative assessments are not feasible. In contrast to quantitative methods, case studies are particularly well-suited to clarifying the "how" and "why" of a phenomenon through in-depth exploration and interaction with participants (Thomas & Myers, 2017).

### 3.5.1 Multiple Case study

According to Crowe et al. (2011), who cite Stake's work, there are three types of case studies: intrinsic, instrumental, and collective. According to the author, an intrinsic case study is conducted to gain insights into a unique phenomenon. On the other hand, an instrumental case study uses a specific case to gain a broader understanding of a topic. In contrast, a collective case study involves studying multiple cases together or in sequence to develop a more comprehensive understanding of a specific problem.

Researchers have debated the optimal number of cases to be included in a multiple case study research. Yin (2016) emphasises the importance of avoiding sampling logic and using power analysis to determine the appropriate sample size. The author posits that it is imperative for researchers to consider the intended quantity of case replications, encompassing both literal and theoretical replications, during the design phase of their study. Schoch (2020) suggests that it is commonly acknowledged that managing a maximum of three to four distinct cases is a realistic approach for the purpose of comparison.

Based on the aforementioned premises, the multiple case study method was employed, and a total of five cases were examined. The study adhered to the advice of Mills and Birks (2017) who postulate that the definition of what constitutes the 'unit', or case to be studied, is at the discretion of the researcher. A case was represented by a project leader working in a company delivering projects as part of their work within South Africa. A project leader is an individual with project-related roles such as project manager, project coordinator, project implementer, and programme manager.

A case should have a pre-determined boundary which clarifies the nature and period covered by the case study (Crowe et al., 2011). Considering this, the study intended to explore the digital transformation phenomenon during the period of COVID-19. Therefore, for the case to be valid it was crucial to specify the period and to be clear that the project leader should have managed projects before, during and after the COVID-19 pandemic. The organisations in which project leaders will be based can be from any industry such as banking, utilities, construction & design, retail, Research and design, Information Technology (IT), telecommunications and project management or professional service consulting industries.

## 3.6 The research sampling.

The term "population" in a research study entails the complete set of individuals, events, or objects that are of relevance and are being investigated by the researcher (Bougie & Sekaran, 2020). And a sample is a selected subset that accurately represents the entire population. Numerous options exist for researchers looking to establish a sampling frame, which is commonly used to select samples (Stokes & Wall, 2017).

According to Rahi (2017), there are two main sampling techniques commonly used in research: probability sampling (random) and non-probability sampling. Probability sampling is a method where each member of the population has an equal chance of being selected for the sample, ensuring that the sample is representative of the entire population. On the other hand, non-probability sampling is a sampling method where the likelihood or probability of selecting each unit is not known or verified (Rahi, 2017; Stokes & Wall, 2017).

Non-probability sampling techniques rely on subjective judgement rather than random selection. Convenience sampling, purposive sampling, and snowball sampling are non-probability sampling methods (Stokes & Wall, 2017). Convenience sampling involves selecting readily available and accessible participants, while purposeful sampling involves selecting participants with specific characteristics or expertise relevant to the research topic (Bougie & Sekaran, 2020; Campbell et al., 2020). Snowball sampling, on the other hand, entails identifying initial participants, who then refer other potential participants for the study (Kawulich, Garner & Wagner, 2012).

The population for this study comprises individuals in project delivery management positions within various industries in South Africa. These positions include project managers, project coordinators, project implementers, programme managers, and PMO managers, who are responsible for overseeing the implementation and completion of projects. However, the population size for this study is unknown due to the diverse range of project leaders in various industries in South Africa.

Convenience sampling involves selecting participants based on their easy accessibility, which may not guarantee the representation of individuals with the specific characteristics or experiences required for the research. Similarly, snowball sampling relies on referrals from initial participants, which could lead to a biased sample that does not adequately represent the target population. These

limitations make convenience and snowball sampling methods unsuitable for this study, as we require a sample that specifically includes project leaders who meet the specified criteria.

Purposive sampling was chosen for this study because it allows for the deliberate selection of participants who possess the specific characteristics necessary for the research. Purposive sampling method increases the likelihood of obtaining valuable insights from individuals who meet the criteria specified below:

- *Project leaders (varied levels/roles)*: project manager, project coordinator, project implementer, programme manager, PMO manager.
- *Working within the project-based organisation in South Africa*: Any company delivering projects as part of their work in any industry within the regions of South Africa
- *Work experience: Project delivery work experience*: average work experience of five years in a project management role.
- *Period:* The project leader should have been involved in project implementation between 2019 - 2022 [before, during, and after the COVID-19 pandemic].

The researcher used LinkedIn and other search engines to find potential participants in appropriate occupations to participate in the study.

## 3.7 Data collection

In qualitative research, collecting data can be done in several approaches, such as through interviews with individuals or groups, observation, contextual or visual analysis, document review, or focus group discussions (Gill et al., 2008). The study opted for primary data collection achieved through conducting a semi-structured interview with five project leaders working for companies that implement the project as part of their work and are based within South Africa.

### 3.7.1 Interviews as a data collection method

In qualitative research, interviews are regarded as the most common approach to collecting data. The interview data collection approach provides the researcher with the opportunity to conduct an in-depth investigation into the individual experiences, perceptions, and beliefs of each participant (Gill et al., 2008). There are two ways that the interview can be conducted: one is to give it a very rigid and organised format (structured), while the other is to give it no format at all (unstructured).

A semi-structured interview is something that falls somewhere in the middle of a completely unstructured interview and a structured interview, and it includes both key questions and a list of topics that need to be covered.

According to Kawulich, Garner and Wagner (2012), the breadth of the data collected through semi-structured interviews enables the researcher to see the world through the perspective of the respondents. One of the advantages of conducting research in the form of interviews is that it enables the researcher to obtain valuable knowledge as well as a comprehensive understanding of the phenomenon being studied.

In keeping with the exploratory nature of this study, a semi-structured interview was selected as the most suitable option to collect data. The researcher decided to use this approach based on the reasons that it will achieve the aim of providing valuable descriptive information. Furthermore, the flexibility of semi-structured interviews allows for additional clarification in the event of a misunderstanding while the open-ended questions allow for more discussion than a simple question-and-answer format.

## 3.8 Data gathering process

Mills and Birks (2017) state that gaining access to a case or unit of the case study is the first step in the development of a case study. If a person is serving as the unit of the case study, that person must confirm their consent to the interaction, which may need to be done more than once depending on the study's design.

First, to gain access to the case or unit the researcher invited potential participants satisfying the criteria of the research as specified in the previous section. LinkedIn was used as the main platform for identifying and inviting potential participants.

Following acceptance to participate, interviews were scheduled, each lasting approximately one hour on average, and all were conducted in an environment free of noise and distractions. Interviews took place via video conferencing (Microsoft Teams).

During the interview the interviewer greeted and briefed the participants before the start of the interview, providing them with information about the research's purpose, the research process, and the rights and responsibilities of the participants in the case study, as well as other pertinent

information. The interviewer summarised the questionnaire to provide context for the questions before asking the questions. An interview schedule was used to maintain consistency among the participants.

The interview schedule (Appendix 1) was divided into two sections: the first section asked participants for personal information such as their name and position within the organisation, as well as their years of work experience in a project-related role and years of experience. The second section focused on the questions related to the study.

## 3.9 Reliability and validity

Reliability and validity in research are crucial for ensuring the accuracy and credibility of the findings. According to Noble & Smith (2015), validity is the accuracy with which the findings reflect the data as well as the integrity and applicability of the methods used. On the other hand, reliability refers to the consistency of the procedures for analysis employed. Kumar (2019), states that qualitative research utilises various adaptable and evolving methods and procedures to address research inquiries, which presents challenges in achieving standardisation of research tools and processes. In the interpretivist or constructivist paradigm, two criteria are commonly employed to assess the quality of an inquiry: trustworthiness and authenticity or credibility.

In order to maintain consistency in the results obtained from interviews conducted with various participants or at different times, the study utilised an open-ended and in-depth interview format instead of a rigid questionnaire or survey. To enhance the reliability of data collection, the researcher developed an interview schedule to ensure that all participants were presented with identical questions, thereby increasing the probability of obtaining consistent outcomes. In addition, all interviews were recorded using voice recording technology and automatically transcribed using the transcribing feature of Microsoft Teams. This was done to minimize the potential for subjective interpretation of the findings. Furthermore, the use of voice recording technology and automatic transcription allowed for accurate and verbatim representation of participants' responses, reducing the risk of errors or misinterpretation during data analysis.

Following the interview, the results were immediately backed up on the cloud to ensure the security of the information. Storing the results on the cloud provided an extra layer of protection against data loss or damage, ensuring the integrity and accessibility of the information for future

reference. Kanza & Knight (2022) asserts that the organisation of data is crucial and suggests employing a logical system of folders and file structures. The author suggests implementing a storage strategy that accounts for both long-term and short-term data storage. Propose storing data in two different types of media, ensuring that each file is stored at a distinct location. Additionally, the author advises against relying on USB sticks for data storage.

Based on the aforementioned recommendations, the following actions were implemented to enhance reliability of data:

- *Kept track record of data collected.*
- *Maintained the data in its original form.*
- *Ensured audio or voice recordings and transcripts were unaltered.*
- *Ensured that data was secure, stored in a safe place, and backed up on cloud storage.*
- *After every interview, data were labelled according to the date and source to achieve a well-organised data record.*

## 3.10 Data analysis

Qualitative data analysis is the process of converting the information contained in interviews, surveys, and other qualitative data into meaningful understanding. The choice of data analysis technique is influenced by several factors, including the research questions being asked, the theoretical foundation of the study, and the technique's suitability for making sense of the data (Kawulich, Garner and Wagner, 2012:229).

The credibility of the study when conducting research is viewed as one of the most important aspects. To ensure the credibility of the study the researcher followed the advice of Nowell et al. (2017) who state that for qualitative researchers to be considered legitimate, they need to show that data analysis was performed precisely, consistently, and exhaustively by documenting, systematising, and disclosing the methods of analysis in sufficient detail for the reader to determine whether the process is credible.

It is also imperative to implement strategies that mitigate potential threats to the validity of the research. During the research process, the validation of findings involves the crucial activities of verifying accuracy and truthfulness (Creswell & Creswell, 2018). The research study employed various strategies, such as descriptive validity, to ensure the accuracy and completeness of the

data. The descriptive validity was accomplished through recording interviews and transcription using Microsoft Teams online recording functionality. Robson & McCartan (2016) assert that the primary challenge in accurately describing one's observations or experiences stems from the potential inaccuracies or omissions in the data.

An interpretive validity approach was also applied, which offers a thorough and authentic representation of the viewpoints and interpretations of the participants, thereby presenting the participants' worldview. Johnson & Christensen (2014) argue that interpretive validity is a crucial aspect of research as it allows for an accurate portrayal of the perspectives and meanings of study participants, thereby providing an insider's viewpoint. To minimise the interpretation threat, a thematic analysis approach was adopted, and quotes from the participants were cited in the report during data presentation and interpretation. This approach helped to ensure that the participants' voices were accurately represented and that their perspectives were not distorted or misrepresented. Additionally, the use of direct quotes adds credibility to the findings and allows readers to directly engage with the participants' viewpoints.

There are various methods for analysing qualitative data in the literature (Kawulich, Garner & Wagner, 2012; Nowell et al., 2017; Tight, 2019), such as content analysis, conversational analysis or verbal protocol analysis, script analysis, narrative analysis, discourse analysis, thematic analysis, grounded theory, interpretive analysis, ethnographic analysis, and phenomenological analysis.

The study employed inductive reasoning, which was facilitated by thematic analysis. When taking an inductive stance, one relies on participant experiences as the basis for analysis. According to Kawulich, Garner, and Wagner (2012:229), the inductive approach entails progressing from a set of data from participants or samples to a generalisation of the findings.

The researcher employed thematic data analysis to make sense of the seemingly unrelated responses by participants, draw out underlying themes and differences, and construct meaning. The purpose of thematic analysis is to identify themes or patterns in the data and classify them into distinct categories (Kawulich, Garner and Wagner, 2012:231). Braun and Clarke (2006) provide a 6-step framework that guides researchers through the thematic analysis: familiarization, coding, theme generation, review, naming themes, and reporting.

Thematic data analysis inspired by Braun and Clarke (2006) and Braun et al. (2019) was utilised in this study to analyse data as outlined below:

Table 3. 1: Theme generation and development adopted from Braun and Clarke (2006)

| **Process** | **Steps** | **Criteria** |
|---|---|---|
| Familiarization | 1 | To ensure data accuracy and impartiality, all interview transcriptions were thoroughly examined and cross-checked multiple times. The researcher engaged with the data intensively and took notes to enhance the understanding and familiarity with the material. |
| Generating codes | 2 | As a second step, the researcher engaged with the generated data in a more methodical manner by generating codes. This phase was data-driven, and no attempt was made to incorporate it into existing code. This indicates that the methodology for creating code was inductive. |
| Generating themes | 3 | In this step, the researcher reviewed the codes generated in the preceding step, recognised similarities, and started to create themes. Multiple codes were grouped into themes. |
| Reviewing themes | 4 | Themes were reviewed once more to ensure that only valuable data was coded and that the data appropriately represented the themes that were developed. Certain codes had to be abandoned and rearranged. |
| Defining and naming themes | 5 | At this stage, the researcher had a definitive list of themes that had been developed and named. Although an inductive approach was adopted, the themes that arose were scrutinized to see whether they aligned with the study question and objectives. However, none of the emerging themes were eliminated at this stage. |
| Write up | 6 | The final step was to write up the analysis. |

The data acquired from five interviews with the project leaders of five different organisations were analysed using the procedures outlined above, which were adapted from Braun & Clarke (2006). The typical interview lasted sixty minutes and yielded sufficient information for the researcher to

commence data analysis. The interviews were done using a Microsoft online video conferencing platform (Teams) and were coded using NVIvo. Using NVivo, a coding scheme model was produced and presented (Appendix 2), with the schematic presentation demonstrating how the analysis was accomplished. This is intended to provide clarity on findings and provide consistency to the argument.

### 3.10.1 Data Analysis tool

A Computer Assisted Qualitative Data Analysis Software (CAQDAS) Nvivo was employed to document and maintain a comprehensive record of data analysis activities, thereby promoting transparency throughout the research process. The utilisation of this software facilitated the effective arrangement and categorization of the data, thereby enabling the researchers to readily identify patterns and themes inherent in the perspectives of the participants. Furthermore, the use of Nvivo software contributed to upholding the integrity of the data analysis process by establishing a transparent record of all analytical choices made during the study.

"NVivo is a computer-assisted qualitative data analysis software (CAQDAS) developed by QSR International (Melbourne, Australia), the world's largest developer of qualitative research software" (Erin Toolis, no date). This software makes it possible to conduct qualitative research that goes further than coding, sorting, and retrieving data. Figure 3.2 provides an overview of the data analysis workflow available in NVivo.

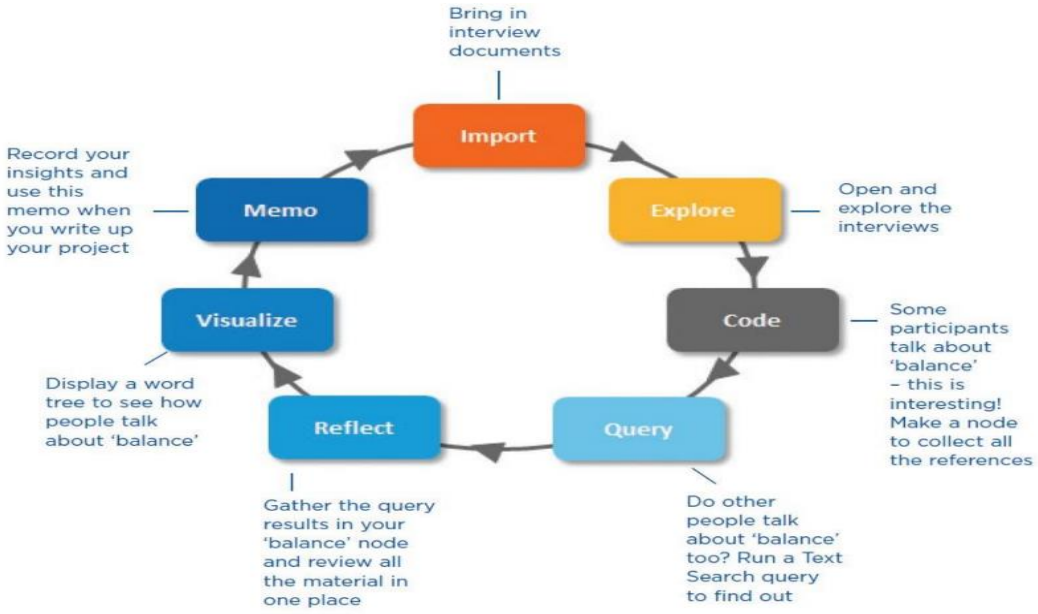


Figure 3. 2: Data analysis process flow using NVivo (Erin Toolis, n.d.)

## 3.11 Ethical consideration

The following ethical guidelines were maintained to consider the ethical issues involved in the study:

### 3.11.1 Ethical clearance

Before starting with data collection, the researcher submitted the ethical clearance to the university for approval. Approval was granted in writing by the university providing the researcher with permission to proceed with data collection.

### 3.11.2 Voluntary Participation

Permission to conduct the research was obtained through a formal process from the potential participants. All participants were informed fully about the research and what would be expected of them to make an informed decision about whether or not to participate. Due diligence was exercised to ensure that participation was voluntary and that no participant was coerced into participating. Additionally, all participants were assured that their responses would be kept completely confidential and anonymous.

### 3.11.3 Informed Consent

Before the start of the interview participants were informed of the ethical consideration items and they were assured that their responses would be kept completely confidential and anonymous. At the start of every interview, the participants were asked for consent to record the session, ensuring that they understood that the entire process is fully voluntary and that should voice recording make them uncomfortable they have the right to withdraw from participating.

### 3.11.4 Communicating Results

Accordingly, the researcher made sure that the findings of the research were reported and communicated ethically and truthfully. The declaration was included in the report that plagiarism, academic fraud, and misinterpretation of results will not be tolerated under any circumstances.

### 3.11.5 Data Management

The researcher took steps to ensure that the information gathered was protected and kept safe. Data were stored and backed up in the cloud, allocated by the University to the researcher. The data is accessible only to the researcher, who also has control over it. The Data Management Plan was created using UCT DPM and shared with the organisation.

### 3.11.6 Respondents' Anonymity

The anonymity of all respondents was maintained throughout this dissertation, which means that the researcher opted to keep the information about the participant confidential and will not make it available to the public. If the information is made public, it will be done in such a way that the public will not be able to identify the person who has provided the information. However, even though the case details are provided, the participants' identities have been protected and the identity of the individual remains unknown to those who read the case studies. The researcher will keep the participants' information anonymous to protect them as well as the companies they work for. Throughout the entirety of the paper, all real names will be substituted with pseudonyms.

# CHAPTER 4 RESULTS AND ANALYSIS

## 4.1 Introduction

This chapter presents the findings of the research. The research findings presented in this study are organised according to the themes that emerged from the interviews. These interviews were analysed using thematic data analysis. Additionally, illustrative quotations from the interviews are also included to substantiate the findings and to better explain the concepts encountered in the process.

The chapter will be presented in the following order: a summary of participants' information followed by the presentations of the themes that emerged from the analysis.

## 4.2 Participants Contextual information

A total of 10 participants were invited to participate in this case study of which five responded positively. The participants included professionals from the project management field based in different regions of South Africa and directly involved in the delivery and management of projects in various industries with experience in project management ranging from 10-15 years. To keep participants anonymous as per ethical standards pseudonyms have been used. Table 4.1 indicates the roles of the PMs.

Table 4. 1: Information about the participants

| ***Pseudonym*** | ***Gender*** | ***Industry*** | ***Role*** | ***Experience [yrs.]*** |
|---|---|---|---|---|
| *PM 1* | Male | Telecommunications & Electrical | Senior Project manager | 10 |
| *PM 2* | Male | Telecommunications | Programme manager | 18 |
| *PM 3* | Male | Manufacturing/software development | Senior Project Manager | 15 |
| *PM 4* | Female | Machinery Manufacturing | Senior Project Manager | 14 |
| *PM 5* | Male | Telecommunications | Project Manager | 10 |

| ***PM 1*** |
| --- |
| PM 1 is a Project Management Professional (PMP) certified project leader, certified by the Project Management Institute (PMI). He has over 10 years of working experience working on various projects within the telecommunication infrastructure and Electrical industries. He is currently holding the position of Senior Project Manager managing projects of various sizes in terms of cost and scope for public and private sector clients within and outside South Africa. |

| ***PM 2*** |
| --- |
| PM 2 is a PMP-certified project leader with over 18 years of working experience working on various projects within the manufacturing, mining, engineering consulting and Telecommunication industries. He currently holds the position of a Programme manager responsible for the delivery of capital projects in the telecommunication sector. |

| ***PM 3*** |
| --- |
| PM 3 is a PMP-certified project leader with over 15 years of working experience working on various projects within the manufacturing, telecommunications and research and development industries. He currently holds the position of Senior Project Manager responsible for managing the design and technological support projects or initiatives for the local manufacturing companies. |

| ***PM 4*** |
| --- |
| PM 4 is a PMP-certified project leader with over 14 years of working experience working on various projects within the Automation Machinery Manufacturing industry. She currently holds the position of senior project manager. |

| ***PM 5*** |
| --- |
| PM 5 is a project manager with over 10 years of working experience working on various projects within the civil engineering, telecommunication infrastructure and Electrical industries. He is currently holding the position of a Senior Project Manager |

## 4.3 Themes presentation

The following are themes that emerged during the analyses: theme 1: the common understanding of digital transformation, theme 2: the digital transformation in the era of COVID-19, theme 3: changes in project management processes, theme 4: the benefits and drawbacks of the digital shift.

### 4.3.1 Theme 1: The common understanding of digital transformation

This theme was concerned with project leaders' understanding of digital transformation. Before exploring the dimensions concerned with digital transformation it was imperative to explore the participants' understanding of digital transformation and its dimensions. This was to ensure that the context of the research was well understood before continuing to the main research dimensions.

*PM 1* explained digital transformation as a transition from physical to digital platforms and elaborated that digital transformation makes access to data easier and enables project managers to rely on online reporting rather than physical reporting. He added that digital technology is advancing rapidly and requires organisations or individuals to keep up with the technology because organisations that fail to keep up with the technological advancement become redundant and face the risk of losing business.

| PM 1 |
| --- |
| "Things have shifted to more digital, even the way we do things, even working as a project manager, most of the reports that we do we do them online, we present them online". |
| "The best way I can explain digital transformation it's we are more relying on software" |
| "Now they're being done in an easier, convenient and effective way" |
| "If you don't keep up with the technology, you become redundant or you lose business to some extent" |

He further expressed that digital transformation makes things to be much easier, more convenient, and more effective, it also saves time and cost. Emphasising that digital transformation has affected every part of our daily lives from how we used to operate the business, communicate, and access information has all been impacted including the education systems.

*PM 2* defined digital transformation as the use of various technologies to enhance or modify existing processes. He stressed that digital transformation is about adopting and leveraging the

various tools and technologies to enhance various initiatives within an organisation such as communications, business processes, and organisational culture.

| PM 2 |
| --- |
| " Digital transformation is about using various technologies and whether you want to enhance existing processes or to enable or even to modify existing processes, or even to communicate while doing business".<br>"Where they want to improve business processes, you want to improve even culture by communicating faster"<br>"We push culture initiatives" |

*PM 3* defined digital transformation as the drive towards the fourth Industrial revolution. He stressed that digital transformation is a manner in which companies in various industries would be able to do business through the use of digital systems and the Internet of Things (IoT). In the form of software systems that will bring a solution or help the organisation to improve its productivity. Consequently, this introduction of digital systems cuts through all forms of business in terms of integration.

PM 3 gave an example of a manufacturing system implementation that will enable the company to track inputs and outputs and incorporate a financial accounting system. He gave an example of using robotics in the manufacturing space where companies can run a full plant without physically being there. Adding that it helps with reporting and tracking of activities involved in the value chain of the production system.

| PM 3 |
| --- |
| "It's a drive towards your fourth industrial revolution".<br>"How companies or industries would be able to do business, through digital systems"<br>"A company that will try to bring some form of a solution or help the organisation to improve its productivity" |

*PM 4* described digital transformation as a shift from the traditional way of doing things or managing projects to digital or virtual platforms. She gave an example of how we had transitioned from having face-to-face meetings or interactions with internal teams or customers to conducting meetings via virtual platforms.

*PM 5* stated that for him, “digital transformation is about how the company applies technology and finds ways to scale the business to accommodate the changing ways in which we operate”.

### 4.3.2 Theme 2: The digital transformation in the era of COVID-19

This theme was concerned with establishing whether or not the COVID-19 pandemic had accelerated the use of digital technologies. Since the purpose of the study was based on the assumption that the COVID-19 pandemic has accelerated digital transformation or the adoption of digital transformation, it was necessary to validate this premise before pursuing the study's following objectives.

The participant’s responses to the question of whether the COVID-19 pandemic accelerated the adoption of digital technologies or not, demonstrated that the COVID-19 pandemic has accelerated the adoption of digital technology. Each of the five respondents discussed the technological developments that had taken place in their respective organisations as their companies were responding to the COVID-19 outbreak and the measures introduced by the government such as national lockdowns and social distancing. One of the participants expressed that even those who were sluggish to embrace digital technology as the norm were eventually forced to do so.

| |
|---|
| PM 1<br>"Yes, despite the negative impacts that COVID-19 brought in, you can see the way we do business nationwide or worldwide that it has accelerated the adoption of digital technologies, especially the way people used to do things on a daily basis and operate their business?"<br>“We had to consult with the IT companies and see what system we can add to whatever we have so that we can have a better-secured communication platform that we can use daily and to make sure that everyone is safe when we do that communication and also the whatever information that we convey through that system is also safe and it's not going to be compromised”<br>“We have a software where it even the client when you're waiting for a team to come and restore the fibre for you can even track them” |

| |
|---|
| *PM 2* "So, in other words, COVID-19 has accelerated the digital transformation and has forced us who are slow adopters to adopt these technologies quicker because we have no choice." |

Some of the participants stated that the digital transformation was already underway in their respective organisations, that they were able to work remotely before the COVID-19 pandemic, and that they had the necessary technologies to facilitate remote work and online reporting tools. furthermore, they stress that COVID-19 has hastened the rate of digital implementation and led to operational and managerial adjustments, noting that this shift will continue.

| |
|---|
| *PM 1* " from a project management perspective I can say that the digital transformation has always been there, but after COVID it is accelerated and with that, acceleration is still going." |

| |
|---|
| *PM 2* "A digital transformation was always in the making and this COVID-19 has forced us to jump in other ways to accelerate." |

| |
|---|
| *PM 5* " the transformation was there, but then it was more accelerated when COVID-19 kicked in. So, we just needed to adjust the way we worked and make sure that now we have regular meetings that we normally used to have and a lot of group chat where we can easily access each other, all the team members, and all the projects' stakeholders. So, it was accelerated but the transformation was there, but I still see that it will be digitalized even more than it is currently. |

A digital-first approach became apparent forcing the diffusion of new technologies within companies and resulting in a spike in digital technology investment initiatives. However, one of the participants who works for a company that assists manufacturing companies in deploying a digital-first strategy expressed that the majority of companies face a lack of funds due to the high cost of digital technology investments and that there is limited funding available to assist those who cannot afford it.

| |
|---|
| *PM 1* "I can say most individuals or businesses were not investing more into technology until COVID-19 hits the ground." |

| |
|---|
| *PM 3* " We are moving slowly towards 4IR but it's going to be difficult because companies don't have the funding, for them to use gadgets like other forms of technology because this all requires funding, and funding is not there. Now that's where we come in, in the manufacturing space. But other, industries require funding. |

### 4.3.3 Theme 3: Changes in project management processes

This theme focused on the identification of the aspects of project management that were impacted by the COVID-19 accelerated digital transformation. The general conception found through all interviews was that five key aspects of project management emerged as being impacted by the COVID-19 accelerated digital shift. The main aspects are presented below under the headings; The emergence of remote work, effective project team communication and collaboration, enhanced access and information sharing, the relevant project manager skills in the digital era, and the project approaches adopted for project delivery.

#### 4.3.3.1. The emergence of remote work

The participants indicated that the pandemic has necessitated changes in their companies' work practices, specifically with a notable rise in remote work. The participants articulated that all workforces had to work remotely, and work had to continue regardless of their geographical location. Working remotely is still prevalent in many companies and in some companies, a hybrid model has been introduced where employees work both from the office and remotely alternating.

| |
|---|
| *PM1* " working from home or even hybrid working environment. has been developed and I don't have to go to the office. I don't have to drive to the office every day so there's been you know an understanding that this, this department, or this part of the organisation can come to the office maybe twice a week, Monday and Wednesday or Monday, Thursday." |

| |
|---|
| *PM 2* "I can summarize the way we work now is completely smooth and seamless in the project that I am right now, I have people in India, in Singapore, in China, in Europe that we are working with." |

The participants noted that the shift to remote work reduced decision-making time, travel time, and costs. One of the participants illustrated how, before COVID-19, design review processes necessitated international teams to travel to meet in person. This changed during the COVID-19 outbreak when teams were forced to work remotely.

| |
|---|
| PM 4<br>“Before with the design review the team from Europe had to fly in to come and conduct the review or the local team had to go to Europe for that meetings and you can imagine the cost implications” |

"COVID promoted, working remotely, which was a bit difficult to achieve before."
“You know that it can be done with the design review. We even went to the extent of even the factory acceptance test where you had to do it remotely because were not able to travel”.

One participant emphasized the significance of establishing effective and regular communication, along with cultivating a culture of transparency. These measures were considered essential for promoting cohesion and a shared purpose among virtual teams.

*PM5*
“We just needed more regular communication in terms of managing your teams and then making sure that, we have transparency”

Although the shift was drastic the participants recognised the opportunities and challenges that came with remote work. Some of the participants identified reduced time and cost of travelling as an opportunity. Adding that they did not have to travel to meet with stakeholders and again the internationally based teams were no longer required to travel to seat in meetings and make decisions pertaining to projects and that saved lots of time and sped up project delivery.

*PM5*
" How that has affected it was in the positive and negatively. Positive because there was a lot of time reduced during that period in terms of travelling to regions where you need to get to meet the project stakeholders. You get to meet the stakeholder via a scheduled meeting on teams (Microsoft teams)."

The participant acknowledges the difficulties of managing a virtual team, including the absence of physical interactions, lack of trust in terms of services to be delivered and the need to establish trust with team members and stakeholders.

*PM 2* " You can't replace the final element that people have to see what they're building to give confidence that human confidence that is a disadvantage of this technology to say they take the human element."

*PM 3* “I cannot trust that the company or the service provider that I've appointed has implemented software in the manufacturing firm in Dimbaza for instance a Township in Eastern Cape of King Williams Town.

*PM 4* “You have to work on trust that I trust that the information that you get from the team is accurate.”

*PM5* " But in another way, it was also affecting it negatively because now the people are not like in the same space where you feel there is not that interaction, so the ways of managing project, you have to keep on checking on people if they are doing their part with their deliverables so that you can keep that connection with them."

4.3.3.2. The importance of effective project team communication and collaboration

Communication emerged as a crucial aspect of project management that was significantly impacted by the COVID-19 digital shift. The participants emphasised that communication is an important component of project management.

*PM 4* "I think the most important one that we do i**s** communication like they say in theory, that 90% of the time of the project management is spent through communication"

All participants expressed that COVID-19 has in some way compelled a shift in communication. Furthermore, some participants added that consequently, there is a pressing need for substantial investment in collaboration and unified communication technologies (software and hardware) that facilitate the work of virtual teams.

*PM 1* "the company that I'm working for ended up during COVID having to consult with the IT companies and see what system we can add to whatever we have so that we can have a better secure communication platform that we can use on a daily business"

*PM 3* " accelerated the communication platforms in terms of interaction between project managers, program managers, portfolio managers, the CEOs in terms of operations as well as the project team members on the ground. "

One of the participants stated that as a result of the digital communication platforms, communication in their organisation and among their project team members has been easier and more efficient than before.

*PM 2* " People are coming from the US, from China and coming to Cape Town to build something. We can do the meeting and conclude it online."

In addition, the participants emphasised that communication was heightened to allow team synchronisation and to be able to effectively lead the team, which resulted in more frequent meetings and increased reporting.

| |
|---|
| *PM 5* "Just needed more regular communication in terms of managing your teams and then making sure that we have transparency " |

The lack of face-to-face interaction due to people not being in the same space was raised as one of the disadvantages of virtual work. This challenge necessitated an increase in the frequency of communications.

| |
|---|
| *PM 5* " But in other ways, it was also affecting it negatively because now the people are not like in the same space Where you feel there is not that interaction, so the ways of managing project, you have to keep on checking on people if they are doing their part with their deliverables so that you can keep that connection with them." |

Part of a project manager's role is to manage the expectations and requirements of stakeholders, and it was apparent from the interviews that the improvement in digital communication tools improves how project managers manage their stakeholders, keeps them on board, and enables them to maintain positive relationships.

| |
|---|
| *PM 1* "stakeholder management improved drastically and a lot especially during the COVID-19 because we then brought in these technologies we are talking about and all forms," |

| |
|---|
| *PM 3* "And digital transformation it helped again in terms of communication," |

In project management work is done through team effort which by default demands a high level of team collaboration. It emerged from the interview that the digital shift that was accelerated by the COVID-19 pandemic fostered team collaboration. The participants felt that the availability of digital communication and collaboration tools enabled the entire team to work together through the entire project process and allowed them to be productive. One of the participants alluded that it became easier to get the involvement of the geographically dispersed team members who initially had to travel to seat in meetings and review designs.  Another participant exemplified the

process of documenting the project scope explaining that the process of documenting the scope requires a team effort and the involvement of relevant project stakeholders.

| |
|---|
| *PM 3* "Between a client and a service provider, or one with the contractor, you will have a scope and One has to understand it has to be a defined, detailed clear scope for the service provider contractor to implement before you could form a create or develop or produce the scope you would have stakeholders in the brainstorming of what is it that is required and these people will be in one boardroom now or even before COVID-19, you had these digital platforms that you could use but then got accelerated by COVID-19. Now we can at any point in any way be able to connect and be able to go through brainstorming, go through a scoping of a project and even if we have questions from the client, we're able to do that." |

| |
|---|
| *PM 2* "I can summarize so the way we work now is completely smooth and seamless in the project that I am right now, I have people in India, Singapore, China, in Europe that we are working on with." |

In terms of the digital communication technology used for virtual communication and collaboration most of the participants mentioned digital tools such as Microsoft Team, Zoom, WhatsApp and Skype. One participant mentioned Asana as an example of a project management collaboration platform that will be mostly used.

| |
|---|
| *PM 1* " project update meetings online, via teams, via Skype via, Zoom," |

| |
|---|
| *PM 3* " People don't understand how WhatsApp became so handy when it comes to COVID-19 and digital transformation because now we started creating these WhatsApp groups.” |

| |
|---|
| *PM 5* "we were doing those meetings via zoom or teams |

| |
|---|
| *PM 5* " there's a lot of stuff that is being digitalized in terms of we have a lot of products that we will come on boards like your asana.” |

#### 4.3.3.3. Enhanced access and information sharing

Accessing and sharing information was mentioned several times by the participants as one of the advantages of the accelerated digital shift that occurred due to the COVID-19 pandemic. Most of the participants expressed that there is an improvement in how they used to access and share project information. The participants articulated that having access to information at the tip of the finger save time and cost and makes business operation effective.

| |
|---|
| *PM1* "So, with this new way which is more like the tech world that we're living in, we can access information from the Internet"<br>"We can access, and we can share information. We can access it; we can even communicate." |

Another participant added that being able to access and share information on digital platforms has positively impacted project reporting. The cloud-based platforms have enabled a quicker way of sharing information with a team that is located remotely, secondly, companies have moved away from paper. The online tools have enabled access to reliable and timely information, reports are easily accessed online.

| |
|---|
| *PM 3* “Transformation also helps in terms of reporting because now you can just punch one button in the system to be able to track and see what has entirely happened within one product or your entire production system light.” |

To some participants, the digital platforms that enabled easy access and sharing of project information were something they were already familiar with. Considering this PM 5 stated that in their company the online reporting platforms were already being used even before COVID-19 and exemplified that they used Power BI tools for sharing project performance information with different stakeholders.

| |
|---|
| *PM 5* “But in terms of the reporting and everything, it was already there. We are using your power BI tools which give all the information on how the projects are performing and what are the bottlenecks because you can see it.” |

4.3.3.4. The relevant project manager skills in the digital era

The participants recognised the importance of acquiring the necessary skills to succeed in the digital economy due to the significant impact of the digital shift in project management. Most of them highlighted that continuous learning and training have become imperative to keep pace with the new technology. Furthermore, the interview revealed that the need for a range of skill sets has resulted in a spike in the number of project leaders who are acquiring PMP certification and Agile certification to remain relevant. One of the participants touched on a very important skill "interpersonal skills" that has become apparent due to the change in roles of project managers and the increased online communication.

| |
|---|
| *PM 3* "I'm now telling you that quite a lot of skills landscape had to be shifted completely for everyone to be able to use digital platforms" |

| |
|---|
| *PM 3* "So, a bit of skilling is involved. One has to look, you know, upskill themselves around the technology that is currently being used." |

| |
|---|
| *PM 5* "there's a lot of project management tools which I don't feel like they are not a thread more than as an entire challenge that someone needs to keep learning all these new platforms and all of that, how to use them" |

| |
|---|
| *PM 5* "Because now we work remotely, I think more of the skill that the project management is key now it's more of Interpersonal how to engage with people" |

| |
|---|
| *PM 1* "But in more like competence it also depends on what the organisation is doing or what business are they in. But I've seen a lot of PMP and PMI certifications." |

4.3.3.5.The project approaches adopted for project delivery

Project management has various approaches that project managers can utilise to deliver value to their stakeholders. During the interview, three participants confirmed that they use agile project management approaches to implement their projects. One of the participants acknowledged the necessity of adopting a hybrid approach, which entails a combination of both waterfall and agile methodologies.

PM 1

"Looking at where I'm working or my background or where I am based, we used to embrace one methodology the most".

"We also had to adapt to agile methodology.

"We also had to consider the hybrid methodology".

"Even though we can't implement waterfall methodology and just Agile methodology into every project".

According to PM1 before COVID-19, the waterfall project management approach was preferred but that changed during COVID-19 they started using the agile and hybrid methodologies more. Additionally, the participant emphasised the benefits of adopting agile approaches, stating that the use of agile and hybrid methodologies facilitates active customer engagement, resulting in customer satisfaction and maintaining the involvement and motivation of the project team.

*PM 1* "So, with that being said, we are saying that the Agile or hybrid methodology that we have adopted brings customer satisfaction it also motivates the team"

According to PM2 project leaders' attitudes and practices towards agile methods were both impacted by COVID-19, and the adoption of such methods necessitated a heightened degree of flexibility on the part of project managers.

PM 2

"The enhancements that came due to COVID and then led to the transformation that you're talking about, which has made our jobs as project managers simpler and has made us more agile".

"So now after COVID-19 with these enhanced digital technologies that we have, people have become more agile".

In terms of what informs the project managers on which methodology to adopt, it appears that the choice of method to be used is determined by the type of project being implemented. Project managers consider various factors when determining which methodology to adopt, such as the project's complexity, scope, and timeline.

*PM 5* " If in a project we focused on starting it from the planning phase we were going with the waterfall methodology. But then, with some of the projects we focused on the things that were based on interest campaigns and the planning was not a contributing part then we used agile.

### 4.3.4 Theme 4: The benefits and drawbacks of the digital shift

The foundation of this theme was established from the perspectives of the participants on the benefits and difficulties associated with the rapid digital shift that was brought about by COVID-19. The participants in the study had identified both advantages and disadvantages associated with the digital shift as summarised in Table 4.2 and Table 4.3.

Table 4. 2: The benefits of the digital shift

| BENEFITS | | |
|---|---|---|
| Emerged Benefits/advantage | | Quotation from the interview |
| 1 | Project team performance: Effectiveness and efficiency | "So, there is more efficient right now."<br>"We can do things faster."<br>"The enhancements that came due to COVID; have made our jobs as project managers simpler and have made us more agile." |
| 2 | The potential cost and time-saving | "And that went quite well because now the companies are saving quite a lot on the travelling costs and all of that."<br>"It saves some cost and also saves time".<br>"So, after COVID-19 the company is spending less money and spending less time on other things that we used to spend more time on and money".<br>"And there is also a more effective way that we're doing business with the companies, also saving money".<br>"So, for me the implementation or the effect of COVID it's kind of, saving quite a bit on the project in terms of the cost and the time." |
| 3 | Project information accessibility | "If I want to share a file or need to share a report, I can just send someone a link, I can even send my program manager a link to access or to download a file. So, which is more convenient." |
| *4* | Increased customer satisfaction | "So, it goes beyond just customer satisfaction. it's more like we are involving the client or the customer in what we do."<br>"Also, it makes the customer feel comfortable and confident" |
| *5* | Enabled remote work | "With the system that we have now, I can manage multiple projects without spending a lot of money. You know, especially with travelling." |

| | | |
|---|---|---|
| | | "You know, we don't have to travel from Cape Town now; you can connect from your own office or your bedroom for as long as you have an Internet connection." |
| *6* | Improved communication and team collaboration | "It has brought so many advantages and also we are able to manage teams, and we are able to run the business more flexibly and effectively."<br>"This enables quicker and faster communication." |

Table 4. 3: The drawbacks of the digital shift

| **DRAWBACKS** | | |
|---|---|---|
| Emerged drawbacks/disadvantage | | Quotation from the interview |
| 1 | Cyber Security:<br>o Security Concerns | "It was a major, concern that ok if we adapt to this transformation, or if we shift this. Is the system or platform, whatever we are communicating while someone is at home, there won't be any hacking." |
| 2 | Lack of competencies | "The main challenge is on competence."<br>"They also lacked training and competences on new systems, new approaches, new processes and business" |
| 3 | Change Management | "The main challenge is on competence and also managing change."<br>"So, with that, there was some resistance to change." |
| *3* | Lack of trust | "You know, there was especially the trust issue between business and the employer".<br>"I cannot trust that the company or the service provider that I've appointed has implemented software in the manufacturing firm in Dimbaza for instance a Township in Eastern Cape of King Williams Town. I have to physically go verify that the software is being installed, is that the software is live and active. I need to be able to go and verify that."<br>"You have to work on trust that I trust that the information that you get from the team is accurate." |
| *4* | Communication:<br>o Lack of face-to-face interactions | "You can't replace the final element that people have to see what they're building to give confidence that human confidence that is a disadvantage of this technology to say it takes out the human element, yeah.<br>"So, I can't sit on my desk because now I have a form of a digital platform that I can use and all of a sudden I'm able to sign off on a |

| | | |
|---|---|---|
| | | project for that service provided to be paid without having to verify."<br>"But in another way, it was also affecting it negatively because now the people are not like in the same space Where you feel there is not that interaction, so the ways of managing project, you have to keep on checking on people if they are doing their part with their deliverables so that you can keep that connection with them."<br>"So, it worked well, but I feel also it also impacted in terms of how the project needs to be managed in terms of that you are no longer in the same space whereby you guys can interact in a daily or like on that like constant basis." |
| *5* | Loadshedding | "Of course, how can we forget the Load-shedding? That's the biggest challenge you have."<br>"South African environment, if I can put it like that with the load-shedding impact that if we're relying on the online tools and you don't have electricity and then the network is not available, that has an impact on your day-to-day Uh working or running project?" |
| *6* | Cost of new technologies:<br>o Lack of funding | "So, it was a bit costly. I can imagine how much they spent to upgrade the system"?<br>"We are moving slowly towards 4IR but it's going to be difficult because. Companies don't have the funding, you know, for them to use gadgets for them like other forms of technology because this all requires funding, you know, and funding is not there." |
| *7* | Network and connectivity | "And now you know that's another big challenge, especially when it comes to this digital transformation, the network itself, in terms of areas in the village" |
| ***8*** | Managing virtual teams | "Many times, people even leave the meeting, and they will do something else because they are not there. And that's another disadvantage, right?"<br>"Also, in terms of, you know load transfer (work delegation) It's not as effective as it used to be" |

# CHAPTER 5 DISCUSSIONS

## 5.1 Introduction

This chapter provides a discussion and analysis of the empirical findings presented in chapter 4. The empirical findings are placed in the context of the theoretical frameworks and existing literature described in chapter 2. This chapter's primary objective is to develop a deeper understanding of the empirical findings in relation to the four major themes of the thesis and to provide an answer to the research question. By examining the empirical findings through the lens of theoretical frameworks and existing literature, this chapter aims to shed light on the implications and significance of the research outcomes. Additionally, it seeks to identify any gaps or areas for further exploration within the field, ultimately contributing to the advancement of knowledge in this area.

## 5.2 Theme 1: The common understanding of digital transformation

Vial (2019) posed the question, "What do we know about digital transformation?" The findings of the study demonstrated that all participants interviewed had a clear understanding of digital transformation and its effects on both the organisational and project delivery levels. The participants have demonstrated a shared understanding of digital transformation.

Summarising the results, digital transformation is defined as "*the adoption of various technologies that integrate across all functional areas of a business intending to improve various business initiatives such as communication, business processes, productivity, and organisational culture*".

The participants' understanding of digital transformation corresponds with Vial, (2019)'s definition of digital transformation which explained it as "a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies".

The majority of participants stated that digital transformation intends to alter how businesses operate, communicate, and access information and these alterations also have an impact on daily lives. This is consistent with the opinion expressed by Trierveiler, Sell & dos Santo (2019) that "Digital transformation is a two-way street" in which digital technologies transform businesses and the transformation of businesses affects people's daily lives.

The participants in the study were able to articulate how digital transformation impacts various aspects of businesses, such as operations, customer experience, and innovation. This suggests that there is a growing awareness and understanding of the transformative power of digital technologies in today's society. While Morakanyane, Grace, and O'Reilly (2017) argue that there is a lack of a common understanding of digital transformation, it is important to note that the study focused specifically on the participants' comprehension of the concept. The findings of the study indicate that the participants demonstrated a clear understanding of how digital transformation impacts various aspects of businesses. However, it is also worth considering that there may still be variations in understanding and interpretation of the concept among different individuals or organisations.

## 5.3 Theme 2: The digital transformation in the era of COVID-19

Assessing the impact of COVID-19 on the adoption of digital technologies from the perspective of project leaders, the study found that there was an increase in the rate of digital technology adoption within the participants' organisations. Although some respondents stated that their companies had already started the digital transformation process, others noted that the COVID-19 pandemic had accelerated the use of digital technologies and validated the transformation of work.

The participants emphasized the importance of leveraging digital technologies to adapt to the challenges posed by the pandemic. They also discussed how these technologies have enabled remote work, virtual collaboration, and contactless operations. However, it is worth noting that their focus was primarily on the immediate response to COVID-19 rather than long-term digital transformation strategies. This was in contrast to the findings of the Dell report, which showed that many South African businesses are more likely than the global average to invest in emerging technologies in the next one to three years in order to become digital enterprises of the future (ITWeb, 2021).

Some of the digital technologies mentioned by the participants included cloud-based communication and collaboration systems and video conferencing platforms. These technologies facilitated team collaboration, file sharing, and virtual meetings, enabling employees to work remotely and sustain productivity during the pandemic. This is consistent with Kudyba (2020) and Amankwah-Amoah et al. (2021), who argue that the pandemic's restrictions have compelled businesses to adopt a digital-first strategy, hastening the trend towards the digitalization of

business models and the integration of technologies into all aspects of daily life and business activities.

One of the participants stated that he had a home office for ten years that he had never used on a regular basis, but that changed during COVID-19 when he worked effectively from home. This was a good example of how the shift to remote work during the pandemic forced many people, including those who had previously been resistant to change, to embrace technology and find creative ways to stay productive. As a result, people discovered the advantages of using their home office and other digital technology platforms that were available prior to COVID-19. This accelerated adoption of technology in the workplace is likely to have long-term consequences for how individuals approach their work environment, even after COVID-19 is no longer in effect.

## 5.4 Theme 3: Changes in project management processes

Key elements of project management that have been impacted by the COVID-19-driven digital transformation, are discussed below under the following headings which emerged during the thematic analysis: The emergence of remote work, effective project team communication and collaboration, enhanced access and information sharing, the relevant project manager skills in the digital era, project manager's competencies and the project approaches adopted for project delivery.

### 5.4.1 The emergence of remote work

The review of the findings from the interviews revealed that all participants attest that the prevalence of the COVID-19 pandemic and the mandatory restrictions introduced by the government amplified the need for companies to switch to remote work. This resulted in a shift in the work practice from the usual face-to-face to remote work practice. This change in the work practice resulted in a spike in the implementation of technologies that facilitate communication and collaborations and a shift from paper-based processes to digital processes. Companies were forced to expand and enhance their IT infrastructure for employees to work remotely.

The findings are in line with Kudyba (2020) who underlines that businesses had to come up with novel strategies to survive the disruption forces since they could not rely on face-to-face interactions with employees, clients, and suppliers. It is also suitable to conclude that the shift to remote work meant projects were and are still being delivered through virtual project teams in many organisations since the COVID-19 pandemic.

Drawing from the work of Blaskovics (2018) who investigated the aspects of digital project management, virtual project teams are not a new thing and projects have always included virtual elements in them. However, it is a work practice that was partially applicable in some of the companies while in some companies it was never an option. Consequently, it is evident that the pandemic forced many project management companies to consider virtual work and virtual project teams.

Prior research has demonstrated the importance of understanding the factors that will determine the success of a virtual team and has identified the most relevant factors for project success in a virtual team, including trust, clear communication, technical assistance, strong leadership, a sufficient level of technology, and the company's overall support (Bergiel, Bergiel & Balsmeier, 2008; Verburg, Bosch-Sijtsema & Vartiainen, 2013). However, none of the participants highlighted the importance of understanding the aspects that will determine the success of a virtual team. The opportunities and challenges presented by working remotely were the primary focus of their discussion.

The findings indicate that the shift to remote work has resulted in a notable decrease in the time required for decision-making processes, such as design approval. However, there was a need to enhance team interactions, increase communication frequencies, and cultivate a culture of transparency among team members. These efforts are crucial for ensuring seamless collaboration and maximising the benefits of remote work. The identified efforts align with those summarised by Blaskovics (2018), who stated that the greatest benefits of a virtual project team are that it facilitates effective communication, team management regardless of geographical location, and information sharing.

Furthermore, the data revealed that participants expressed concerns about the absence of personal or in-person interaction and a lack of trust in the services provided by service providers and the work conducted by the project team. The inability to verify deliverables in person was also mentioned as a challenge. This accords with the findings of Blaskovics (2018), who identified the absence of personal presence, the lack of direct contact with other stakeholders, and the difficulty of achieving trust, as some of the challenges of managing a virtual project team.

### 5.4.2 The importance of effective project team communication and collaboration

The data indicates that a significant proportion of project leaders perceive communication as an essential component in the field of project management. In addition to this, they indicated that the rapidly growing adoption of digital technologies has a significant impact on communication within project teams and how they collaborate.

The findings further showed that organisations prioritised the introduction of digital technologies that facilitated online communication and collaboration among project teams. Project teams and stakeholders relied heavily on "Lean" channels of communication like Microsoft team, Zoom, Skype, and WhatsApp groups. As a result of adopting and utilising such "Lean" communication channels, project team members were able to keep up their routine of frequent meetings and engagements with stakeholders. These results are consistent with those of Subramaniam et al. (2021) who showed that the rapid pace of digital transformation has compelled businesses to rethink their methods of communication and management.

Additionally, the data showed that the digital communication tools adopted have enabled geographically dispersed team members to participate in meetings and decision-making processes, eliminating the need for physical presence. This has also improved stakeholder management by keeping them on board and maintaining positive relationships. The process of documenting project scope and managing stakeholder expectations has also improved.

However, a lack of in-person connection among project team members emerged as a challenge, necessitating project managers to improve communication and implement effective methods of communicating with and engaging the team. Some participants believe that increasing the frequency of meetings and developing greater transparency is necessary to address the issues raised. These findings support Swart, Bond-Barnard, and Chugh's (2022) recommendation to use an agile communication framework that enables regular interaction, collaboration, and task allocation as one of the success factors when managing a virtual team. However, none of the participants mentioned using a clear communication guideline or training to improve communication, both of which Swart, Bond-Barnard, and Chugh (2022) mentioned as additional success factors.

### 5.4.3 Enhanced access and sharing of information

The findings showed that accessing information and sharing it with the project team or any other project stakeholders became much quicker and easier during COVID-19 due to the introduction of digital technology and the use of cloud-based platforms in organisations. Additionally, the study found that the use of digital technology has provided advantages in project reporting, such as significantly reducing the time and effort required to compile and analyse data, ultimately leading to more efficient project management processes. These findings align with the finding of Kozarkiewicz (2020), who discovered that project data accessibility regardless of location is among the top six most important aspects of digital transformation in project management. Lieberson (2021) adds that moving to cloud-based platforms enables easy access to data and enables organisations to share dashboards that provide stakeholders with real-time information on budget, progress, and more.

Although the majority of participants demonstrated that the shift to online platforms, which aided in accessing and sharing information, became apparent or was accelerated during COVID-19, some participants demonstrated that this was not a new thing in their organisation. Online tools such as Power BI were already being used for sharing project performance information with different stakeholders.

According to Lieberson (2021), project managers have already widely adopted process automation and workflow technology for tasks such as reporting and data collection; however, none of the participants mentioned the importance of automation of routine tasks or workflows related to project reporting. The majority of participants discussed how project management has become increasingly focused on leveraging technology to improve reporting efficiency, as well as general access and sharing of information.

### 5.4.4 The relevant project manager skills in the digital era

Based on the participants' views on project managers' skills and competencies, most acknowledge the need to upskill, especially in utilising digital platforms, which means digital skills are necessary to thrive as a project manager. PMI (2018) in their report postulates that for businesses to succeed in today's increasingly digital world, they will need to recognise the importance of a wide range of skills required to carry out their projects and programmes.

Drawing on previous research, Marnewick and Marnewick (2021) identified the following as the most important skills for the project workforce of the future: Online communication and collaboration, Digital empathy, Public and mass communication, Balanced use of technology, Data literacy and AI literacy, and Content and cyber-risk management. Furthermore, data management and analytics, an innovative mindset, security and privacy knowledge, legal and regulatory compliance knowledge, collaborative leadership, and data-driven decision-making have been identified as skill sets that foster success in the digital era (PMI, 2018).

These skills are crucial for project managers to navigate the evolving landscape of virtual teams and remote work. As technology continues to advance, project managers must be adept at utilising online communication and collaboration tools to facilitate effective teamwork. Additionally, digital empathy is essential to understanding and addressing the unique challenges that team members may face in a virtual setting. Project managers should also possess strong skills in public and mass communication to effectively disseminate information to stakeholders.

Though the literature identifies a number of digital skills that are becoming increasingly important for success in the modern workplace (PMI, 2018; Marnewick and Marnewick, 2021), it is worth noting that while some participants believe that digital skills are important, none of them have stated any specific digital skill sets that they believe are required. This suggests that there may be a lack of awareness or understanding about the specific digital skills required for the workforce of the future.

While digital skills are becoming increasingly important, they should not overshadow the importance of other foundational skills such as leadership, problem-solving, and adaptability. To effectively navigate the complexities of the modern workplace, project managers still require a strong foundation in these areas. According to one participant, one of the most important skills required to navigate the landscape of project management in the digital era is "interpersonal" skills.

Lastly, the analysis of the results revealed an intriguing finding related to the participant's perception that obtaining PMP certification demonstrated that project managers are striving to become competent in fulfilling their roles and remaining relevant in this digital era. According to Marnewick and Marnewick (2021), competency is determined by the practical application of knowledge, skills, and behaviours gained through experience rather than the acquisition of

certification. They argue that, while certification may demonstrate a commitment to professional development, true competency in project management is achieved through hands-on experience. This perspective challenges the notion that certification alone guarantees competence in fulfilling project management roles in the digital era.

### 5.4.5 The project approaches adopted for project delivery

The findings confirmed the widespread adoption of agile project management among the majority of project participants. Notably, one participant acknowledged the necessity of a hybrid approach that combines both waterfall and agile methodologies. According to the results, the method a project manager chooses to use depends on the type of project being executed. To ensure the success of a project, it is crucial to make the appropriate decision. There were also comments made about how the waterfall approach is necessary for completing some projects, particularly in the planning stage. This is consistent with Belling's (2020) assertion that agile teams can benefit from incorporating traditional (waterfall) methodologies when a precise definition of the project's scope is necessary.

Although the literature indicates that Agile-implemented projects are more successful than waterfall-implemented projects (Khoza & Marnewick, 2020), none of the participants mentioned the impact of agile methodology on project implementation success rates. Participants focused on three crucial benefits of agile and hybrid methodologies: improved stakeholder engagement, customer satisfaction, and project team motivation. These three highlighted benefits are consistent with Gemino, Reich, and Serrador's (2021) conclusion that agile and hybrid approaches increase project stakeholder satisfaction more than traditional approaches.

Furthermore, the finding revealed that the shift prompted project leaders to develop agility. The pandemic forced project leaders to adapt quickly to remote work environments and find innovative ways to collaborate with their teams. Despite the challenges, many project leaders recognised the value of agile methods in enabling them to respond swiftly to changing circumstances and deliver value to their customers.

## 5.5 Theme 4: The benefits and drawbacks of the digital shift

The findings of the study revealed that the transition to digital technologies during the COVID-19 pandemic brought about a combination of benefits and drawbacks. The subsequent sub-sections outline the identified opportunities and challenges:

### 5.5.1 The benefits of the digital shift:

Participants view the transition from face-to-face to remote work as one of the most significant advantages, as it has eliminated the barrier to collaborating with geographically dispersed teams and accessing or sharing information regardless of location. They also noted that with remote work and virtual meetings becoming the norm, there was a reduction in travel expenses and time spent commuting for both domestic and international teams. These findings are supported by Blaskovics (2018), who identified the biggest benefits of virtual work as reduced travel costs and time, improved communication, cloud-based document storage, and improved team management.

It is important to point out, however, that these findings regarding cost savings were in contrast to the findings of Battisti, Alfiero, and Leonidou (2022), who argued that remote work had a negative financial-economic impact on employees due to the additional costs incurred from the use of digital technology platforms, utilities, and a variety of other things. Battisti, Alfiero, and Leonidou (2022) highlighted that remote work resulted in increased expenses for employees, such as the need to invest in reliable internet connections and suitable home office setups. They also emphasised the importance of considering these additional costs when evaluating the overall financial impact of virtual work on individuals.

In summary, the findings of the study highlight the potential benefits of adopting digital technologies as follows:

- Improved project team performance
- The potential cost and time-saving
- Project information accessibility
- Increased customer satisfaction
- Enabled remote work
- Improved communication and collaboration

### 5.5.2 The drawbacks of the digital shift:

The findings of the study revealed that the following issues are the primary challenges that businesses face when adopting digital technologies in the field of project management:

- Cyber Security
- Lack of competencies
- Change management

- Lack of trust
- Communication: lack of face-to-face interaction
- Load-shedding: power blackouts
- Network and connectivity
- Managing virtual teams

Previous research on virtual teams has highlighted the challenges of managing remote teams, such as the lack of personal presence, the absence of direct interaction with other stakeholders, the difficulty in establishing trust within the team, and work-life balance (Blaskovics, 2018). Additionally, literature has shown that cyber security is a major concern in the era of digital transformation, with an increasing amount of data being generated and stored (Vial, 2019; Al-Ruithe et al., 2018). These findings from the literature support the challenges identified in the study.

Considering the study's setting in South Africa, it's important to highlight load-shedding, as one of the challenges revealed in the study that was not mentioned in the literature. Participants stated that "load-shedding" is one of the most significant challenges that have a negative impact on digital technology or online tools. Load-shedding is a nationwide phenomenon in South Africa, where scheduled power outages are implemented to prevent the collapse of the electricity grid. These outages can last for several hours and occur regularly, causing disruptions in the functioning of digital technology and online tools. Participants in the study highlighted that load-shedding has a negative impact on their ability to work effectively in virtual teams as it leads to loss of connectivity, interruptions in communication, and delays in project completion.

## 5.6 Schematic diagram presentation of the results

A schematic representation of the study's findings is shown in Figure 5.1. The diagram provides an overview of the participants' understanding of digital transformation, the project management practices impacted by the digital shift and the benefits and drawbacks of the digital shift.

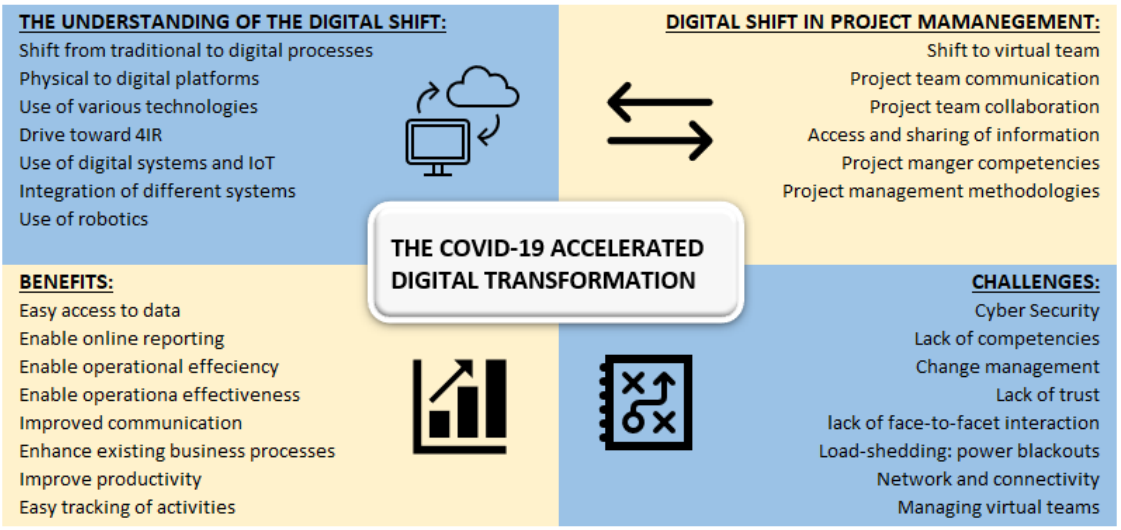


Figure 5. 1: The COVID-19-Driven Digital Transformation (Own Research)

# CHAPTER 6 CONCLUSION AND RECOMMENDATIONS

## 6.1 Introduction

This chapter provides a summary of the research findings in relation to the research objectives and questions, as well as an assessment of their significance and contribution to the field. Furthermore, this chapter presents the research's limitations and makes recommendations for future research.

## 6.2 A summary of the main findings

The purpose of the study was to investigate the effects of the COVID-19 pandemic-driven digital transformation on project management practices and processes in the context of South Africa. Understanding the effects of this transformation is crucial for project leaders in South Africa to adapt and optimise their management strategies. By exploring the impact of digital transformation on project management, the study contributes to the existing literature and provides valuable insights for organisations navigating the digital landscape.

The research was conducted using a qualitative research approach based on the interpretivist paradigm. This approach allowed for an in-depth exploration of the participants' experiences and perspectives on the impact of digital transformation on project management. Data was collected through 5 semi-structured interviews with professional project leaders, including project and programme managers, from selected South African organisations. The selection of participants was based on their experience and expertise in project management, ensuring that their insights would provide valuable insights into the effects of digital transformation.

**Research objective one** - Project leaders' understanding of digital transformation

The findings demonstrated that project leaders understand the notion of digital transformation. It is viewed from two dimensions: the introduction of digital technologies into business functional areas and their impact on various elements of the business and work practices. Therefore, the results suggest that digital transformation is intended to impact organisations positively in terms of improved business processes, productivity, communication, and culture.

**Research objective two** - the impact of the COVID-19 pandemic-driven digital transformation on the key aspects of project management

The third research objective has been met through the identification of several key aspects of project management that have been impacted. These include the emergence of remote work which

necessitated the shift from collocated teams to virtual teams, changes in team communication and collaboration, enhanced information access and sharing, project manager skills, and the project approaches adopted for project delivery.

The findings suggest that the COVID-19 pandemic has compelled organisations to adopt virtual work practices and virtual project teams as a means of ensuring business continuity and adapting to remote work requirements. Companies that were previously hesitant or resistant to implementing virtual work practices were compelled to adapt in order to ensure business continuity. As a result, organisations have gained valuable insights into the benefits and challenges of managing projects remotely, paving the way for a potential shift in project management practices even beyond the pandemic. Virtual project teams will likely become a more prevalent and accepted form of project management even beyond the pandemic. This has the potential to reshape traditional project management practices and open up new opportunities for collaboration and efficiency.

The results highlighted that organisations are increasingly relying on digital communication tools, such as Microsoft Teams, Zoom, Skype, and WhatsApp groups, to adapt to the fast-paced digital transformation. These tools offer benefits such as improved collaboration, real-time communication, and enhanced efficiency in project reporting. This emphasises the need for organisations to adapt their communication and collaboration strategies to meet the demands of the digital age.

The results also highlighted that the use of digital technology and cloud-based platforms can significantly enhance project reporting efficiency and facilitate better communication and collaboration among team members. This suggest that project managers should leverage these tools to streamline data collection and analysis processes, leading to more informed decision-making and improved project outcomes.

In today's rapidly evolving business landscape, project managers must be able to navigate and adapt to new technologies and digital tools. This requires a strong understanding of how to effectively communicate and collaborate virtually, as well as the ability to quickly learn and utilise new digital platforms. Findings point to the importance of strong interpersonal skills for project managers, especially in a remote work environment, when collaborating with team members and stakeholders. By combining these interpersonal and digital skills, project managers can

successfully lead their teams and stakeholders through the challenges of remote work and ensure project success in the current changing landscape.

**Research objective three** - The impact of COVID-19 on the adoption of digital technologies

There was consensus amongst participants that digital transformation was already underway, but the pandemic acted as one of the greatest catalysts towards the adoption of emerging digital technologies. Based on the response of the project leaders, it appeared that generally the digital shift catalyst by the COVID-19 pandemic was met with a positive attitude. It was viewed as a positive force driving the adoption of new technologies, but both its positive and negative effects were undeniable. The project leaders concur that the rapid convergence of technologies has affected every aspect of life. Evidently, for many organisations, what may have taken years in the past has literally occurred overnight.

The results suggest that the COVID-19 pandemic accelerated the paradigm shift towards digital transformation in many organisations. This shift has not only affected the way businesses operate internally but has also changed the way they interact with customers. As a result, companies that have successfully embraced digital transformation are likely to stay competitive in the evolving market landscape.

**Research objective four** - Opportunities and challenges associated with the digital transformation driven by the COVID-19 pandemic.

Project leaders play a crucial role in driving organisational change and implementing digital transformation strategies. By understanding their experiences and perspectives, the study provided valuable insights into the challenges and opportunities associated with digital technology adoption during the pandemic. The findings of the study can inform decision-making and strategy development for organisations seeking to navigate the digital transformation process and ensure business continuity in the face of future disruptions.

- Opportunities

The research findings highlighted several advantages linked to the implementation of digital technologies, such as enhanced project team performance, improved accessibility to project information, increased customer satisfaction, fostered remote work capabilities, enhanced communication, and increased collaboration.

Additionally, the results indicated that the adoption of remote work and virtual meetings as the prevailing practice has yielded advantages in terms of cost and time efficiency. The aforementioned opportunities suggest that organisations have the potential to cultivate innovation and accelerate decision-making processes, thereby allowing them to maintain a competitive edge within a rapidly evolving digital economy environment.

- Challenges

When exploring the main challenges faced by project leaders, particularly during the pandemic's digital shift, the following issues were identified: a lack of competencies, a lack of trust, cyber security, network and connectivity issues, and load-shedding (power blackouts). In addition to a lack of trust, the study also revealed that lack of face-to-face interaction and physical presence has a negative impact on project team management. This suggests that as organisations continue their digital transformation, it is critical to recognise that social and personal contact will remain a challenge.

It is also critical to understand that trust fosters relationships and team cohesion; thus, a lack of trust among team members may have a negative impact on the team's performance. These challenges are particularly evident in remote work environments where face-to-face interactions are limited. Therefore, project leaders must find innovative ways to foster trust and build strong relationships among team members to ensure optimal performance and collaboration.

## 6.3 Recommendations

Moving forward, project leaders need to develop strong interpersonal skills, particularly in a remote work environment, as these skills are essential for effective collaboration, communication, active listening, fostering a sense of trust and empathy among team members and relationship-building with team members and stakeholders. Project managers can enhance their interpersonal skills by developing emotional intelligence, actively seeking feedback, and continuously improving through participation in training programs or mentorship opportunities. Project managers can also leverage digital technology and cloud-based platforms to streamline data collection and analysis processes, leading to more informed decision-making and improved project outcomes. Furthermore, addressing the lack of competencies can be achieved through training and upskilling programmes to ensure that team members have the necessary skills to navigate the digital landscape effectively. Lastly, implementing robust cybersecurity measures

and investing in reliable network infrastructure can help mitigate the risks associated with cyber threats and connectivity issues, enabling smooth digital operations.

## 6.4 Suggestions for further study

1. Future research can further investigate the long-term effects of digital transformation on project management practices by exploring whether the adoption of digital technologies, remote work, and virtual teams will continue to be prevalent even after the pandemic.
2. Future research can further explore strategies for addressing the challenges identified in this study.
3. Future research could examine the role of leadership in creating a supportive and inclusive virtual work environment that encourages trust and engagement.
4. Future research can investigate the essential skill set required for successful digital project management

## 6.5 Limitations of this research study

It is crucial to acknowledge the limitations of the research. The study was conducted with a limited sample size of five project leaders from three industries who voluntarily agreed to take part in the research. The sample representation may not be adequate due to the broad application of project management in various industries and the involvement of multiple individuals in project delivery. Therefore, the limited sample size may have restricted the diversity of perspectives and experiences represented in the study. This limitation implies that future research should incorporate a larger sample size to achieve a more comprehensive understanding of the topic.

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# APPENDIX 1: RESEARCH SCHEDULE

**RESEARCH TOPIC:** The impact of COVID-19-driven digital transformation on project management in South Africa

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**PROCEDURAL INFORMATION:**

- Ask for consent to record the interview.
- Ensure that the interviewee understands that it is voluntary to participate in the study.
- and that they may withdraw their consent at any time.
- Briefly describe the purpose of the study to the participant.

**SECTION A: BACKGROUND INFORMATION**

1. Company Name (Optional):
2. What is your designated position?
3. What is the sector of your organisation?
4. Please indicate relevant experience in the current position

| Number of years | |
|---|---|
| 0-5 | |
| 5-10 | |
| 10-15 | |
| 15-20 | |
| 20+ | |

5. Does your company do projects in the public, private sector or both?

| Public | |
|---|---|
| Private | |
| Both | |

**SECTION B: INTERVIEW SCHEDULE**

1. Understanding digital transformation:
    - What is your understanding of digital transformation or how would you define it?

2. Impact of COVID-19 on Digital Transformation from the project leaders' perspective
    - Guiding questions:
        - Would you say COVID-19 had accelerated a digital transformation or not?
        - Explain how project continuity was archived in the face of the COVID-19 pandemic.
        - What were the new technology-intensive project implementation models/methodologies adopted?

3. Impact of the COVID-19 accelerated digital transformation on project management.
    - In your view and based on your experience in the past 3 years since COVID happened and new digital technologies have been introduced do you think the landscape of project management has changed? Or do you think the digital transformation shift had an impact on project management?
        - If yes: What in particular within the project management practices and standards have changed?
        - If no: elaborate further,

4. Opportunities and challenges of Digital Transformation in project management
    - What do you perceive as the primary opportunities and challenges related to the digital transformation discussed?

# APPENDIX 2: RANDOMLY SELECTED TRANSCRIPT

**0:0:0.0 --> 0:3:13.410**
**Tshego Mokgotho**
OK. Thank you let's get started. I'm first going to do the introduction and when I'm done, I'm also going to allow you to introduce yourself. My name is Tshegofatso Mokgotho. I am a master's student at UCT currently in my third year doing my research. Hence you received my invitation to participate in my research.

To give you a background of my study or the study that I'm conducting. The topic is understanding the impact of the COVID-19 pandemic on project management transformation in South Africa. So, this study is based or is in the context of South Africa. Meaning I will be looking at getting your perspective in terms of the projects that you have implemented in South Africa. With the aim of trying to find out or establishing or understanding how the COVID pandemic has accelerated the adoption or implementation of digital transformation, in various industries. My study is not based on specific industries but across industries.

I have decided to interview Project leaders or anyone who is involved in the project. It can be a project manager, PMO head or you know your coordinators. As long as you are your role is based on the delivery of projects or delivering of projects. So that is a bit of background on this study that I am conducting.

And just to give you a background on my academic and career background, I have studied civil engineering and also, I have studied project management, PDP with Stellenbosch. I am currently completing my master's with UCT, and I am working as a project manager.

I will go through the ethical considerations, I want to make you aware that your participation is completely voluntary and if you feel like withdrawing at any stage of the interview, you can just, you know, indicate our stop immediately and also your identity will be kept anonymous on the company and your name company is working for in your name or any details that you provide will not be mentioned in my research publication.

I will also just give you a chance before we proceed if there is any question that you want to ask or any clarity before I give you a chance to do an introduction.

**0:3:14.930 --> 0:3:23.130**
**Participant: PM 5**
Alright, Tshego, I think you've covered everything. On my side that I would like to know, I don't think that you missed anything.

**0:3:24.50 --> 0:3:38.60**
**Tshego Mokgotho**
OK, great. Then you can just introduce yourself, giving me a background about your career, the position that you are currently holding and background about your organisation. Briefly.

**0:3:39.570 --> 0:4:54.490**
**Participant: PM 5**
My name is Participant: PM 5 currently working for Company A as a project lead. I am also coming from a similar background as you in civil engineering, I have also done a Project management course with UCT via get smart. I'm also currently studying for my BSc in Computer Science So my career background, I worked quite a lot in the telecom cation industry, but at the beginning of my career I started working for Company B maybe you might know them they are in Cape Town. Where we are managing projects and they were purely civil engineering projects, road construction of Rd speech and then.

Then at some point, I had to divert. And then I went to Telecommunication infrastructure projects where I joined Company C. And that was 2015. Then I joined Company D as a site manager and from Company D. Then I joined Company A in my current position as a project lead.

**0:4:55.730 --> 0:5:9.470**
**Tshego Mokgotho**
And what are your years of experience as a project lead? How many years have you been working? The number of years that you've been working on projects.

**0:5:11.610 --> 0:6:49.180**
**Participant: PM 5**
I'm working on a project starting from my career because Starting with Company B I have been involved in projects, delivering projects road and stormwater sewer. But I was more of a supervisor site supervisor where I was overseeing the site operations, making sure that the material was over that way ahead of time, and making sure that site operations are running in a safe manner. Where I was overseeing the teams and then making sure that we work out the break-evens. To ensure that any cost input for the company, we do make the revenue for that specific project or all the resources spent on that specific task.

So, I have been on projects and then from there and then I joined Company C where I was project lead. Being a project lead I was managing contractors indirectly and directly. We had a lot of subcontractors work so that's when I now had to go into terms of managing the higher level of project management in terms of deliverables, making sure the quality is up to standard. And at Company D, it was a similar role, but it was more of the telecom infrastructure project.

I can say managing projects since my career in 2012 being involved in projects and up until now.

**DIGITAL TRANSFORMATION, COVID-19 IMPACT**

**0:6:50.540 --> 0:8:19.470**
**Tshego Mokgotho**
OK, Thank you for that. And OK, so now we can move to the first part of the question. I will first take you through the sections. I tried to not ask the question as one but divided it into three sections. The first section is to get an understanding from your point of view or your perspective, of what is digital transformation. I don't expect you to give a definition from the book. I just want to get an understanding because the nature of my study is explorative. So, this means I'm trying to tap into the knowledge of the project leaders just to see how they view digital transformation. So that will be my first question just to get your understanding.

The second question will be where we start to look at how COVID has impacted the digital transformation according to your experience and move on to the last question which will be now focusing on project management specifically.

I am going to start with the first one. You can take me through your understanding of digital transformation, and what it means when we say digital transformation.

**0:8:22.700 --> 0:11:32.240**
**Participant: PM 5**
For me digital transformation It's how the company is applying the technologies and finding ways of scaling the business in terms of meeting the new ways of how we operate.

In terms of when we had COVID, we had to adjust a lot of things in terms of if we had meetings that we had to meet indirectly, we were doing those meetings like uh via Zoom or teams getting feedback in all of that.

In my space how that has affected it was in the positive and negatively because positive it's because maybe there was a lot of time reduced during that period in terms of travelling to regions where you need to get to meet the project stakeholders you get to meet the stakeholder via a scheduled meeting team.

And that we went quite well because now the companies were saving quite a lot on the travelling costs and all of that.

But in another way, it was also affecting it negatively because now the people are not in the same space Where you feel there is not that interaction, so the ways of managing project management, you have to keep on checking on people if they are doing there, their part with their deliverables so that you can keep that connection with

them. So that we don't lose track in terms of going through a meeting and then we don't know how far we are with progress. So, it worked well, but I feel also it also impacted in terms of how the project needs to be managed in terms of that you are no longer in the same space whereby you guys can interact daily or like on that constant basis.

But then also needed to change now and then adapt to a new way in terms of having a lot of group chats. Anyone that is stuck with something needs assistance from the team members and they can easily go to the group and then as well assistance. So, during the COVID, yes that it was sort of a setback but then it's something that works perfectly now and then.

Also, teams improve their systems in terms of Adding some features when you're in a noisy place where you can filter that noise, so it was, but then I still feel like a lot is coming in terms of project management.

But then I don't see that as a threat to project management because rather than as a challenge, there's a lot of stuff that is being digitalized in terms of we have a lot of products that we will come on boards like your asana.

Umm, there are a lot of project management tools I don't feel like they are not a thread more than an entire challenge that someone needs to keep learning all these new platforms and all of that, how to use them.

So, I still see that there's a lot that's going to be digitalized. But starting now, yes, we were not ready for that. But then Getting to it and then we had to adjust immediately during COVID. We handle that quiet, very well and we adjusted where we needed to adjust it in terms of making sure that the teams increase the collaborative way how we interact with other team members. And then I think the projects were delivered within agreed timeframes and within reasonable time frames as well.

**0:12:19.330 --> 0:13:23.160**
**Tshego Mokgotho**
And how did the project implementation continue, how was that achieved? I know you mentioned having to adjust and also starting to use WhatsApp groups and all that, but with any systems that had to be implemented. And also, I think before you answer that in your area, do you think the company already had digital platforms in place or there was nothing at all, they had to start from scratch? I am trying to understand if the transformation was already there or the implementation of new technologies was already in place, but it was kind of accelerated or it wasn't there at all. They had to start putting new technologies or digital platforms in place.

**0:13:14.460 -->0:14:48.790**
**Participant: PM 5**
No, it was already there on our side. As mentioned earlier. The only thing that maybe wasn't there was the frequent travelling in terms of having those technical sessions and then you do have to go down together and keep track, having technical sessions with the team, then getting the progress update.

But in terms of the reporting and everything, it was already there. We are using your Power BI tools which give all the information on how the projects are performing and what are the bottlenecks because you can see it.

And even projects how they flow and what issues are there so the transformation was there, but then it was more of accelerated when COVID-19 kicked in. So, we just needed to adjust the way we wept and make sure that now we have regular meetings that we normally use to have and a lot of group chat where we can easily access each other, all the team members, all the projects' stakeholders. So, it was accelerated but the transformation was there, but I still see that it will be digitalized even more than it is currently.

It is not even clear to project management in terms of where you want to see Is it going to affecting like the jobs in the industry? I do not feel so. I feel like it's just and it's just a challenge that everyone needs to equip themselves with and then make sure that they, familiarize themselves, with the tools and the platforms that are being used.

**0:14:50.640 --> 0:15:12.380**
**Tshego Mokgotho**
Do you have anything to say in terms of the project manager skills or competencies, I heard you mentioned now that people need to be you know to equip themselves, but are there any particular skills or competencies that you see emerging from this whole shift?

**0:15:15.30 --> 0:16:2.980**
**Participant: PM 5**
I'll say that because now we work remotely, I think more of the skill the project management is key now it's more Interpersonal how to engage with people. I think that's the most skill that project manager needs to equip themselves with because they deal with a lot of people, you to get feedback from different people in terms of putting a project in place. So, in that in that point of view, you need to be able to be someone that is very interactive with people. Other than that, it's all the other necessary skills for a project manager to have, but that one I feel like someone needs o to have it. It's mandatory.

**0:16:3.770 --> 0:16:9.690**
**Tshego Mokgotho**
I forgot to ask in the beginning. Are you PMP certified?

**0:16:11.150 --> 0:16:43.240**
**Participant: PM 5**
No, not yet. I'm planning to have to be PMP I've started loading my profile, just waiting for approval on my profile. I wanted to finish it with a fee before the 1st trimester. I have the profile approved and then write an exam.

**0:16:46.920 --> 0:17:17.640**
**Tshego Mokgotho**
So then in in terms of the challenges? When COVID I think especially during the COVID. You mentioned that you can say, OK, you had already existed. Digital platforms were you using for reporting and other things, but do you think that the way challenges that came with COVID or the new things or the change or the shift that was introduced?

**0:17:19.0 --> 0:19:43.590**
**Participant: PM 5**
Yes, definitely. Because when, when, COVID started it was a new thing we didn't know if this is going to be a norm going forward,

Every project has a business case so your business case you didn't know that it will still be relevant during COVID.

So, it was more of that uncertainty to say, are we still going to be operating the same way we used to operate just this is just this phase and obviously yes, it impacted a lot of companies.

In terms of like to make an example of the companies that were impacted, like if they were doing like your office space. So, the Internet people are working from home so meaning that the business case that demand is no longer there.

For such projects and then that means that the business changes completely changed, but fortunately for our infrastructure projects, uh, it was more of the demand was more was even worse.

Even what we anticipated in the business case was even like the return on investment spiked up because everyone needed to have connectivity when working for a department, we need to deliver that infrastructure as quickly as possible. So, it was working in our favour on our side.

But other businesses yesterday impacted as I mentioned. So, because of our business cases as much as we stated that maybe the return on investment might be five years or so. But during that peak COVID we saw a high demand and which accelerated now the return on investment and then even make it like even to be accomplished within fewer years.

So, it was a positive on our side in the talk on the project we've also a lot of pages in terms of we needed to complete the project as soon as possible because now there was a demand that we need to deliver.

Internet to all customers Umm where they based. So yeah, he didn't impact us negatively, but yeah, they were companies that were impacted negatively.

**0:19:43.670 --> 0:20:11.80**
**Tshego Mokgotho**
Thank you for that. And so, in terms of, if we look at project management approaches or some will call it methodologies.

Is there any there? Were there any changes there or you've continued the way you have been managing the project and which methodologies are you using currently?

**0:20:12.520 --> 0:21:58.790**
**Participant: PM 5**
If a project, we became focused on starting it from the planning phase. We were going with the waterfall methodology.

But then, with some of the projects that we focus on the thing we based on interest campaign or something like that, So the planning is not contributing part then that one we are using agile. So, we need to adjust as the demand increases like this one like now during COVID we never expected that people will be working from home and then we needed to provide infrastructure in areas that we never intended to provide Internet to but then that was an opportunity.

So, we needed to ramp up resources and then also everything in terms of delivering that project. So, we are using the Agile methodology there in terms of that. We can always go back to the planning and say, guys, we no longer need this much staff and resources, we need more and we need more funds and any project may be in terms of when we deploy the infrastructure because normally what we do on our project, we break it down into Building the network and then also there will be the connectivity of customers on the network when it's already completed without so building the network when you know the area that you targeted for  It is much easier because you know the area that you're targeted and you build a network based on the waterfall you do your planning everything and then your cost will be like OK, it is based on the planning.

But then when there's now a number of customers that are coming in and signing up you, you will never know how many numbers of customers you will get in that area. Then you will need to ramp up based on the number of based on uptake. Then on that one, we are using both waterfall and other method.

**0:22:0.300 --> 0:22:29.990**
**Tshego Mokgotho**
OK. Thank you for that. And so, in terms of managing the project team.

Before and after, I'll always say before and after because my studies are based on establishing if there was a difference. So, were there any, you know, changes? Or did you implement certain things you mentioned you had an OK, there was a challenge when in terms of you know managing the team and hands. I'm going back to this question of how did you manage the project team?

**0:22:33.310 --> 0:24:50.990**
**Participant: PM 5**
During COVID, It was very difficult because you will never know when it's going to be shut down completely.

So, you always don't know when is your completion time as much as you have it on your project, it might be like they might be a complete nationwide sat down, so that made it very difficult in terms of knowing your exact completion time, right? And you need to adjust it and as soon as you have a Period whereby you can go out and do some work then you go out and do some work, but in terms of managing the teams, there is nothing much change on our side.

We just introduced maybe some more transparency and communication to the teams and more reporting in terms of where they are when they're doing what they are busy with when they go into the next phase of the project. So that's the thing that we change in terms of more transparency created groups to make sure that OK, we could tell where the guys are, what they busy with and.

Any challenges need to be reported immediately if they need my attention in terms of signing off. There is a VO that is there and then I need to sign it off and then I can attend it immediately as well. So that's something that we

normally do so that nothing much changes there. But then in terms of transparency groups were giving us more transparency. What the teams are busy with and what escalations are going there, but we always have those groups as well. It's not like we didn't have them.

Yeah. During COVID, we were pushing numbers, especially when we get like a leeway to get work because we knew that maybe we'll get a backlog when the country is completely shut down. We cannot do anything. We can only do maintenance then then we will push what we have in the backlog. Maybe if we just coming out of a complete lockdown and then we'll say OK guys we have a backlog we need to push. So, it is something that happens when the project is just to accept late it. So, there is nothing much in terms of management of the teams that changed because we already have like sort of a digital transformation in place.

**0:24:53.290 --> 0:25:6.540**
**Tshego Mokgotho**
And in terms of communication with any new communication-specific platforms introduced, you've been using WhatsApp and you continue to use WhatsApp or any other communication platforms.

**0:25:8.110 --> 0:25:52.50**
**Participant: PM 5**
No, there was not. There was nothing. There was nothing new It has been the same. So, we kept using it, but then we just maybe increased the. The communication in terms of having meetings in terms of then we started having regular meetings because that's as I mentioned that now we're working in different places this summer working from home. So definitely we will have those daily stand-ups to say, OK, what's on your plate today? Are there any things that are running behind? If is there anything that you need assistance from all team members or project team members then we'll make sure that if there are any issues everyone can help and then they can have the spare time in the morning that they can assist.

**0:25:53.820 --> 0:26:2.580**
**Tshego Mokgotho**
Hmm OK. And any advantages or benefits that you can share with me in terms of, you know the whole shift and everything that you've explained to me now?

**0:26:5.640 --> 0:27:28.370**
**Participant: PM 5**
Ohm, as I said, like uh, on our side in terms of the COVID It was all advantages because we had more demand, in the pipeline, the growth, it was there and then it was just on us to deliver.

So that was good news for the business because now that means if the pipeline is filled with that means at least now you also have number of projects that you can put up there in place.

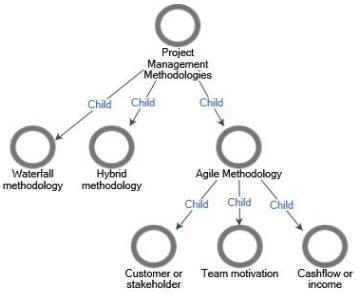
But I think in other organisations, yes, like as I mentioned like your business parks, they were impacted negatively because companies were no longer renewing their list.

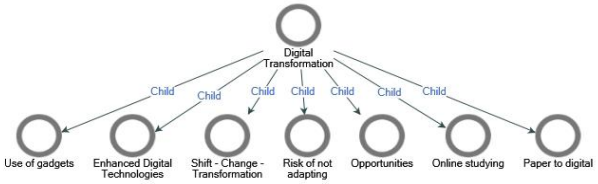
So, on our side, definitely, the COVID-19 Was of an advantage Just needed more of more regular communication in terms of managing your teams and then making sure that, uh, we have transparency and then you know what they busy with and their deliverables.

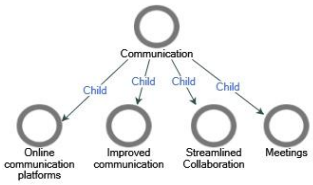
**0:27:7.260 --> 0:27:33.130**
**Tshego Mokgoth**o
That is great. I think you answered all my questions.

0:27:33.680 --> 0:27:37.350
**Participant: PM 5**
No, definitely. Uh. You can engage with me anytime.

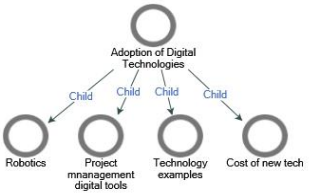
# APPENDIX 3: NVIVIVO CODING STRUCTURE



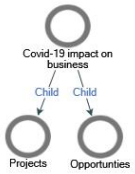



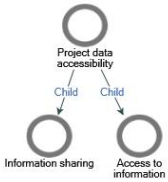







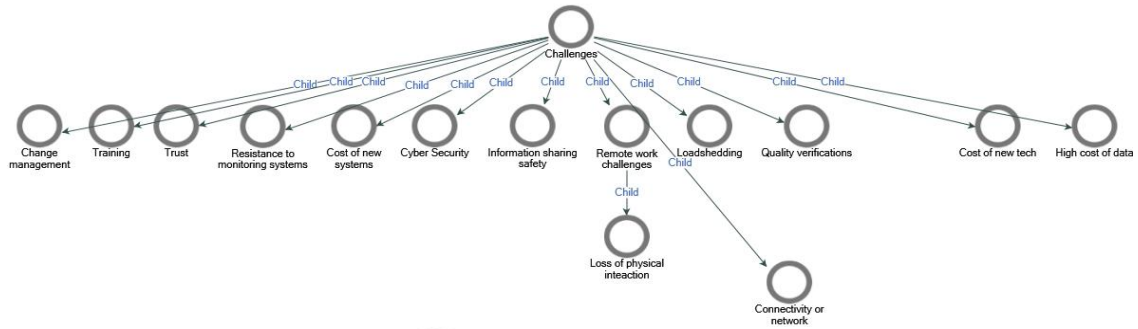


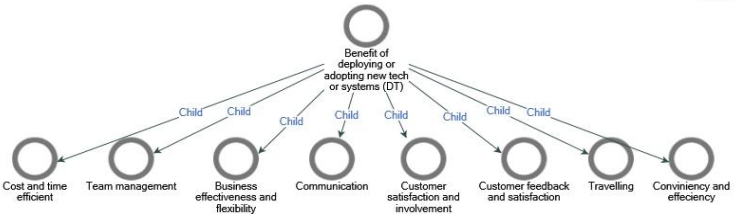







# APPENDIX 4: INVITATION TO PARTICIPATE

## INVITATION TO PARTICIPATE IN RESEARCH THROUGH AN INTERVIEW

### Dear prospective participant

My name is Tshegofatso Mokgotho, I am conducting a research study in partial fulfillment toward an ***MSc in Project Management*** at the University of Cape Town. The research aims to contribute to the South African phenomenon of digital transformation and project management by investigating the impact of digital transformation on project management, which has been accelerated by the Covid-19 pandemic.

For the purpose of this research study, I will be conducting interviews with project leaders who are actively involved in the management of projects in South Africa. I would like to extend an invitation to you to take part in the interview.

**Ethical considerations:**
If you consent to participate in my research, I will kindly request approximately 45 minutes of your time for a semi-structured interview. Depending on your preference, the interview will be performed virtually via one of three options: Teams, Zoom, or Google Meet. Interviews can also be performed in person when feasible.

If you are interested to participate, please contact me at mkgtsh015@myuct.ac.za or tshego252@gmail.com.

**Ethical considerations:**
Your participation is completely voluntary, and you are able to withdraw at any time throughout the interview without facing any consequences. Your identity will be kept anonymous, and I will treat your comments with strict confidentiality. In addition, participation in this study has no anticipated concerns or risks.

Kind regards
Tshegofatso Mokgotho

## APPENDIX 5: RANDOMLY SELECTED SIGNED CONSENT FORM

**DEPARTMENT OF CONSTRUCTION ECONOMICS AND MANAGEMENT**

### CONSENT FORM

**Title:** Understanding the impact of covid-19 on project management transformation in South Africa
**Researcher:** Tshegofatso Mokgotho (MKGTSH015)
**Degree:** MSc Project management
**Department:** Constructions Economics and Management Department, Faculty of Engineering & the Built Environment, University of Cape Town

**Background to the study:**

The research is based on the rise of digital transformation in businesses which is the wave of the future, and COVID-19 has accelerated the need for digital transformation, driving organizational leaders to develop new transformative strategies and have a deeper grasp of the redefined work environment. A number of project-based organizations are embracing digital transformation in order to better adapt to the changing business environment and achieve a more successful end result.

The study intends to contribute to the South African phenomenon of digital transformation and project management by investigating impact of digital transformation on project management, which has been accelerated by the Covid-19 pandemic.

- I. Masande Dlulisa ..... voluntarily agree to participate in this research study.
- I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind
- I understand that I can withdraw permission to use data from my interview within two weeks after the interview, in which case the material will be deleted.
- I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study.
- I understand that participation involves 45 minutes semi-structured interview conducted via

one of three options: Teams, Zoom, or Google Meet.

- I understand that I will not benefit directly from participating in this research
- I agree to my interview being audio-recorded.
- I understand that all information I provide for this study will be treated confidentially
- I understand that in any report on the results of this research my identity will remain anonymous. This will be done by changing my name and disguising any details of my interview which may reveal my identity or the identity of people I speak about.
- I understand that disguised extracts from my interview may be quoted in: dissertation, conference presentation, published papers.
- I understand that signed consent forms and original audio recordings will be retained using a service provided by UCT (UCT Google Drive, UCT OneDrive, Netstorage, ZivaHub etc.).
- I understand that I am free to contact any of the people involved in the research to seek further clarification and information.

**Signature of research participant**

---------- 28 November 2022

Signature of participant Date

**Signature of researcher:**

I confirm the participant is giving informed consent to participate in this study

---------- 28 November 2022

Signature of researcher Date