Research report title

Exploring organisational culture and digital transformation in the public sector

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A research report submitted to the Gordon Institute of Business Science, University of Pretoria, in partial fulfilment of the requirements for the degree of Master of Philosophy in Corporate Strategy

28 November 2022

ABSTRACT

This study explored organisational culture and digital transformation in the public sector. The study used qualitative research methods in a form of semi-structured interviews and thematic data analysis to explore key factors which drive a public sector organisational culture and how these factors affect digital transformation in the public sector. The research findings point to a myriad of organisational cultural factors which impede digital transformation in the public sector. These include factors related to organisational strategy and leadership, organisational structure, organisational systems and processes, organisational mindset and attitude, organisational skills, organisational incentives, organisational learning and innovation, collaboration and partnership, and technology investment. The study puts forward key recommendations and offers a broader perspective to help managers take a holistic, multifaceted view and approach when dealing with issues of organisational culture in the context of digital transformation in the public sector. The study concludes by recommending key areas for further research.

KEY WORDS

Organisational culture; digital transformation; digital culture; fourth industrial revolution; public sector

DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Philosophy in Corporate Strategy at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

TABLE OF CONTENTS

CHAPTER ONE: INTRODUCTION

CHAPTER TWO: LITERATURE REVIEW

CHAPTER THREE: RESEARCH QUESTIONS

CHAPTER FOUR: RESEARCH METHODOLOGY

CHAPTER FIVE: RESEARCH FINDINGS

CHAPTER SIX: RESEARCH DISCUSSION

CHAPTER SEVEN: CONCLUSION

CHAPTER ONE: INTRODUCTION

1.1. Introduction

This chapter provides background to the research problem and sets out the research problem, research question and sub-questions, research aims, research contribution and the scope for the study.

1.2. Background to the research problem

The world has entered the fourth industrial revolution (4IR), a convergence of multiple technologies, which marks a new era in human civilization and progress. In this era, modern digital technologies are permeating and impacting the lives of individuals, organisations, economy and the society at large, causing disruptions, but also presenting opportunities at the same time (Gimpel et al., 2018). These disruptive and transformative technologies include artificial intelligence, robotics, automation, big data, cloud computing, internet of things, augmented and virtual reality, 3D printing, nanotechnology and blockchain technology (Ulas, 2019).

Digital transformation has therefore become a necessity for governments, businesses and societies in the twenty-first century (Abd-Rabo & Hashaikeh, 2021; Hanna, 2018). According to Mahraz et al. (2019, p.924), digital transformation has become an "inevitable" and "irreversible" issue of strategic importance to all organisations across the different sectors of society. For companies in the private sector, digital transformation is a strategic business imperative for survival and improved performance and competitiveness (Marks et al., 2020).

For the public sector, digital technologies offer a greater opportunity for "a more efficient, transparent, and effective government" (Gil-Garcia et al., 2018, p.633). In the context of public sector fiscal constraints, higher public expectations for

better services and increased pressure for transparency and accountability, digital revolution presents governments with an opportunity to leverage digital technologies to build public sector capabilities, responsiveness, accountability and citizen-centric paradigm (Hanna, 2018). Digital transformation also represents a key attempt at the modernisation of government and public service delivery (Wimmer et al., 2020). In this context, transformation of governments has therefore become a strategic imperative to escape irrelevance (Battisti, 2020)

South Africa is in the initial phase of the fourth industrial revolution (4IR) and government has a major role to play in driving this technological revolution (The Presidential Commission on the 4th Industrial Revolution, 2020). Digital transformation therefore presents a golden opportunity to the country in terms of transformation and modernisation of government or the public sector to improve public service delivery and address the challenges of unemployment, poverty and inequality in South Africa.

Against the backdrop of this broader general background to the research, the sections below outline the research problem, the research aims, the research contribution and the research scope.

1.3.   Research problem

While digital transformation has become a necessity for governments to leverage digital technologies to improve their capabilities and public services (Eom & Lee, 2022), it does, however, present a major challenge for governments (Battisti, 2020). In this regard, the challenge of digital transformation goes beyond technology and requires changes in organisational culture and mindsets (Abd-Rabo & Hashaikeh, 2021; Hanna, 2018). However, fundamental changes in governments are difficult to achieve digital transformation due to the hierarchical and in-ward orientation (Hanna, 2018) as well as complex bureaucratic

configuration (Layton-Matthews & Landsberg, 2022) of these public sector organisations. As a result, many governments still lag behind in embracing the opportunities of digital transformation (Huang & Karduck, 2017).

This therefore suggests that a public sector organisational culture presents a barrier to digital transformation in the public sector. However, little is known about how public sector organisational culture affects digital transformation in government. This knowledge gap warrants an empirical research to understand how organisational culture affects digital transformation in the public sector. In this regard, Eom and Lee (2022) assert that "there is a dearth of systematic research on how public administrators define and understand digital transformation" (p.4). Rukh and Qadeer (2018) contend that "…the field of public organization development should be established more and studies must be conducted to diagnose and change the culture for making public sector effective and efficient" (p.416-417).

To address the above research problem or knowledge gap, the main research question was formulated as follows: *how does organisational culture affect digital transformation in the public sector*?   This main research question was further amplified through the following two key research sub-questions: a) *what are the key factors that drive organisational culture in the public sector* and b) *how do those factors affect digital transformation in the public sector?*.

1.4.   Research aims

Based on the above research questions, the main research aims or objectives of the research were articulated as follows: a) to identify key factors that drive organisational culture in the public sector, b) to explore how such factors affect digital transformation in the public sector, and c) to highlight theoretical and practical implications of the study to contribute to knowledge and management practice.

1.5. Research contribution

This research sought to make both theoretical and practical contribution. In terms of theoretical contribution, the research sought to contribute to the existing body of knowledge by shedding more light on how organisational culture affects digital transformation in the public sector. The research further sought to expose and illuminate key organisational factors, nuances and intricacies at play regarding the nexus between organisational culture and digital transformation in the public sector.

In terms of practical contribution to management practice, the research sought to provide useful insights to managers, especially public sector managers, about key factors, related to organisational culture, affecting digital transformation in the public sector. The research further sought to provide a broader perspective to help managers take a holistic multi-faceted view and approach when dealing with issues of organisational culture in the context of digital transformation in the public sector. Overall, the research sought to contribute to a better understanding of how organisational culture (and its underlying factors) affects digital transformation in the public sector.

1.6. Research scope

The research focused on the role of organisational culture in digital transformation in the public sector. It has identified key factors or drivers of public sector organisational culture and explored how these factors affect digital transformation in the public sector. The research used semi-structured interviews to collect qualitative data from purposively sampled or selected participants or officials dealing with planning / strategy / performance /IT functions in the public sector. The qualitative data was collected on the opinions and experiences of the participants on what they regard as key factors or drivers of public sector organisational culture and how these factors, in their view, affect digital

transformation in the public sector. The perspectives of citizens and external stakeholders were not covered in the study.

1.7. Conclusion

This chapter has outlined the background to the research problem, research problem and the research question and sub-questions, research aims, research contribution and research scope. The research question and sub-questions in outlined in this chapter are further amplified in chapter three, which provides literature grounding for the research question and sub-questions.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

This chapter provides a conceptual clarification of the concepts of organisational culture and digital transformation, which are the key concepts in this study. It clarifies the definitions of these concepts and the dimensions and drivers of digital transformation as well as the role of organisational culture in digital transformation. The chapter further provides a theoretical framework for the study focusing on different organisational culture types and explores a new, emerging concept of a digital organisational culture to explain the nexus between organisational culture and digital transformation. The chapter concludes with a conceptual framework, which provides an empirical account of key factors at play when it comes to organisational culture and digital transformation in the public sector.

2.2. Conceptual clarification

This section clarifies the concepts of organisational culture and digital transformation as key concepts in this study drawing from various definitions in the literature.

2.2.1. The concept of organisational culture

Organisational culture is an important aspect in the day-to-day existence of the organisations. The concept of organisational culture draws from various disciplines such as "anthropology, sociology, social psychology and cognitive psychology" (Schein, 2010, p.ix). It is among the most complex concepts in organisational theory (Karapancheva, 2020). The concept of organisational culture is difficult to define (Farrell, 2018) and lacks a common universal definition in the literature (Odor, 2018); hence its definitions vary across academic disciplines (Szydlo & Grzes-Buklaho, 2020).

Organisational culture consists of a set of shared values, norms, attitudes, beliefs, assumptions and code of conduct which guide the relationships and behaviour of members of the organisation (Obiekwe, 2018). It guides organisational behaviour and actions (Odor, 2018) and influences how people think and act in the organisations (Karapancheva, 2020). Rambabu and Pilli (2018) define organisational culture as "the basic pattern of shared assumptions and values that governs behaviour within a particular organisation" (p.124). According to Bhatti et al. (2020), "organizational culture includes norms, values and beliefs that are shared between organization employees to help perform their duties as a social collective unit" (p.88). Farrell (2018) maintains that "organizational culture describes how individuals work … and the patterns, assumptions, values, attitudes, and behavior that help an organization to operate within its environment and achieve, or not achieve, its mission" (p.861).

In other words, organisational culture speaks to "the way people behave and work within an organization" (Farrell, 2018, p.863). Put differently, it is "the glue that holds the organization together" (Van den Berg & Wilderom, 2004, p.571). According to Cichosz et al. (2020), "organizational culture defines how a company operates and how it introduces changes" (p.223). Organisational culture can also be conceptualised as "the shared values and assumptions that bind individuals who share a workplace" (Watling et al., 2020, p. 294). However, Van den Berg and Wilderom (2004) emphasize the centrality of organisational practices in the definition of organisational culture. They contend that organisational values, while constitute an important part of organisational culture, are invisible and are therefore generally expressed through organisational practices (Van den Berg & Wilderom, 2004). This definitional diversity of organisational culture speaks to a complex interplay involving people, values and practices in the organisations (Watling et al., 2020).

Furthermore, there are different manifestations of organisational culture (Farrell, 2018). According to Cameron and Quinn (2011), key observable and unobservable elements or manifestations of organisational culture are a) implicit assumptions, b) contracts and norms (including rules, policies and procedures), c) artifacts (including buildings, offices, furniture and logos) and d) behaviour of members of the organisation. On the other hand, Schein (2010) has identified three levels or manifestations of culture, namely a) artifacts (visible products, structures and processes), b) beliefs and values (ideals, values and ideologies) and c) underlying assumptions. There are some key similarities in this regard.

Overall, despite the lack of a common definition, there is however a greater degree of convergence in the literature about the core organisational values and assumptions being at the centre of organisational culture (Cameron & Quinn, 2011). Norms and values (Chen et al., 2019) and assumptions and beliefs (Taye et al., 2019) are common themes running across various definitions of organisational culture. Notwithstanding the above definitions, Priyadharsan and Nithiya (2020) provide the most comprehensive definition of organisational culture as "a dynamic system of shared values, beliefs, philosophies, experiences, habits, expectations, norms and behaviours that give an organization its distinct character" (p.692). This research aligns itself to this latter definition.

2.2.2. The concept of digital transformation

Digital transformation is an important aspect of the Fourth Industrial Revolution (4IR) (Marks et al., 2020). The concept of digital transformation is relatively new (Mahraz et al., 2019) and has its origin in the private sector when companies adopted new technologies to drive their competitiveness (Mergel et al., 2019). Digital transformation provides companies with opportunities to grow or access new markets and customers and to change the way in which they deliver services and interface with customers (Mergel et al., 2019). In the public sector,

the term 'e-government' has been used to describe ICT application to provide services to citizens, but this has been limited to migration of services to online platforms without the necessary organisational transformation and change, hence the need for public sector digital transformation to transform the organisational structure and culture as well as government's relationships with citizens (Mergel et al., 2019).

The concept of digital transformation is often conflated or confused with the concepts of digitization and digitalization in the literature (Mergel et al., 2019). Conceptual clarification and differentiation of these concepts is therefore necessary. Digitization means a change from an analog to a digital format while digitalization is about the use of technology to automate and optimise processes (Mahraz et al., 2019). Mergel et al. (2019, p.3) provide a basic conceptual distinction of digitization as "downloading forms online", digitalization as "filling out forms online" and digital transformation as "full service delivery online." However, Verhoef et al. (2021) regard digitization, digitalization and digital transformation as phases in a digital transformation process.

The literature provides many different conceptual definitions of digital transformation, which in itself demonstrates the lack of a common academic consensus on this concept. Digital transformation is a complex process involving different technologies (Saarikko et al., 2020). According to Ivancic et al. (2019), digital transformation "can be comprehended as a continuous process of climbing the scale of digital maturity by employing digital and other technologies along with organisational practices to create a digital culture" (p.36). Abd-Rabo and Hashaikeh (2021) define digital transformation as "a series of deep and coordinated culture, workforce, and technology shifts that enable new operating models and transform an institution's operations and strategic directions" (p.124).

Marks et al. (2020) regard digital transformation as "an organizational change realized by means of digital technologies and business models with the aim to improve organization's operational performance" (p.504). Gurbaxani and Dunkle (2019) offer a more comprehensive definition of digital transformation *as* "the reinvention of the company— its vision and strategy, organisational structure, processes, capabilities, and culture" (p.209). This study aligns itself with this latter definition for its holistic, multi-dimensional approach to digital transformation. The above definitional divergence points to the lack of a common definition of digital transformation in the literature. However, embedded in all the above definitions is the idea that digital transformation involves a far-reaching organisational transformation and re-achitecture based on digital technologies.

2.2.2.1.   Dimensions of digital transformation

The literature further unpacks digital transformation in terms of its various dimensions. In this regard, Sainger (2018) has identified business model, structure, people, processes, technological adoption, offerings and engagement model as key organisational dimensions of digital transformation. On the other hand, Gimpel et al. (2018) contend that there are six critical aspects to help organisations with a holistic approach to digital transformation, namely customer (customer experience and insights), value proposition (products and services), operations (integrated IT and digital supply networks), data (data integration, analytics, ownership, privacy and security), organisation (agility, digital skills and digital mindset) and transformation management (digital strategy, transformation leadership and change management).

However, according to Ivancic et al. (2019), strategy (digital strategy), people (digital skills and talent), organisation, customer (customer experience), ecosystem (cooperation and partnerships), technology and innovation (creation and sharing of new ideas) are the key dimensions of digital transformation. A digital strategy, shared digital vision, digital skills, customer service and

experience, partnerships and collaborations and adoption of appropriate digital technologies are fundamental to the implementation of digital transformation in organisations (Ivancic et al., 2019). Data also forms an important cornerstone of digital transformation (Aslanova & Kulichkina, 2020).

Organisations need to develop a clear strategy for digital transformation (Gabryelczyk, 2020; Korachi & Bounabat, 2020). In fact, digital transformation requires rethinking, changes and realignment of strategy (Gabryelczyk, 2020; Osmundsen et al., 2018). Such a strategy should take into account different key considerations such as social, technical and organisational factors (Saarikko et al., 2020). However, formulating a strategic vision to underpin digital transformation remains a daunting challenge to organisations (Abd-Rabo & Hashaikeh, 2021). Similarly, an organisation also has a greater bearing on strategy. Effective strategy implementation depends on a good organisational structure (Reddy & Scheepers, 2019).

As part of digital transformation, organisations also need to develop competencies and capabilities (Saarikko et al., 2020) as well as change mindsets (Abd-Rabo & Hashaikeh, 2021) to be able to leverage different digital technologies. From the above analysis, the main broad areas of commonality or convergence as the main building blocks or key aspects of digital transformation are strategy, organisation, people, technology, customer and value proposition (products and services) and data. Areas of differences or divergence in this analysis point to different conceptual perspectives or understandings of digital transformation.

2.2.2.2. Drivers of digital transformation

According to Verhoef et al. (2021), digital technology, digital competition and digital customer behavior are the driving forces of digital transformation. Digital technologies are driving transformation of organisations and challenging traditional business models (Sánchez, 2017). Digital transformation impacts organisations in terms of "the transformation of the customer experiences, the transformation of business processes, and the change of business models" (Mahraz et al., 2019, p.923). This further necessitates transformation in key areas of organisational strategy, leadership, structure and culture to create value (Mahraz et al., 2019).

Digital transformation is also causing disruption to the public sector organisations (Marks et al., 2020) including changes in citizens' expectations about public services (Mergel et al., 2019). In this 21st century, governments need to leverage technology to modernise their operations and improve citizen and stakeholder experiences (Huang & Karduck, 2017). Digital transformation enables organisations to sustain their performance and competitiveness (Marks et al., 2020) and also provides a strategic opportunity for organisations to enter new markets and expand their market share (Mergel et al., 2019).

2.2.2.3. The role of organisational culture in digital transformation

Despite definitional differences among scholars on the concept of organisational culture, there is a greater degree of consensus on why organisational culture matters to organisations and the reasons include the effect on the bottom line and the ability of the organisations to achieve a merger, embrace a new technology or succeed in different jurisdictions (Watling et al., 2020). Organisational culture also affects the ability of an organisation to achieve its strategic mission and goals (Farrell, 2018) and to respond or adapt to changes in both the internal and external environments (Shin & Shin, 2022). This is so

because organisational culture has a bearing on people's behavior and attitude in the organisations and gives them a distinct sense of belonging and organisational identity (Shin & Shin, 2022).

Organisational culture constitutes one of the key success factors for digital transformation in organisations (Osmundsen et al., 2018). It has been singled out as a key factor for technology adoption in organisations (Mohtaramzadeh et al., 2018). In this regard, resistance to change has also been identified in the literature as a barrier to digital transformation in organisations and this underscores a need for organisations to create a conducive and enabling culture for digital transformation (Cichosz et al., 2020).

In the final analysis, digital transformation is less about technology but more about organisational culture, which drives organisational transformation (Saarikko et al., 2020). Digital transformation is therefore about fundamental organisational change and transformation (Sainger, 2018). However, fundamental changes in the public sector are difficult to achieve digital transformation due to the hierarchical and in-ward looking nature of the public sector organisations (Hanna, 2018). Overall, the success of digital transformation rests on a coherent strategy, the right talent, flexible, innovative, collaborative and agile organisational culture and strong leadership (Van Dyk & Van Belle, 2019).

In conclusion, the preceding section on conceptual clarification has clarified the definitions, meanings, manifestations and dimensions of the concepts of organisational culture and digital transformation. Most importantly, the section has clarified why organisational culture matters to digital transformation. Overall, the section serves to provide a conceptual background to this chapter. The subsequent section then provides a theoretical framework for the study.

2.3. Theoretical and conceptual framework

History, tradition and structures of organisations influence their organisational cultures; hence organisations have different cultures (Karapancheva, 2020). Every organisation is unique and distinct from other organisations in how it operates (Odor, 2018). Organisational culture gives organisations their own identity (Karapancheva, 2020; Priyadharsan & Nithiya, 2020), differentiates organisations from others (Obiekwe, 2018; Priyadharsan & Nithiya, 2020) and can create a competitive advantage for business organisations (Obiekwe, 2018; Odor, 2018).

Organisational culture has a major bearing on both employee and organisational performance (Odor, 2018). It is a catalyst for employee and organisational creativity and innovation (Shayah & Zehou, 2019) as well as organisational performance, effectiveness and success (Obiekwe, 2018). In other words, organisational culture can enable or constrains organisational effectiveness (Priyadharsan & Nithiya, 2020). Organisational culture promotes a greater sense of employee connection, loyalty and commitment to the organisation (Obiekwe, 2018). A better understanding of organisational culture helps in achieving organisational transformation and change as well as organisational efficiency, effectiveness and performance (Rukh & Qadeer, 2018).

This section presents a theoretical framework for the analysis of organisational culture focusing broadly on organisational culture types drawing from the Competing Values Framework. Cameron and Quinn's model of organisational culture, called Competing Values Framework (CVF), identifies four main organisational culture types, namely market, clan, adhocracy and hierarchy culture (Caliskan & Zhu, 2019). In this regard, the analysis will only focus on culture types and not the sub-dimensions or other aspects of the Competing Values Framework. In addition, the analysis addresses the link between organisational culture and digital transformation as part of a theoretical

framework. In this regard, the analysis explores the concept of a digital organisational culture to explain the nexus between organisational culture and digital transformation.

2.3.1. Organisational culture types

2.3.1.1. Market culture

Market culture is one of the organisational culture types identified in the Competing Values Framework. Market culture is associated with external focus, competition and results orientation (Caliskan & Zhu, 2019; Liao, 2018; Rukh & Qadeer, 2018). Competitiveness and productivity are the core features or values of market culture (Felipe et al., 2017; Okatan & Alankus, 2017). In other words, market culture is competitive and results-oriented (Goncalves et al., 2020).

2.3.1.2. Clan culture

The clan culture, which is another type of organisational culture, operates like a family culture with a greater emphasis on family values, friendship, collaboration and communication (Caliskan & Zhu, 2019). The clan culture is characterised by greater flexibility, shared vision and objectives (Felipe et al., 2017) as well as teamwork, employee empowerment, participation, commitment and loyalty with leaders playing a mentorship and parental role in the organisation (Okatan & Alankus, 2017). It is a flexible and collaborative organisational culture (Rukh & Qadeer, 2018) which places a premium on ongoing learning and focus on client needs (Goncalves et al., 2020).

2.3.1.3. Adhocracy culture

Adhocracy culture is premised on creativity, innovation and entrepreneurship (Okatan & Alankus, 2017; Rukh & Qadeer, 2018) as well as vision, imagination, dynamism and flexibility (Caliskan & Zhu, 2019). This organisational culture type

is also underpinned by experimentation, agility, risk taking and individual initiative (Goncalves et al., 2020). Adhocracy culture appears to be associated with both innovation and entrepreneurial culture. This culture promotes creativity, entrepreneurship, generation and nurturing of new ideas, risk taking and results orientation (Bhatti et al., 2020; Lee, 2020). However, innovation requires a supportive and enabling organisational culture and the right skills and incentives (Okatan & Alankus, 2017). To be innovative, organisations need to transform or change their culture (Shayah & Zehou, 2019).

In contrast to the business sector, the public sector is unable to learn from better models of innovation (Moussa et al., 2018). Conservative solutions, lack of resources, investment, experimentation and incentive system, as well as resistance to change constitute some of the key impediments to public sector innovation and this impedes public sector efficiency and better service delivery (Moussa et al., 2018). Other key barriers to public sector innovation include risk averseness and organisational culture (Raksnys et al., 2020). In this regard, the challenges of public sector innovation cannot be divorced or separated from the public sector politics (Raksnys et al., 2020). This suggests a hidden hand of politics in impeding public sector innovation.

2.3.1.4. Hierarchy culture

The hierarchical organisational culture is based on internal control, order, rules, procedures, certainty, standardization and formality (Felipe et al., 2017) as well as conformity, efficiency, stability and predictability (Camacho et al., 2018). Put differently, the hierarchical organisational culture is premised on formalised, structured and rules-based command and control environment, which is mainly associated with incremental change (Goncalves et al., 2020).

This form of organisational culture is internally focused and reflects an organisational culture commonly associated with the public sector organisations (Rukh & Qadeer, 2018). The hierarchical organisational culture accords with a bureaucratic organisational culture. A bureaucratic culture is based on hierarchy, authority and siloed structure and is associated with a stable environment (Bhatti et al., 2020). Organisations with a hierarchical culture display a lack of innovation (Liao, 2018). In this regard, the inability of the public sector to match business sector innovation (Wimmer et al., 2020) could therefore be attributed to these cultural attributes.

Max Weber's traditional bureaucracy, as an organisational configuration with its rigid hierarchical and rules-based orientation or approach, has become redundant and unable to respond to changes and complexities of the modern environment in the 21st century (Kalimullah et al., 2017). Overall, these organisational cultures hold different implications for the implementation of digital transformation in organisations. However, the Competing Values Framework (CVF), while it contains some useful theroretical analytical value for this study, it provides an inadequate framework for understanding the nexus between organisational culture and digital transformation.

2.3.2. Linking organisational culture and digital transformation

While organisational culture types described in the preceding section explain key attributes and defining features of different organisational cultures, they are however inadequate in explaining the nexus between organisational culture and digital transformation. This section fills the gap through the analysis of the concept of digital organisational culture, which explains the link between organisational culture and digital transformation. This section also discusses the key elements of digital organisational culture which have been synthesized from the literature review. For conceptual clarity, in this study, the concept of digital organisational culture is used interchangeably with the concept of digital culture.

17

2.3.2.1. The concept of digital organisational culture

The demands and pressure from digital customers make it imperative for organisations to adopt a digital culture and products to serve their customers better and starve off competition (Duerr et al., 2018). The success of digital initiatives requires challenging existing organisational norms and values (i.e. existing organisational culture) (Pradana et al., 2022). This brings to the fore the concept of digital organisational culture, which is essentially about the nexus between organisational culture and digital transformation. Digital organisational culture is a relatively new, emerging concept, which is still in its infancy in the literature. Currently, the literature on this subject is very scant and therefore there is no clear definition of this emerging concept in the literature.

In this regard, Khitskov et al. (2017) defines a digital culture as "a system of new values, knowledge, skills, competencies, behaviours and communication, real and symbolic phenomena, based on digital encoding" (p.861). A digital culture involves "digital approaches and multichannel capabilities" (Hie, 2019, p.52). Digitalization is more than a technological change and has become a new way of people's lives (Hie, 2019). A digital culture or a digital organisational culture is therefore a key success factor for the digitalization (digital strategy) and performance of the organisations (Pradana et al., 2022). Organisational cultural transformation is therefore key in helping organisations to transition and adapt to technological changes (Lee, 2020).

Digital transformation has succeeded in organisations which have made quick cultural transformation and transition to adapt to the fourth industrial revolution (Lee, 2020). In other words, these are the organisations which have transformed and embraced a digital culture. This suggests that organisations which adapt to rapid changes in digital technologies are better poised to survive and thrive in this complex environment (Rowles and Brown, 2017). However, while a digital organisational culture contributes to organisational performance (Pradana et al.,

2022), it must be noted that "building a digital culture is a challenging and ever-changing task" (Rowles and Brown 2017, p.2).

From the literature review, the concept of a digital organisational culture or a digital culture appears to intersect or accord with the concept of a start-up culture. The term 'start-up' is associated with young or emerging innovative companies while a start- up culture is associated with the start-up entrepreneurship, which has the main association with technology innovation traditionally or commonly associated with Silicon Valley (Koskinen, 2021). The main hallmark of a start-up mentality is an acceptable culture of failure which promotes risk taking, creativity and innovation mainly through prototyping to improve customer experience (Duerr et al., 2018). In contrast to the mentality of the established traditional organisations, a start-up mentality facilitates greater openness and development of new ideas or solutions to address customer needs or problems (Duerr et al., 2018). Compared to startups, large or established organisations have some difficulties, mainly due to cultural issues, responding to change and driving digital innovation, and this impedes their organisational agility or agile culture (Goncalves et al., 2020).

In short, a start-up culture or entrepreneurial culture (i.e. Silicon Valley culture) embraces creativity and innovation as well as risk and failure (Koskinen, 2021). In this regard, Duerr et al. (2018) contends that digital organisations "adopt a failure culture, i.e. allowing [employees] to test risky ideas without being sanctioned, to motivate employees to try out new things and come up with novel solutions" (p.5132). A failure culture allows employees and organisations to learn from mistakes (Duerr et al., 2018) as innovation is critical to organisational success in the 21st century (Shayah & Zehou, 2019). Furthermore, a start-up innovative culture also embodies a combination of the clan and adhocracy cultures (Goncalves et al., 2020).

In this regard, it could be argued that a start-up culture or a digital culture contrasts sharply with hierarchical bureaucratic culture which mainly characterises traditional organisations, particularly public sector organisations. Departmental and functional silos, risk averseness and lack of a common or single view of a customer militate against the institutionalisation of a digital culture within these organisations (Lee, 2020). Overall, digital transformation and innovation require organisational culture that nurtures and promotes teamwork (cooperation and collaboration), experimentation, risk taking and learning from failure in order to succeed (Singh et al., 2017). Having explained the concept of a digital organisational culture, the section below delves into the analysis of the key elements of a digital organisational culture.

2.3.2.2. Key elements of digital organisational culture

Organisational culture affects digital innovation (Muller et al., 2019). Since cultural transformation constitutes one of the key impediments to digital transformation (Lee, 2020), it is therefore important that organisations should identify key cultural attributes that support or impede digital transformation and should do away with those that inhibit it (Pradana et al., 2022). The analysis below outlines key elements of a digital culture or factors of central importance to the successful implementation of digital transformation in organisations.

2.3.2.2.1. Digital strategy and leadership

The success of digital transformation depends on a clear digital strategy (Schwertner, 2017). The literature points to the importance of a digital strategy in bridging the gap or divide and facilitating the transition between organisational culture and digital transformation. The lack of strategic direction in terms of digital strategy creates conflicts in terms of organisational values as well as fragmentation in synergy of organisational work (Pradana et al., 2022). In this

regard, Pradana et al. (2022) seems to suggest that achieving a digital organisational culture depends on a clear digital strategy.

According to McLaughlin (2017), any digital strategy should fundamentally be about "providing information for better business decision making, developing a responsive customer-focused organisation, developing flexible and responsive business models and developing demand sensitive products and services in a cost effective manner" (p.66). In summary, organisational digital strategy should broadly aim to "improve customer experience, increase efficiency, improve innovation, improve decision making and transform the business" (Schwertner, 2017, p.389).

With regard to leadership, the literature highlights the importance of transformational leadership and change management as key success factors for digital transformation (Gimpel et al., 2018). Digital transformation requires a strong leadership in order to succeed (Van Dyk & Van Belle, 2019). In this regard, McLaughlin (2017) specifically stresses the importance of a strong business and technology leadership to ensure the success of digital transformation. Lastly, Hie (2019) points to a need for deliberate efforts and change of behaviour at the top leadership level of the organisations to build a digital organisational culture.

2.3.2.2.2. Organisational configuration and orientation

Digital transformation has brought about disruptive changes to the organisations transforming how organisations operate and deliver value to their clients using digital technologies (Lee, 2020). This process is dismantling organisational hierarchies, boundaries and functions (Cortellazzo et al., 2019) as traditional hierarchical organisational culture has a potential to hinder digital transformation and innovation (Muller et al., 2019). A digital culture associated with digital

transformation has brought about a new organisational reconfiguration and orientation which have come to characterise digital organisations.

The structural configuration of digital organisations is based on "novel ways of internal collaboration (namely: cross-functional teams, physical and virtual collaboration, and dual structures) and external collaboration (startups, platforms with competitors and partners, and customer integration)" (Duerr et al., 2018, p.5129).

Digital organisations use cross-functional teams, internal and external collaboration and decentralised responsibilities and decision making models to promote faster organisational innovation, agility and competitiveness (Duerr et al., 2018). Cross-functional teams, which are a common practice in digital organisations, minimise or reduce potential conflicts and confusion between various functions and promote faster innovation while physical and virtual collaboration breaks down boundaries and allows people to easily share knowledge (Duerr et al., 2018).

Dual structures enable digital organisations to pursue faster innovation, agility, adaptation and change in customer services functions while maintaining the existing traditional core functions which are not affected by digitalization (Duerr et al., 2018). Organisational agility, innovation, adaptability and modernisation require a transformation of outdated organisational bureaucratic structures and cultures to enable organisational learning, adjustment and faster adaptation to change (Goncalves et al., 2020).

Collaboration with startup firms is important to inject entrepreneurial mindset and facilitate knowledge exchange and innovation in organisations (Duerr et al., 2018). In this regard, Duerr et al. (2018) contends that "creating a startup mentality is a novel approach to enable digitalization…" (p. 5131). Creating shared platforms with partners and competitors promotes greater innovation,

capabilities and sharing of data while involving and collaborating with customers provides direct feedback loops and facilitates interactions and 'co-creation' of products with customers in the innovation value chain (Duerr et al., 2018). The role of an IT function in the digital organisations has also undergone a fundamental shift from a traditional support function to a new role of a business creator and partner in the innovation and new product development value chain (Duerr et al., 2018).

Overall, organisational structures of digital organisations are generally characterised by a distribution or decentralisation of power, responsibilities and decision making to different business units and to middle to lower levels of management to facilitate digital innovation alignment processes as well as faster and more agile responses to changes or developments in the business environment (Duerr et al., 2018).

2.3.2.2.3. Employees skills, mindset and attitude

Employees' skills, attitude and mindset constitute critical people factors in building a digital organisational culture. To build a digital culture, organisations are required to develop or acquire a new set of skills and collaboration and networking are critical to the development of digital skills (Rambabu & Pilli, 2018). In this regard, Duerr et al. (2018) contends that digital organisations demonstrate open mindset by developing and acquiring new skills, including digital skills which are important in this digital era (Duerr et al., 2018).

However, new skills alone are not sufficient to cultivate a digital organisational culture. Employees' attitudes and mindset are equally important in this regard. Many organisational failures in implementing digital technologies could also be attributed to their inability to change their employees' mindset (Pradana et al., 2022). Digitalization requires attitudes that allow organisational adaptation and change as well as openness to new possibilities (Rambabu & Pilli, 2018).

Organisations and their employees should "see digital change not as a threat but as a great opportunity to adapt, learn, relearn, evolve and progress" (Rambabu & Pilli, 2018, p.127). Culture change associated with digital transformation therefore requires both a shift in employees' mindset and continuous organisational innovation (Lee, 2020). Overall, this suggests that a digital organisational culture requires a new breed of employees who possess not only a new set of skills, but also an open mindset and mentality which embraces change and promotes ongoing learning and development of new ideas and solutions. Learning is important because it allows adaptation and innovation (Goncalves et al., 2020).

2.3.2.2.4. Digital technology adoption

The adoption and deployment of digital technologies constitute a core defining feature of a digital organisational culture. Digital technologies bring about a paradigm shift allowing organisations to integrate technology into their core business functions and processes to improve organisational responsiveness and performance to meet their customer needs (McLaughlin, 2017). In this regard, McLaughlin (2017) has identified key technology capabilities required for the success of a digital organisation. These key capabilities include the organisational ability to align technology to business strategy and integrate it into the core business processes of the organisation to build a responsive customer-centric organisation (McLaughlin (2017).

Building a digital organisation requires a holistic perspective and integration of technology across the whole organisation as well as paradigm shift in the role of IT from a business support function to a key driver of organisational performance and competitiveness (McLaughlin, 2017). Duerr et al. (2018) echoes the same view and contends that the role of IT function in the digital organisations has undergone a fundamental shift from a traditional support function to a new role of a business creator and partner in the innovation and new product development

value chain. In a digital era, organisations need to "recognise IT as an essential part of digital innovations" (Duerr et al., 2018, p. 5133). This organisation-wide perspective and approach to digital transformation requires a strong business and technology leadership (McLaughlin, 2017). This is important because building a new digital culture requires deliberate efforts and change of behaviour at the top leadership level of the organisation (Hie, 2019).

For successful implementation of digital transformation, organisations should promote innovation and experimentation with new technologies and business models to provide customer-centric products and services (Mhlungu et al., 2019). In this regard, involving and collaborating with customers is also important as this provides direct feedback loops and facilitates interactions and co-creation of products with customers in the innovation value chain (Duerr et al., 2018). Innovation is critical to organisational success in the 21st century (Shayah & Zehou, 2019).

2.4. Conclusion

The Competing Values Framework identifies four main organisational culture types, namely market, clan, adhocracy and hierarchical cultures. The market culture promotes competitiveness and results orientation while the clan culture is a family-like culture based on family values, friendship, collaboration, teamwork and employee participation and empowerment. Adhocracy culture places a higher premium on creativity, innovation and entrepreneurship while hierarchy culture is based on rules, certainty, predictability and stability, which promote incremental organisational changes. Hierarchy culture is therefore ill-suited to respond to constant changes and complexities associated with the modern 21st century environment.

Overall, these organisational cultures hold different implications for the implementation of digital transformation in organisations. In this regard, a combination or a fusion of the market, clan and adhocracy cultures approximates or partly explains a culture required for digital transformation in the organisations. However, the Competing Values Framework, while it contains some useful theroretical analytical value for this study, it does not provide adequate framework for understanding the nexus between organisational culture and digital transformation. To bridge this gap, the study explored the concept of a digital organisational culture to provide a full account of the nexus between organisational culture and digital transformation.

The concept of a digital organisational culture is a relatively new, emerging concept in the literature. It lacks a common universal definition, but it essentially represents a new set of values, skills, competencies and behaviours associated with digitally transformed organisations. The concept of a digital organisational culture or a digital culture intersects or accords with the concept of a start-up culture. The main hallmark of a start-up mentality is an acceptable culture of failure which promotes risk taking, creativity and innovation. The start-up culture also facilitates greater openness and development of new ideas or solutions to address customer needs or problems. A start-up culture or a digital culture contrasts sharply with hierarchical bureaucratic culture which mainly characterises traditional organisations, particularly public sector organisations.

A digital culture associated with digital transformation has brought about a new organisational reconfiguration and orientation which have come to characterise digital organisations. In contrast to traditional organisational models, digital organisations use cross-functional teams and rely on internal and external collaboration and decentralised responsibilities and decision making models to promote faster organisational innovation, agility and competitiveness. A digital organisational culture requires a clear digital strategy and a new breed of employees who possess not only a new set of skills, but also an open mindset

and mentality which embraces change and promotes ongoing learning and development of new ideas and solutions. The adoption and deployment of digital technologies constitute a core defining feature of a digital organisational culture. A traditional role of IT functions in digital organisations has also undergone fundamental transformation from a traditional support function to a key business partner in a digital innovation value chain.

Overall, based on the theoretical framework based on organisational culture types and the concept of a digital organisational culture discussed in this chapter as well as the empirical research findings from this study as presented in chapter five and discussed in chapter six of this research report, the following conceptual framework has emerged from the study, which provides an empirical account of the key factors at play when it comes to organisational culture and digital transformation in the public sector. The key factors are: organisational strategy and leadership; organisational structure; organisational systems and processes; organisational performance management and accountability; organisational incentives; organisational mindset and attitude; organisational skills; organisational learning and innovation; collaboration and partnership, digital technology adoption; and technology investment. These factors are presented and discussed in detail in chapter five and six of this research report

Figure 1: A conceptual framework for organisational culture and digital transformation in the public sector

	Organisational strategy and leadership
	Organisational structure
	Organisational systems and processes
	Organisational performance management and accountability
Organisational culture ⟷	Organisational incentives ⟷ Digital transformation
	Organisational mindset and attitude
	Organisational skills
	Organisational learning and innovation
	Collaboration and partnership
	Digital technology adoption
	Technology investment

Source: (author's interpretation)

CHAPTER THREE: RESEARCH QUESTIONS

3.1. Introduction

This chapter addresses the research question and sub-questions for the study based on the literature review. In other words, the chapter grounds the research question and sub-questions on the relevant literature. By so doing, this chapter further amplifies chapter one of this research report in terms of the research problem and the research question and sub-questions.

For the purpose of completeness, the main research question for this study as outlined in chapter one of this research report was formulated as follows: *how does organisational culture affect digital transformation in the public sector*? This main research question was further amplified through the following two key research sub-questions: a) *what are the key factors that drive organisational culture in the public sector* and b) *how do those factors affect digital transformation in the public sector?*.

3.2. Research question and sub-questions

Context to the research question and sub-questions for the study is important. Modern organisations operate in an uncertain, complex and turbulent environment which requires them to possess dynamic capabilities to adapt and respond to environmental changes in order to survive (Felipe et al., 2017). The adoption of digital technologies is of greater importance to modern organisations operating under this context.

Beside the private sector organisations, digital transformation is also causing disruption to the public sector organisations (Marks et al., 2020) including changes in citizens' expectations about public services (Mergel et al., 2019).

Governments therefore need to leverage technology to modernise their operations and improve citizen and stakeholder experiences (Huang & Karduck, 2017). However, compared to the individual citizens, governments appear to be slower in keeping up pace with technological changes (Lee, 2020). Technological changes have implications for organisational culture (Mbeba, 2018).The challenge of digital transformation goes beyond technology and requires changes in organisational culture and mindsets *(*Abd-Rabo & Hashaikeh, 2021; Hanna, 2018).

While digital transformation seeks to improve public service delivery, complex structural configuration of the public sector organisations hampers their ability to keep pace and adapt to technological changes (Omar et al., 2017). Fundamental changes in governments are therefore difficult to achieve digital transformation due to the hierarchical and in-ward orientation (Hanna, 2018) as well as complex bureaucratic configuration (Layton-Matthews & Landsberg, 2022) of these public sector organisations.

Public sector organisational culture is complex (Rukh & Qadeer, 2018). Therefore, bringing about change or transformation to a rigid and highly formalised and departmentalised bureaucratic configuration of governments or the public sector organisations requires a deeper understanding of a public sector organisational culture (Rukh & Qadeer, 2018).

Furthermore, the success of organisational change initiatives depends on organisational culture change (Mbeba, 2018). However, culture is deeper, enduring and difficult to change (Schein, 2010). Overall, it seems that "… in the public sector, empirical findings of the cultural diagnosis are either non-existent

or sketchy" (Rukh & Qadeer, 2018, p.398). The importance or significance of this study should also be contextualised within this knowledge gap.

Overall, it is therefore against the above literature review background that the main research question for this study was formulated as follows: *how does organisational culture affect digital transformation in the public sector*? This main research question was further amplified through the following two key research sub-questions: a) *what are the key factors that drive organisational culture in the public sector* and b) *how do those factors affect digital transformation in the public sector?.*

3.3. Conclusion

This chapter has grounded the research question and sub-questions in the relevant literature. By so doing, this chapter has further amplified chapter one of this research report in terms of the research problem and the research question and sub-questions.

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1. Introduction

This section outlines the research methodology used for the study. The section discusses the philosophical premises for the study, research design, research population / setting, sampling / selection criteria, level and unit of analysis, data gathering process and research instrument, data analysis approach and research quality and rigour.

4.2. Research philosophy and design

It is important to begin by locating this study within an appropriate philosophical framework or research paradigm. The literature on research methodology talks about different ontological and epistemological traditions that underpin different types of research. In this regard, there are two main ontological traditions, namely objectivism that stands for objective nature of reality and constructionism / constructivism which contends that reality is socially constructed (Bell et al., 2019). The main epistemological traditions are 1) positivism which advocates for objective, value-free knowledge and 2) interpretivism, which, in direct contrast to positivism, rejects a natural sciences approach and asserts that knowledge is subjective and socially constructed (Bell et al., 2019). Ngozwana (2018) asserts that "interpretive paradigm uses methods of understanding by interpreting the subjective meanings which individuals place upon their actions" (p.20). Interpretivism therefore accords with constructivist ontological tradition while positivism goes with an objectivist ontological tradition.

The research question for this study lends itself to interpretivism in that the nature of knowledge generated from this research is based on people's experiences rather than objective factual data. In this regard, the logical methodological implication is that this is a qualitative study based on an inductive

approach. As opposed to a deductive research logic which hypotheses based on existing theory in accordance with positivist research tradition, an inductive approach mainly infers or derives theory from research data, findings and conclusions (Bell et al., 2019).

In terms of research design, this research is a case study of the public sector. A case study is an in-depth analysis of a specific case which could be an organisation, a location, a person or an event (Bell et al., 2019). A case study is differentiated from other research designs by the bounded nature of its focus (Bell et al., 2019). A case study provides a rich method for studying a case and generates context-specific knowledge (Widdowson, 2011)

4.3. Research population / setting

The setting for this research was the public sector organisations in South Africa. In this context, the term 'population' as it is normally used in positivist quantitative studies is not applicable to this study.

4.4. Research sampling / selection criteria

This study applied a non-probability sampling approach. In this regard, a purposive sampling approach was used to select the interview participants. A purposive sampling is based on the researcher's judgement about the usefulness of the units to be studied (Babbie, 2013). In purposive sampling, the researcher(s) intentionally "select those individuals or objects that will yield the most information about the topic under investigation" (Leedy & Ormrod, 2013, p.152).

The interview participants' selection criteria was based on public sector officials responsible for planning / strategy / performance / IT functions in the public sector organisations in South Africa. The rationale for this choice was that these

officials are central when it comes to the implementation of digital transformation in the public sector organisations. Their views and experiences were therefore important to provide deeper insights into the organisational cultural factors that affect digital transformation in the public sector organisations in South Africa. In this regard, a total of ten (10) participants working for the public sector organisations in South Africa were interviewed.

4.5. Level and unit of analysis

The study focused on the views / opinions and experiences of public sector officials dealing with planning / strategy / performance / IT functions in the public sector organisations in South Africa.

4.6. Data gathering process and research instrument

The study conducted semi-structured interviews using a pre-designed interview guide / protocol as a key instrument to collect data. Semi-structured interviews give the researcher a flexible space to study the topic / issues without much restriction to allow concepts and theories to emerge (Bell et al., 2019). Interviews can provide quite useful information (Leedy & Ormrod, 2013). Prior contacts and the necessary arrangements were made with the interview participants in advance to secure appointments for the interviews.

Ethical clearance approval was obtained for this study before the interviews were conducted. Normal ethical considerations and protocols were adhered to during the interviews. In this regard, the purpose of the research and the informed consent of the participants were explained to the participants before the interviews including assuring the participants the confidentiality. The participants were requested to sign an informed consent form to give their consent to their participation in the study. Although the participants did not have any issues with signing the informed consent form, they were however not comfortable with the

recording of their interviews and the interviews were accordingly not recorded and the researcher only took the notes of the interview.

Furthermore, while access to the participants was generally not a problem, the busy work schedule of some participants meant that some participants were not immediately available for the interviews and this affected the research interviews schedule or plan. The interviews were conducted as follows:

Table 1: Research interviews schedule

A table below provides dates on which the interviews with the research participants took place.

Interviews	Date of interviews
Interview 1	19 September 2022
Interview 2	26 September 2022
Interview 3	27 September 2022
Interview 4	05 October 2022
Interview 5	11 October 2022
Interview 6	24 October 2022
Interview 7	26 October 2022
Interview 8	01 November 2022
Interview 9	03 November 2022
Interview 10	11 November 2022

To maintain confidentiality of the participants, interview data is stored without the participants' identifiers and the information is reported in an aggregated manner in the report without disclosing or revealing the identity of the participants and their organisations. Data will be stored safely on a cloud platform via a password-protected Microsoft One Drive private account for a minimum of a 10-year period.

4.7. Data analysis approach

A coding process was undertaken using excel spreadsheet to analyse all the interview data and this process unfolded through iterative phases or process. The key research findings in this report are structured and presented in terms of the following key thematic areas which emerged from data coding: organisational strategy and leadership; organisational structure; organisational systems and processes; organisational performance management and accountability; organisational incentives; organisational mindset and attitude; organisational skills; organisational learning and innovation; collaboration and partnership, digital technology adoption; and technology investment.

These key thematic areas are discussed in detail in chapters 5 and 6 of this research report. This method of data analysis is called thematic analysis and it allows data to be systematically analysed and refined into different categories and thematic areas to make sense of data regarding the research question, the literature and relevant theoretical concepts (Bell et al., 2019). The data was interpreted and discussed in terms of chapter two of this research report, which deals with the theoretical and conceptual framework for the study

4.8. Research quality and rigour

The research quality and rigour for this study was ensured through careful design of the interview instrument (i.e. interview guide / protocol). The interview guide was designed in a way that sought to eliminate biases. Most importantly, the interview questions in the interviews guide were carefully formulated to address the research question. The primary data was triangulated across the participants. Data analysis and discussion were done with specific reference to the literature and the theoretical and conceptual framework discussed in chapter two of this research report to ensure that the research question is addressed. Furthermore, a careful attention was paid to the overall conceptualisation of the research

report to ensure a coherent flow and connections of chapters to provide 'a golden thread' for the study.

4.9. Methodological and research design limitations

Time and budget constraints presented obvious limitations in terms of the size and the scope of this study. However, the specific limitations of this study relate to its chosen qualitative methods with regard to both sampling and data collection instruments. The non-probability purposive sampling method used in this study has an inherent bias towards the specific participants. A limited sample of ten (10) participants who took part in the study also means that the findings of this study cannot be generalised. Furthermore, using only the interviews as a data collection instrument has somewhat limited the triangulation value of the study.

However, these limitations need to be weighed up and counterbalanced with equally important methodological design considerations underpinning this study. The sample size, the purposive sampling method and the participant interviews were justified in the context of the qualitative nature of the study and the nature of the research question for the study. Firstly, this study did not intend to have a representative sample to enable generalisation of the research findings, but it sought to provide an in-depth analysis and deeper insights into the issues related to the research question. Secondly, the purposive sampling method enabled the study to target relevant participants who had the information relevant to the research question.

Thirdly, semi-structured interviews afforded the study an ample opportunity and scope to delve deeper into the research questions to generate rich knowledge and insights. In this regard, methodological rigour was achieved through a triangulation of the primary data and research findings across the interview participants..

4.10. Conclusion

Except for some delays with certain interviews, the whole research process, including the interviews with the participants, went relatively smooth without major hiccups. Overall, the researcher is confident that the overall research methodology used for this study has finally yielded credible research findings and analysis, which make a valuable contribution to the existing stock of knowledge and management practice.

CHAPTER FIVE: PRESENTATION OF THE RESEARCH FINDINGS

5.1. Introduction

This chapter presents the empirical research findings from the research interviews conducted with the selected participants in line with the sampling approach and data analysis method outlined in chapter four of this research report. The empirical findings respond to the research question and sub-questions of the study. For the purpose of completeness, the main research question was formulated as follows: *how does organisational culture affect digital transformation in the public sector*? This main research question was further amplified through the following two key research sub-questions: a) *what are the key factors that drive organisational culture in the public sector* and b) *how do those factors affect digital transformation in the public sector?*.

Based on the above research question and sub-questions, the main research aims or objectives of the study were articulated as follows: a) to identify key factors that drive organisational culture in the public sector, b) to explore how such factors affect digital transformation in the public sector, and c) to highlight theoretical and practical implications of the study to contribute to knowledge and management practice. In response to the research question and sub-questions as well as the first two research objectives of the study, the empirical findings are presented below.

5.2. Research findings

This section provides a detailed presentation of the empirical research findings from the research interviews. The section begins with some broader contextual issues arising from the interviews in order to provide a contextual background to the presentation of the research findings. The section then delves into a detailed

presentation of the empirical research findings, which are structured and presented in terms of broad thematic areas in response to the research questions and the objectives of the study. The broad thematic areas, which are presented below, are as follows: organisational strategy and leadership; organisational structure; organisational systems and processes; organisational performance management and accountability; organisational incentives; organisational mindset and attitude; organisational skills; organisational learning and innovation; collaboration and partnership, digital technology adoption; and technology investment. The chapter then concludes by pulling together and synthesizing all the empirical findings into overall conclusions.

5.2.1. Public sector context

There are few broader contextual issues that came out during the research interviews, which are worth highlighting upfront to provide a backdrop to the presentation of the research findings. The first broader contextual issue relates to the fact that the fourth industrial revolution (and its associated digital technologies) is still at its infancy in developing countries such as South Africa compared to the developed countries, mainly due to vast differences in resources and skills. In this regard, one participant said "there is a difference between developed and developing countries in terms of resources". Another participant reinforced this view and said "in developing countries, people still lack basic services and 4IR is therefore not as easy as in developed countries".

The second broader contextual issue has to do with the digital divide in South Africa between urban and rural areas on the one hand and between the younger and older generations on the other hand. In this regard, the participants raised the issue of digital technologies deepening socio-economic inequalities in the South African context including the exclusion of elderly people who cannot use these technologies. The issue of community resistance to the implementation and use of technology by government also came out during the research

interviews. Some participants gave an example of community resistance to the implementation of smart metering technologies and indicated that part of the reasons for this resistance is because these technologies make it difficult for communities to by-pass these systems. Lastly, the participants mentioned the issue of politics in the public sector, which they said has a major influence on the operations or operating environment of the public sector, including the appointment of staff. Overall, the participants seem to suggest that these broader contextual issues have a bearing on the public sector environment and its ability to adopt and implement digital technologies in this context.

5.2.2. Organisational strategy and leadership

The research interview participants identified organisational strategy and leadership as one of the key organisational cultural factors which have a major bearing on digital transformation in the public sector. In this regard, the participants identified poor leadership as a major barrier to digital transformation in the public sector. One interview participant said "we need leadership to lead the adoption and application of digital technologies in the public sector". However, the challenge of poor leadership came through as a common theme during the research interviews.

In this regard, the participants identified different leadership aspects or factors that account for poor public sector leadership and how these leadership factors affect digital transformation in the public sector. The first one relates to a lack of a clear vision and strategy for the fourth industrial revolution (4IR) in the public sector. The participants generally attributed this poor strategic leadership to a lack of foresight and forward planning. In this regard, one interview participant said "the drive for digitalization needs to be driven from the top. We have talk shops about 4IR, but 4IR has not been taken further to the implementation level in the public sector".

Another interview participant said "progressive leadership should keep abreast of developments in the environment and learn about how 4IR technologies could be leveraged and mainstreamed into the public sector to improve productivity and efficiency". The participant continued and said "it is about having good leaders with foresight who will lead the public sector organisations on the right path, leaders who are able to inspire people and translate government policies into action". In support of a view on poor public sector leadership, another interview participant opined as follows: "although there are some pockets of excellence, we have a real dearth of leadership in the public sector and we are consumed by a culture of mediocrity".

The interview participants further mentioned public sector leadership instability as another key factor which undermines public sector visioning and strategy for the 4IR digital transformation in the public sector. One interview participant summarized the essence of this problem and said "we are lacking in both political and administrative leadership. Constant changes in political and administrative leadership create instability and a confusion of vision and undermine a long-term vision in the public sector". This was echoed by another interview participant who opined that "every leader should have a vision for 4IR but constant changes in political and administrative leadership and the short-term tenures of public sector leadership such as DGs and HODs undermine 4IR vision and implementation in the public sector"

Another key issue of poor leadership that came out sharply during the research interviews relates to poor management of change in the public sector. The participants shared the same view that the public sector is not good at change management. In this regard, the interview participants expressed a common view that change management in relation to digital transformation in the public sector must start at, and be driven from, the top leadership level of the public sector organisations. The participants further emphasised the point that a change process to embrace 4IR digital technologies in the public sector should be

deliberate, structured and systematic. In support of this sentiment, one interview participant said "you can talk about digitalization but if you are not deliberate about it and do not include it in the strategy, structure, budget and employee job responsibilities, it will not succeed. In short, the public sector needs to be deliberate about digitalization".

Related to the issue of deliberate change management, the participants further emphasised the importance of an inclusive and participatory digital transformation process. In this regard, the participants converged on the need for involvement of all staff (including labour unions) in the digital transformation process from the very beginning of the planning process and for the leadership to take the staff along the journey in order to secure their buy-in and ownership of the process. In this respect, one interview participant maintained that "technological changes should involve everyone in the organisation and new technologies should be introduced in such a way that people will embrace them and also see the value of why they need to embrace new technologies". In support of this view, another interview participant opined as follows: "people should be engaged more to understand the bigger picture in terms of where government is going for them to embrace change".

Furthermore, the participants also highlighted a general lack of willingness by the public sector leadership to embrace and drive 4IR digital technologies in the public sector. Lastly, the interview participants contended that, as a result of poor public sector leadership which is lacking in strategic vision and foresight, South Africa is lagging behind and playing a catch-up with other countries such as Egypt, Kenya and Rwanda, which are moving ahead in embracing 4IR digital transformation.

Overall, there was convergence and commonality of perspectives among the interview participants on the various manifestations of poor public sector leadership and how these issues create major barriers to digital transformation in the public sector. In conclusion, the interview data appears to suggest that a lack of clear strategic vision and foresight, leadership instability, poor change management and general leadership unwillingness to embrace 4IR digital technologies constitute key leadership barriers to digital transformation in the public sector. This therefore boils down to a lack of a clear strategy and poor strategic leadership as major barriers to digital transformation in the public sector.

5.2.3. Organisational structure

The organisational structure of the public sector also emerged from the research interviews as a key driver of a public sector organisational culture which hampers digital transformation in the public sector. The interview participants contrasted the public sector organisational structure with the private sector organisational structure and generally shared a common view that the rigid, hierarchical and bureaucratic nature of the public sector organisational structural configuration does not facilitate nor allow change.

In describing and contrasting the public and private sector organisational structures, one interview participant said "the public sector organisational structure is hierarchical, bloated and inefficient compared to flatter and leaner structures in the private sector". Another interview participant went further and said "the private sector organisations have organisational structures that respond to their strategies, but the public sector organisational structures are not properly funded to respond to strategy".

In this regard, some participants were of the view that some hierarchical levels in the public sector organisational structure should be eliminated to create more efficiency in the system. On this point, one participant said "bureaucracy is huge in the public sector compared to the private sector and we should therefore use digital technologies to reduce bureaucracy and promote more efficiency". To do this, the participant argued that "each department must begin to identify key efficiency gains that could be achieved through digital technologies and each must appoint 4IR digital champions to help mainstream digital technologies in the departments". Overall, from the interview data, it seems that the hierarchy, bureaucracy and rigidity associated with the public sector organisational structure constitute major barriers to digital transformation in the public sector.

5.2.4. Organisational systems and processes

The interview participants identified public sector systems and business processes as part of the key defining features of a public sector organisational culture, which create systemic and operational barriers to digital transformation in the public sector. The participants highlighted key aspects or areas of these systemic and operational barriers. The first one is the public sector red tape. One participant said "red tape is a problem in the public sector. The private sector is quicker in implementing change, but public sector processes are very slow". Another participant said "4IR will be positive to the public sector in reducing the red tape and lengthy processes through software applications".

The second systemic barrier relates to systems fragmentation and silos. In this regard, the interview participants indicated that the public sector systems operate in silos and are not integrated. Some participants cited an example of fragmented data management systems in the public sector. One participant said "data in the public sector currently sits with individuals instead of being stored centrally to allow collaboration, usage and sharing so that the left knows what the right is

doing. I have seen worst cases where it gets so bad that people do not know what data they have despite them collecting it all the time".

Another participant went further and opined that "how data is kept, where it is kept and how it is shared and disseminated is not that great in the public sector. There should be a single point of data where all government departments can access it as sharing of data is key to solving service delivery problems". In relation to the consequences of this public sector system fragmentation, one interview participant indicated that "these silos create duplication and redundancies of data, which affect effective decision making in the public sector".

Furthermore, the interview participants highlighted the fact that public sector systems and processes are old and outdated. In this regard, one participant opined as follows: "the public sector still has old systems which are not adaptable to 4IR". Another participant said "we are still stuck in old-fashion culture, old ways of doing things and the traditional ways of providing services. We are still largely paper-based and automation of manual systems and processes has not been done". Another different participant shared the same view and said "this thing of people queueing for public services is old school and outdated. Just imagine the amount of time people spend queueing waiting for public services and this time could well be spent doing other things".

Another interview participant also echoed the same sentiment and said "we need to use technologies to move away from manual and paper-based processes. We have been talking about going digital for the past five years but we are still not yet there. Things are just slow in the public sector". Another participant said "there is no interest in wanting to improve our systems and how we work as public sector officials. We need digitalisation and automation of the public sector processes, but at this point, we are still stuck in manual processes". The participant went on and said "every time you go to a public hospital or clinic, they

will ask you for the same information instead of having your digital medical record which can be accessed through your ID"

Overall, the participants echoed each other in describing and explaining the above systematic barriers to digital transformation in the public sector. The participants also converged on the fact that all these systemic barriers create major inefficiencies in the public sector. In conclusion, the interview data seems to suggest that a combination of red tape, systems fragmentation and silos as well as old and outdated systems and processes constitute systemic and operational barriers to digital transformation in the public sector.

5.2.5. Organisational performance management and accountability

The interview participants further identified public sector performance and accountability culture as a major barrier to digital transformation in the public sector. In this regard, the participants identified three main institutional features or aspects of this organisational culture. The first one relates to poor performance management including a lack of accountability or consequences for poor performance in the public sector.

The interview participants contrasted the public sector with the private sector to amplify this point. In this regard, one participant summarized the current state of affairs in the public sector as follows: "the mentality that you cannot be fired in the public sector creates laxity in performance. It is just a matter of doing the bare minimum compared to the private sector and such behaviour is tolerated in the public sector". This sentiment was echoed by another participant who said "the public sector is more lenient on poor performance and there is no consequence management for non-performance". Another participant attributed this to the role and influence of the public sector unions and said "unions have really not come to the party when it comes to accountability and have contributed to poor work ethics in the public sector".

It also appeared from the interviews that leadership instability, occasioned by short-term tenures and constant changes of Directors General (DGs) and Heads of Departments (HODs) as well as continuous acting arrangements for these positions, seems to undermine performance and weaken accountability in the public sector. In this regard, one participant asks a rhetorical question: "if we fail to achieve and we had three people who were acting during that period, who do you hold accountable for failure? This is a problem in the public sector".

The second aspect relates to a compliance-based culture of the public sector as opposed to a results-based performance culture found in the private sector. To amplify this point, one participant opined that "the public sector needs to be results-driven. In the public sector, performance is more about sticking to the rules and the law". In support of this view, another participant maintained as follows: "in the public sector, we are not results-driven but compliance-driven and micro-managing officials"

The third aspect has to do with poor professional ethics or ethos for customer service. On this aspect, one interview participant said "the public sector is still lacking a bit of professionalism compared to the private sector". The participant amplified this point by citing an example of poor public service to citizens by public sector officials. In this regard, the participant said "many public servants are not able to assist people when looking for help but instead they take them from pillar to post"

To drive digital transformation and promote productivity, performance and accountability in the public sector, one interview participant said "it must be made a compulsory requirement for all top management in the public sector to have digital competencies dealing with 4IR and digital technologies as part of core generic public sector management competencies and those who don't must be trained and up-skilled".

In conclusion, the interview data seems to suggest that a compliance-based culture and a culture of poor performance and accountability as well as poor professional ethos for customer service or lack of care for customers constitute the core foundational pillars of a public sector performance and accountability culture, which militates against digital transformation in the public sector.

5.2.6. Organisational incentives

The interviews participants highlighted a poor system of organisational incentives as another institutional feature of a public sector organisational culture which militates against digital transformation in the public sector. According to the participants, poor organisational incentives undermine public sector efforts for digital transformation in the sense that it becomes difficult for the public sector to attract and retain top talent and digital skills required to drive digital transformation in the public sector. The participants further highlighted the fact that the public sector is losing talent and skills to the private sector due to a poor system of incentives compared to the private sector.

In comparing the public and private sector incentives, one interview participant summarized the sharp contrast as follows: "the public sector is lagging behind the private sector in terms of performance and innovation because the private sector incentivizes its employees and that is why it is able to sustain good performance of its employees and ensure that its employees perform beyond the call of duty". In this regard, the participants described the incentives as going far beyond financial rewards to include creating an enabling and conducive environment for talents to thrive as well as providing learning and development opportunities for employees to learn new things.

Another interview participant reinforced this public and private sector contrast and said "the private sector is always innovating and rewards performance. In contrast, performance bonuses in the public sector are mere peanuts and that is why the public sector is losing skills and talent". To ensure the success of digital transformation, the participants expressed a common view that the public sector should improve its incentives system to attract and retain digital skills and create innovative and high-performance teams. The participants further maintained that the public sector also needs to do more to motivate and incentivize public servants to acquire digital skills. In conclusion, the interview data seems to suggest that an improved system of organisational incentives would constitute an essential element of critical success factors for digital transformation in the public sector.

5.2.7. Organisational mindset and attitude

The interview participants sharply raised the mindset and attitudes of public sector officials as a major defining feature of a public sector organisational culture, which poses a huge barrier to digital transformation in the public sector. In this regard, the interview participants went into some details to characterise public sector mindset and attitude. Firstly, the participants expressed a common view that the public sector is narrow-minded, in-ward focused, rigid, reactive and unable to think outside the box as it enjoys operating in a comfort zone more preoccupied with compliance rather than substantive results.

Secondly, the participants shared the same sentiment that the public sector lacks a deep appreciation of the strategic importance of 4IR digital technologies. In this regard, one participant commented as follows: "4IR digital competence is taken as an add-on or luxury, but not as a core competency area to improve public sector performance". Another participant expressed a similar view and said "in the public sector, we see technology as a luxury than an intervention to improve public sector productivity"

Thirdly, the participants spoke about the public sector fear and resistance to change. The participants converged on a common view that the public sector is unable and unwilling to embrace 4IR digital technologies to change and modernise how it operates and deliver services. In this regard, one participant articulated public sector resistance as follows: "Where we are right now, we are paying a lip service to 4IR. I do not think that we fully embrace the transformation that comes with 4IR technologies". The same participant went further and said "technology is disruptive because it pulls us out of our comfort zones, but as the public sector we have not changed. As usual the public sector will be the last one to join the 4IR bandwagon".

To amplify the point further about the need for public sector modernisation and adoption of 4IR digital technologies, another participant made the point that "it is no longer about the bricks and mortar where people have to queue for services". However, in support of the participants' common view about public sector resistance to change, one participant opined as follows: "the public sector is just talking 4IR because is a buzzword, but there is no commitment, it is just a lip service to it without any commitment to change how we work". This view was further corroborated by another participant who said "there is resistance to change where people just want to stick to the old ways of doing things and a lack of desire to learn or change is a barrier to 4IR digital technologies in the public sector"

Some participants attributed this public sector resistance to change to a mere fear for change and the fear of the unknown as well as people's negative attitude to technology. One participant summarized this state of affairs as "a misinformed narrative that technology is going to take our jobs" supported by another participant who opined as follows: "the public sector employees see technology as a threat to their jobs and believe machines will do their work". According to another participant, "this is mainly because of lack of awareness and knowledge

51

of 4IR". Some participants also attributed this attitude to a major influence of labour unions in the public sector. In this regard, one participant said "unions can also be a stumbling block to the work of government in terms of wanting to control what employees can and can't do".

The participants went further to explain the nuances and intricacies of this public sector resistance to 4IR digital technologies. The first one relates to the current age profile of the public sector employees. The participants indicated that the younger generation in the public sector seems to be more willing and receptive to 4IR digital technologies compared to the older generation which appears to be more conservative and resistant or slower to adapt to these technologies. In this regard, one participant described this generational divide as follows: "the younger generation in the public sector is keen to embrace and use 4IR technologies and is ready to explore and have fun with these technologies than the older generation".

The second issue of nuance is that public sector resistance to digital technologies is much deeper and more institutionalized than just human resistance. In this regard, the participants attributed the resistance not just to public sector officials, but also to the public sector system itself as well as the sheer size of public sector. One participant summarized this point as follows: "Government is a big machinery and the rate at which it adapts is slower". The participant further amplified this point as follows: "because of the way government is structured, there is resistance not only from the people, but also from the whole system because of its inflexible regulatory framework and rigid procedures". The same participant went further and said "we are not agile in how we approach our work and the public sector needs to create an agile environment to facilitate digital technologies"

The third issue of nuance relates to the impact of the Covid-19 pandemic on the adaption of digital technologies by the public sector. There seemed to be some divergence of views among the participants in this regard. One participant opined that "the Covid-19 pandemic has done 4IR technologies a huge service". While some participants lauded the Covid-19 pandemic for demystifying technology and forcing the public sector to embrace digital technologies as a matter of necessity, some participants indicated that this was a temporary arrangement during the pandemic as the public sector now seems to be reverting back to its old and traditional way of doing things. According to some participants, this runs contrary to a 4IR digital era, which represents a paradigm shift in how organisations should operate and conduct their business.

Lastly, the participants brought to the fore a community dimension to public sector resistance to technology. In this regard, the participants argued that, since the public sector serves communities, public sector resistance to 4IR digital technologies should not be viewed in isolation from community resistance to these technologies. For this reason, the participants emphasized the need for public education, awareness and communication campaigns to educate communities about the role, importance and value of 4IR digital technologies to public service delivery in order to promote community buy-in and acceptance of these technologies.

In conclusion, it appears from the interview data that cultural barriers to digital transformation in the public sector are driven by more complex, multi-faceted and nuanced human, institutional and systemic factors. These include the mental models and orientation (mindset) as well as the attitude and fears of public sector officials in relation to digital technologies. The age or generational profile of the public sector employees also plays a major role in this regard. More importantly, it seems that public sector resistance to digital transformation is much deeper and more institutionalized and systemic in nature than just the issue of human mindset and attitude. Lastly, it also appears that public sector resistance to digital

technologies is somewhat connected or related to community resistance to these technologies.

5.2.8. Organisational skills

The interviews explored the availability of public sector skills and expertise to drive digital transformation in the public sector. The participants shared the same view about a general shortage or paucity of digital skills and other relevant skills required to drive digital transformation in the public sector. While the participants agreed that the public sector has various training programmes, they also agreed that such programmes lack specific focus on digital skills. One interview participant summarized a shortage of digital skills in the public sector as follows: "the public sector lacks basic technology skills such as Excel skills and I do not think that the public sector is doing enough to provide its employees with 4IR digital skills". Another participant opined as follows: "the current demands related to 4IR require a new set of skills and many people in the public sector do not have such skills and the issue of digital skills is probably one of the most important areas that the public sector should look into".

The participants attributed a shortage of digital skills in the public sector to a number of factors, which include leadership, age or generational profile of the public sector employees, loss of skills to the private sector, poor public sector recruitment strategy, lack of resources and the neglect of the IT function. In relation to leadership, the participants raised the lack of leadership will for change and the style of leadership which does not nurture talent and promote continuous learning and development of the public sector employees. Related to the leadership issue is the issue of poor recruitment strategy and practices, which the participants highlighted as one of the main causes of poor personnel appointment and an impediment to public sector's ability to attract and retain skills.

The participants further highlighted the fact that the public sector workforce is made up of many older employees, which makes it difficult for them to adapt to a 4IR digital era in terms of their retraining and reskilling in digital skills. In this regard, another participant summarized this point as follows: "the public sector workforce is getting older and this affects the skills and the rate at which we are able to adapt and embrace digital technologies"

Regarding the neglect of the IT function, the participants raised the lack of competent and well-capacitated IT teams as another key barrier to digital transformation in the public sector. In addition, the participants raised the lack of customised digital skills training programmes for the public sector as another impediment to public sector digital transformation. In this regard, one participant commented as follows: "I have not seen training programmes or courses on digital technologies for officials in the public sector. Even though I am interested in learning about digital technologies, where do I start?". The issue of poor organisational incentives already covered in the preceding section was also raised by the participants as another key factor accounting for a shortage of digital skills in the public sector.

To address the current digital skills gap, the participants emphasised the need for public sector leadership to be deliberate about digital transformation and prioritise budget and resource allocation for public sector digital skills acquisition, development and retention, including the capacitation of the public sector IT teams. Interestingly, the participants also raised the importance of training communities in digital skills for them to embrace and use digital technologies. This point links directly to an earlier point made in the preceding section about the importance of community education, awareness and communication campaigns regarding role and importance of digital technologies in public service delivery.

In conclusion, the interview data seems to place a shortage of digital skills in the public sector squarely on poor leadership, age or generational profile of the public sector employees, loss of skills to the private sector, poor public sector recruitment strategy and practices, poor organisational incentives and shortage of customised digital training programmes as well as a lack of resources and a lack of investment in the capacity of the public sector IT function. Overall, the lack of skills seems to be a barrier to digital transformation in the public sector.

5.2.9. Organisational learning and innovation

The interview participants viewed digital transformation as a form of innovation linked to organisational ability to learn, adapt and innovate. According to the participants, the hierarchical, bureaucratic and rigid public sector environment, coupled with the inability of public sector officials to be open-minded and think outside the box, make it difficult for the public sector to become a dynamic learning organisation able to adapt and embrace 4IR digital technologies. Most participants cited the inability of the public sector to leverage and use massive data at its disposal to improve its operations and service delivery as a classic example of public sector organisational learning failure.

The participants juxtaposed the public sector with the private sector and made the point about the private sector being open to new ideas and new ways of doing things compared to the public sector. In this regard, one participant opined as follows: "the private sector is more innovative than the public sector using new technologies and finding innovative ways of doing things and reducing costs". Another participant shared this sentiment by saying "the private sector companies are up to date with new technological changes and developments and are constantly trying to find better ways to improve". However, the situation seems to be different in the public sector as described by one participant who said "in the public sector, people stick to what they have been doing all along

focusing on meeting the basic requirements and ticking the boxes and focusing on what they know without exploring new ways of doing things"

In this regard, the participants made an interesting point about what drives organisational learning and agility of the private sector organisations compared to the public sector organisations. One participant summarized it as follows: "in the private sector, innovation is about the survival of the company and the survival of the company is your survival as an employee and this promotes individual innovation". In support of this view, one participant highlighted the peril of organisational rigidity in the private sector citing the example of Nokia and said "Nokia used to be the leader in technology space, but it is gone now because it failed to change and adapt to new technologies and the changing needs of customers". To contrast this private sector example with public sector scenario, one participant said "unfortunately, in the public sector, there is no innovation and motivation because the organisation will not close down even if it performs badly. Municipalities are performing poorly but they still exist".

For the public sector to become a learning and innovative organisation able to adapt and embrace digital transformation, the participants mentioned the need for the public sector to be open-minded and think outside the box and embrace lessons and good practices from the private sector and from other countries. The participants further highlighted the importance of creating organisational incentives for innovation and leveraging both the talent of young professionals and diversity of the public sector employees to make the public sector a dynamic learning organisation. In this regard, one participant amplified the issue of diversity as follows: "the public sector needs to become a learning organisation that celebrates diversity, more importantly diversity of ideas, which allows people to have descending views in a respectful manner"

Overall, the interview data suggests that both the public sector environment and the mentality and mindset of public sector officials stifle organisational learning and innovation, which, in turn, impede the public sector's ability to adapt and embrace digital transformation.

5.2.10. Collaboration and partnership

Issues of technology collaboration and partnership came out sharply during the research interviews as critical success factors for successful implementation of digital transformation in the public sector. In this regard, the participants identified internal organisational collaboration between business units, intergovernmental collaboration between public sector organisations and strategic partnerships with the private sector organisations and research institutions as key success factors for public sector digital transformation.

However, the participants expressed a view about the lack of both internal organisational collaboration and intergovernmental collaboration within the public sector and attributed this to silo mentality and mindset as well as in-ward thinking among the public sector officials. In this regard, one participant opined as follows: "everyone has plans and targets but these are not integrated. All spheres of government should collaborate and embrace technology to achieve economies of scale". Another participant said "technology will make government departments to work better together and ensure much better compliance with legislation"

Furthermore, the participants emphasized the need for the public sector to establish and foster strategic partnerships with the private sector organisations and research institutions to drive technology innovation to improve public service delivery. In this regard, one participant amplified the need for strategic partnerships as follows: "the public sector needs to form partnerships with the private sector to share 4IR knowledge and skills". Another participant echoed this view by saying "it is very important for government to pursue partnerships with

the private sector to leverage off the skills that exist in the private sector to build public sector capacity". In conclusion, the interview data suggests that a silo-based mental orientation of the public sector officials is an impediment to public sector collaboration and partnership, which, in turn, militates against digital transformation in the public sector.

5.2.11. Digital technology adoption

The research interviews explored in greater detail the use of digital technologies in the public sector. All the participants expressed the same view that digital technologies are affecting different aspects of life across various sectors of society. The participants indicated that it is imperative for the public sector to adapt and embrace 4IR digital technologies as a matter of necessity in order to remain relevant in this digital era.

The participants painted a picture about the current state of digital technology adoption and use in the public sector. In this regard, the participants indicated that the use of 4IR digital technologies is still in its infancy in the public sector and that the public sector still lags behind the private sector in terms of adoption and application of sophisticated digital technologies to operate their business and deliver services.

Notwithstanding this relative infancy and lack of sophistication compared to the private sector, the participants highlighted some of the digital technologies currently being used in the public sector including cloud computing for virtual data storage, smart metering technologies for some municipal services, virtual meeting platforms such as Microsoft Teams and Zoom, automation of certain processes and digitization of certain services such as job application, business licensing and development application processes and tax e-filling and e-learning services as well as the use of robotic technology in some public hospitals to perform surgeries.

The participants cited the South African Revenue Services (SARS) as an example of public sector excellence in terms of the adoption and application of digital technologies to provide services such as e-filling. The participants further mentioned Gauteng and Western Cape Provincial Governments as the provinces which are at the forefront in embracing digital technologies.

The participants went further and identified sophisticated digital technologies that could be used in the public sector based on their massive possibilities and opportunities in terms of their various use cases and related benefits to the public sector. In this regard, the participants argued for an adoption of technologies such as artificial intelligence, blockchain technology, internet of things, data analytics, cloud computing, robotics and 3D printing to improve public sector efficiency, effectiveness and performance in relation to delivery of public services. In this regard, the participants mentioned a number of public sector use cases and benefits associated with these technologies. The examples of the benefits mentioned during the research interviews include better communication between government and the citizens, real-time data and quick decision making, improved service delivery efficiency, convenience and speed, improved crime prevention, improved public infrastructure delivery, integrated public transport ticketing system and improved housing delivery through the use of 3D printing technology.

In relation to the role of digital technologies in public sector communication, one participant opined as follows: "communication should be about how we use digital technologies to communicate better, to engage and get feedback. These technologies introduce a different way of communicating with citizenry, especially the youth". Regarding the importance of data analytics in the public sector, one participant said "government should see data as a big asset and optimize its use using artificial intelligence". Another participant went further and argued that "digitization and automation of processes and operations is the core of what government needs to do to improve and speed up service delivery" while a

another different participant contended that "4IR digital technologies can be used as tools to ensure that public sector processes and systems are faster, efficient and responsive".

It is quite profound that the participants further identified 4IR digital technologies as key drivers and enablers of the concepts of smart government and smart cities and also as important tools to reduce organisational hierarchies for efficient decision making and to help government respond to sustainability, climate change and disaster management issues citing 3D printing technology as just one example of delivering faster, cost-effective and environmentally friendly public housing projects.

Overall, the interview data paints a picture of the public sector which is still in its infancy phase in relation to the adoption and application of digital technologies in its core business functions and processes. The data further puts the public sector behind the private sector in terms of sophistication when it comes to application of digital technologies. Most importantly, the data highlights immense opportunities and possibilities to the public sector in terms of various public sector use cases and benefits associated with the application of digital technologies. These include 4IR digital technologies being used as key drivers and enablers of the concepts of smart government and smart cities as well as key tools to reduce organisational hierarchies for efficient decision making and to help government respond to sustainability, climate change and disaster management issues.

5.2.12. Technology investment

The interview participants highlighted the fact that digital technologies come at a great cost in terms of both capital and operational costs, including ongoing maintenance costs. In this regard, the participants indicated that, in contrast to the private sector organisations, the public sector has not prioritised investment

in 4IR digital technology infrastructure and software applications as well as related human capital investment in terms of skills acquisition, development and retention. The participants cited the lack of competent and well-capacitated IT teams in the public sector as an example of poor public sector investment in technological capabilities.

In this regard, one participant commented as follows: "4IR technologies are not being prioritised in the public sector. The public sector IT units are very basic and this shows that the public sector is not investing enough in research and new technologies". Another participant questioned the role and effectiveness of public sector technology agencies and said "the sad part is that there are public sector institutions that are supposed to be the custodians of digital technologies in the public sector such as the department of communication and digital technologies". In support of the need for public sector investment in digital technologies, one participant argued that "the public sector needs technologies that could bring government closer to citizens and those technologies that could facilitate citizen engagement and allow citizens to monitor the work of government proactively using apps".

From the interviews, it appears that a combination of these technology investment-related issues constitutes a major barrier to digital transformation in the public sector. For a successful public sector digital transformation, the participants highlighted the need for public sector investment in 4IR research and innovation, digital technology infrastructure and software applications (including devices and reliable internet connectivity) as well as the development of strong IT teams for deployment in the provision of digital public services. To drive effective digital transformation in the public sector, one participant further argued that "we need to repurpose IT units in the public sector to focus on 4IR digital technologies to make their roles much broader than just changing and setting up our passwords"

Overall, the interview data suggests that public sector digital transformation is also hampered by a lack of public sector prioritization of investment in 4IR research and innovation, digital technology infrastructure and software applications as well as the lack of human capital investment in terms of skills acquisition, development and retention. The data further paints a picture of the ineffectiveness of public sector technology agencies and the lack of capacity in public sector IT functions or teams to drive digital transformation in the public sector.

5.3. Conclusion

The overall summation of the empirical findings from the research interviews points to a nuanced combination of key public sector organisational cultural factors, which present major barriers to digital transformation in the public sector. The first one relates to broader contextual issues, which have a bearing on the public sector environment and the adoption and implementation of digital technologies in the public sector context. The second factor pertains to poor public sector leadership, which includes the lack of clear strategic vision and foresight, leadership instability, poor change management and leadership unwillingness to embrace 4IR digital technologies. The third factor has to do with the hierarchy, bureaucracy and rigidity associated with the public sector organisational structure. The fourth factor relates to systemic and operational barriers related to the public sector organisational systems and processes, which include a nuanced combination of outdated systems, systems fragmentation and red tape.

The fifth factor speaks to a compliance-based culture and a culture of poor performance and accountability as well as poor professional ethos for customer service. The shortage of digital skills and poor systems of public sector organisational incentives, learning and innovation also constitute key factors in this regard so is the lack of internal organisational and intergovernmental

collaborations as well as strategic partnerships with the private sector and research institutions. Another key factor relates to the deep-seated mental models and orientation (mindset), the attitude and fears of public sector officials as well as the age or generational profile of the public sector employees and much deeper public sector institutional and systemic issues which go beyond issues of human mindset and attitude.

The infant nature of digital technology application in the public sector represents another key factor. The last factor relates to the lack of public sector investment in 4IR research and innovation, digital technology infrastructure and software applications as well as the lack of human capital investment in terms of skills acquisition, development and retention. This includes the lack of investment in public sector technology agencies and the capacity of the public sector IT functions or teams to drive digital transformation in the public sector. In conclusion, the totality of these empirical research findings seems to suggest that a complex and nuanced interplay of contextual, structural, systemic, strategic, operational, mental and behavioural (attitudinal) factors shape the public sector organisational cultural environment in which it is difficult for the public sector to adapt and embrace digital transformation.

CHAPTER SIX: RESEARCH DISCUSSION

6.1. Introduction

This chapter provides the analysis and discussion of the research findings (empirical findings) presented in chapter five in terms of the literature review and theoretical framework (theoretical analysis) discussed in chapter two of this research report. The theoretical framework consists of organisational culture types in terms of the Competing Values Framework and the concept of a digital organisational culture, which explains the nexus between organisational culture and digital transformation. The discussion of the empirical and theoretical analysis is structured and presented in terms of broad thematic areas presented in chapter five of this research report. This is in response to the research questions and the objectives of the study.

The broad thematic areas, which are analysed and discussed below, are as follows: organisational strategy and leadership; organisational structure; organisational systems and processes; organisational performance management and accountability; organisational incentives; organisational mindset and attitude; organisational skills; organisational learning and innovation; collaboration and partnership, digital technology adoption; and technology investment. The chapter then concludes by pulling together and synthesizing the empirical and theoretical analysis into the overall conclusion.

6.2.   Research analysis and discussion

Thematic discussion of the empirical and theoretical analysis is provided below.

6.2.1. Organisational strategy and leadership

The analysis of the research interview data points to poor public sector strategy and leadership as a major barrier to digital transformation in the public sector. Based on the analysis of the interview data, there are various key manifestations or factors that account for this poor public sector leadership. The first one relates to a lack of a clear vision and strategy for the fourth industrial revolution in the public sector. This is mainly due to poor strategic leadership in the public sector, which the interview data links to the lack of strategic foresight and forward planning by the leadership in the public sector.

The second key factor or manifestation of poor public sector leadership pertains to leadership instability mainly due to constant changes in both political and administrative leadership in the public sector. Short-term tenures of Directors-General (DGs) and Heads of Departments (HODs) and perpetual acting arrangements in these key leadership positions also seem to contribute to leadership instability in the public sector. It further appears from the interview data that leadership instability contributes to a confusion of strategic visioning (including long-term vision) and implementation in the public sector.

The third factor or manifestation of poor public sector leadership relates to the inability of the leadership to drive change in a deliberate (determined), structured and systematic manner, which, as the interview data suggests, is reflected through a leadership failure to embed digital transformation in the public sector strategy, structure, budget and employees' job responsibilities. The leadership's unwillingness to change, learn and keep pace with new developments also appears to be a major contributory factor to poor public sector leadership. The

data analysis further suggests a leadership failure to ensure an inclusive and participatory digital transformation process that takes everyone along a transformation journey for their buy-in and ownership.

The literature speaks about the important role of organisational strategy and leadership in driving effective implementation of digital transformation. The literature highlights key important points in this regard. The first set of points relates to strategy. In this regard, the literature points to the fact that formulating a strategic vision to underpin digital transformation remains a daunting challenge for organisations (Abd-Rabo & Hashaikeh, 2021).

Digital transformation therefore requires a clear digital strategy (Gabryelczyk, 2020; Korachi & Bounabat, 2020; Pradana et al., 2022; Schwertner, 2017). In fact, digital transformation requires rethinking, changes and realignment of strategy (Gabryelczyk, 2020; Osmundsen et al., 2018). Such a strategy should take into account different key considerations such as social, technical and organisational factors (Saarikko et al., 2020). The lack of strategic direction in terms of digital strategy creates conflicts in terms of organisational values as well as fragmentation in synergy of organisational work (Pradana et al., 2022).

According to McLaughlin (2017), any digital strategy should fundamentally be about "providing information for better business decision making, developing a responsive customer-focused organisation, developing flexible and responsive business models and developing demand sensitive products and services in a cost effective manner" (p.66). In summary, organisational digital strategy should broadly aim to "improve customer experience, increase efficiency, improve innovation, improve decision making and transform the business" (Schwertner, 2017, p.389).

The second set of points relates to leadership. In this regard, the literature highlights the importance of transformational leadership and change management as key success factors for digital transformation (Gimpel et al., 2018). Digital transformation requires a strong leadership in order to succeed (Van Dyk & Van Belle, 2019). In this regard, McLaughlin (2017) specifically stresses the importance of a strong business and technology leadership to ensure the success of digital transformation. Lastly, Hie (2019) points to a need for deliberate efforts and change of behaviour at the top leadership level of the organisations to build a digital organisational culture.

Based on the overall empirical and theoretical analysis, it appears that the research findings accord with the literature on the critical role of organisational strategy and leadership in ensuring the success of digital transformation in the organisations. It also appears that the nature of strategic leadership required for digital transformation speaks more to transformational leadership with specific focus or emphasis on business and technology leadership. Finally, the overall analysis seems to support the overall conclusion drawn from the empirical research findings that a lack of a clear strategy and poor strategic leadership constitute major barriers to digital transformation in the public sector.

6.2.2. Organisational structure

The interview data analysis has identified public sector organisational configuration as a barrier to public sector digital transformation. In this regard, the interview data points to a highly hierarchical, bureaucratic, bloated and inefficient public sector organisational structure, which contrasts sharply with relatively flatter and leaner organisational structures in the public sector.

Organisational structure constitutes one of the key organisational dimensions of digital transformation (Sainger, 2018). The literature describes an organisational culture associated with hierarchical, bureaucratic organisational structures. The

hierarchical organisational culture is based on internal control, order, rules, procedures, certainty, standardization and formality (Felipe et al., 2017) as well as conformity, efficiency, stability and predictability (Camacho et al., 2018). A hierarchical organisational culture is also premised on formalised, structured and rules-based command and control environment, which is mainly associated with incremental change (Goncalves et al., 2020).

This organisational culture type is internally focused and reflects an organisational culture commonly associated with the public sector organisations (Rukh & Qadeer, 2018). A hierarchical organisational culture accords with a bureaucratic organisational culture. A bureaucratic culture is based on hierarchy, authority and siloed structure and is associated with a stable environment (Bhatti et al., 2020). Organisations with a hierarchical culture display a lack of innovation (Liao, 2018).

A traditional hierarchical organisational culture could hinder digital transformation and innovation (Muller et al., 2019). Digital transformation is about fundamental organisational change and transformation (Sainger, 2018). Fundamental changes in the public sector are however difficult to achieve digital transformation due to the hierarchical and in-ward looking nature of the public sector organisations (Hanna, 2018).

It is for this reason that a successful implementation of digital transformation requires a completely different organisational configuration. The structural configuration of digital organisations is based on "novel ways of internal collaboration (namely: cross-functional teams, physical and virtual collaboration, and dual structures) and external collaboration (startups, platforms with competitors and partners, and customer integration)" (Duerr et al., 2018, p.5129).

Digital organisations use cross-functional teams and rely on internal and external collaboration and decentralised responsibilities and decision making models to promote faster organisational innovation, agility and competitiveness (Duerr et al., 2018). Organisational agility, innovation, adaptability and modernisation require a transformation of outdated bureaucratic organisational structures and cultures to enable organisational learning, adjustment and faster adaptation to change (Goncalves et al., 2020).

The organisational structures of digital organisations are generally characterised by a distribution or decentralisation of power, responsibilities and decision making to different business units and to middle to lower levels of management to facilitate digital innovation alignment processes as well as faster and more agile responses to changes or developments in the business environment (Duerr et al., 2018).

Overall, the research findings paint a picture of a hierarchical, bureaucratic and rigid public sector organisational configuration while the literature paints a completely different picture of a decentralised, cross-functional and collaborative organisational structure as an ideal or suitable organisational model to facilitate effective digital transformation in the organisations. This analysis therefore appears to support the empirical research findings that the rigid, hierarchical and bureaucratic nature of the public sector organisational configuration impedes the organisational agility and ability of the public sector to adapt and embrace digital transformation.

6.2.3. Organisational systems and processes

The interview data analysis has identified public sector systems and business processes as part of the key defining features of a public sector organisational culture, which create systemic and operational barriers to digital transformation in the public sector. Based on data analysis, there are three key systemic and

operational barriers associated with public sector systems and processes. The first one pertains to public sector bureaucratic red tape, which creates inefficiencies as well as systemic and operational bottlenecks within the public sector system.

The second systemic and operational barrier relates to systems fragmentation in the public sector, which means that the public sector systems are not integrated and operate in silos. Fragmented data management systems is one example coming from the empirical data and this silo-based operational model is said to create duplication and redundancies, which impede effective decision making in the public sector. Thirdly, public sector systems and processes are old and outdated, suggesting that the public sector has not yet transformed to embrace digitalization and automation. In this regard, the data analysis suggests that the public sector still remains largely stuck in old traditional ways of doing things and providing public services mainly relying on manual and paper-based processes.

Organisational processes constitute one of the key organisational dimensions of digital transformation (Sainger, 2018). Schein (2010) has identified organisational processes as artifacts of an organisational culture, which essentially represents one practice through which organisational culture manifests itself practically in different organisations. Van den Berg and Wilderom (2004) emphasize the centrality of organisational practices in the definition of organisational culture. They contend that organisational values, while they constitute an important part of organisational culture, are invisible and are therefore generally expressed through organisational practices (Van den Berg & Wilderom, 2004).

Public sector systems and processes therefore represent public sector organisational cultural artifacts and practices. These systems and processes also represent a practical expression or manifestation of a public sector organisational culture. Based on the empirical and theoretical analysis, it therefore appears that the bureaucratic and outdated nature of the public sector systems and processes

underpins or undergirds a hierarchical, bureaucratic and rigid organisational culture of the public sector, which then hampers the public sector's ability to adapt and embrace digital transformation.

6.2.4. Organisational performance management and accountability

The interview data analysis has identified public sector performance and accountability culture as a major barrier to digital transformation in the public sector. Based on data analysis, there are three main institutional features or manifestations of this culture. The first one is the lack of accountability and consequences for poor or sub-standard performance. The analysis suggests that a feeling of job security, and the general mentality that public servants cannot be fired, breeds a culture of poor work ethics, poor performance and mediocrity for which there are no consequences or accountability. The data analysis further points to the role and influence of public sector unions in reinforcing this culture in the public sector.

The data analysis further suggests that leadership instability and perpetual acting arrangements in leadership positions in the public sector also undermine or weaken public sector performance and accountability in that it becomes difficult to apportion performance failure and accountability to many different acting people. The second institutional feature of this culture relates to a compliance-based culture of the public sector as opposed to a results-based performance culture found in the private sector. The third feature pertains to poor professional ethics or ethos for customer service, which, as data analysis suggests, is reflected through the lack of care for the citizens by public servants who take the citizens from pillar to post instead of helping them. The data analysis suggests that this contrasts sharply with the private sector performance and accountability culture.

Based on the literature review, this compliance-based public sector performance and accountability culture could be better explained in terms of different organisational culture types discussed in chapter two of this research report. These organisational culture types explain organisational cultural attributes which essentially distinquish the public and private sector organisational cultures.

Market culture is associated with external focus, competition and results orientation (Caliskan & Zhu, 2019; Liao, 2018; Rukh & Qadeer, 2018). In short, market culture is competitive and results-oriented (Goncalves et al., 2020). On the other hand, adhocracy culture is premised on creativity, innovation and entrepreneurship (Okatan & Alankus, 2017; Rukh & Qadeer, 2018). This organisational culture type is also underpinned by experimentation, agility, risk taking and individual initiative (Goncalves et al., 2020). These organisational culture types mainly reflect organisational cultures found in the private sector. By their very nature and core attributes, these organisational culture types promote results-based performance cultures.

In contrast, the hierarchical organisational culture places a higher premium on internal control, order, rules, procedures, certainty, standardization and formality (Felipe et al., 2017) as well as conformity, efficiency, stability and predictability (Camacho et al., 2018). It is also premised on formalised, structured and rules-based command and control environment, which is mainly associated with incremental change (Goncalves et al., 2020). This organisational culture type is internally focused and reflects an organisational culture commonly associated with the public sector organisations (Rukh & Qadeer, 2018). The core attributes and orientation of this culture therefore seem to explain a compliance-based public sector performance culture.

Based on the analysis, the literature seems to suggest a hierarchical organisational culture as a key factor that could explain the empirical research findings on a compliance-based public sector performance and accountability

culture, which appears to militate against digital transformation, which, at its core, is about great customer experience and superior organisational performance and results.

6.2.5. Organisational incentives

The interview data analysis has identified a poor system of organisational incentives as another institutional feature of a public sector organisational culture which militates against digital transformation in the public sector. The data analysis suggests that poor organisational incentives undermine public sector efforts on digital transformation in the sense that it makes it difficult for the public sector to attract and retain top talent and digital skills required to drive digital transformation in the public sector.

The data analysis also points to the public sector incentives lagging behind the private sector incentives, which is said to better incentivize employees' performance and innovation, and to the fact that the public sector is losing talent and skills to the private sector due to its poor system of incentives. In this regard, the data analysis further suggests that the incentives go far beyond financial rewards and include creating an enabling and conducive environment for talents to thrive as well as providing learning and development opportunities for employees to learn new things.

Based on the literature review, the concept of organisational incentives cannot be viewed in isolation from public sector organisational performance management and accountability culture discussed in the preceding section above. Similarly, a system of public sector organisational incentives is a cultural issue that could be better explained in terms of different organisational culture types discussed in chapter two of this research report. As indicated in the preceding section on public sector performance management and accountability, the market and adhocracy organisational culture types essentially reflect organisational cultures

found in the private sector while the hierarchy culture typifies a public sector organisational culture.

In the context of digital transformation, the literature seems to suggest a broader view of incentives which speaks more to a conducive and enabling environment rather than just narrow financial rewards. In this regard, Duerr et al. (2018) contends that digital organisations "adopt a failure culture, i.e. allowing [employees] to test risky ideas without being sanctioned, to motivate employees to try out new things and come up with novel solutions" (p.5132). A failure culture allows employees and organisations to learn from mistakes (Duerr et al., 2018) as innovation is critical to organisational success in the 21st century (Shayah & Zehou, 2019). Digital transformation and innovation also require organisational culture that nurtures and promotes teamwork (cooperation and collaboration), experimentation, risk taking and learning from failure in order to succeed (Singh et al., 2017).

Based on the literature review, it appears that a poor system of public sector organisational incentives is a function of an organisational culture, which does not promote an enabling and conducive environment for learning, innovation and performance. Finally, the overall analysis seems to suggest that a rigid, hierarchical, bureaucratic and compliance-based public sector organisational culture is antithetical to incentives required for digital transformation; hence a public sector organisational culture constitutes a barrier to digital transformation. The inverse of this conclusion therefore suggests that an improved system of organisational incentives would constitute an essential element of critical success factors for digital transformation in the public sector

6.2.6. Organisational mindset and attitude

The mindset and attitudes of public sector officials have emerged from the interview data analysis as a major defining feature of a public sector organisational culture, which create a barrier to digital transformation in the public sector. From the data analysis, the public sector comes out as narrow-minded, in-ward focused, rigid, reactive and unable to think outside the box as it enjoys operating in a comfort zone more preoccupied with compliance issues rather than substantive results. The data analysis has further identified public sector mindset and attitudes as a major contributory factor to public sector resistance to 4IR digital technologies.

From the data analysis, these public sector mindset and attitudes and their resistance to 4IR digital technologies manifest themselves in different ways. The first manifestation of these public sector mindset and attitude is that the public sector lacks a deep appreciation of the strategic importance of 4IR digital technologies and regards 4IR digital technologies only as an add-on or a luxury, but not as a core competency or an intervention to improve public sector performance.

The second manifestation of these public sector mindset and attitudes relates to public sector fear and resistance to change which is reflected through the public sector's inability and unwillingness to come out of its comfort zone and embrace 4IR digital technologies to change and modernise how it operates and deliver services. The third manifestation of the prevailing public sector mindset and attitudes is the fear of technology as a threat to job security whereby public sector officials fear that technology will take their jobs and replace them with machines. The empirical data attributes this fear mainly to the lack of awareness and knowledge of 4IR as well as the influence of labour unions in the public sector.

The data analysis has also identified some nuances and intricacies of this public sector resistance to 4IR digital technologies. The first one relates to the current age or generational profile of the public sector employees in which the younger generation appears to be more willing and receptive to 4IR digital technologies than the older generation which seems relatively conservative and resistant or slower to adapt and embrace these digital technologies.

The second area of nuance is that resistance to change does not only come from public sector officials, but also from the public sector system itself due to rigid regulatory framework and procedures in the public sector, which seem to undermine organisational agility of the public sector.

The third area of nuance relates to the fact that, while the Covid-19 pandemic forced the public sector to adopt digital technologies as a matter of necessity, the empirical data seems to suggest a backward trend by the public sector reverting back to the pre-Covid-19 old traditional ways of doing things. Lastly, the data analysis suggests that public sector resistance to 4IR digital technologies is somewhat connected or related to community resistance to these technologies; hence both resistance should be viewed and addressed together.

Similar to the theoretical analysis of public sector organisational performance management and accountability as well as organisational incentives discussed in the preceding sections of this chapter, the concept of organisational mindset and attitude is also a cultural issue which could be better explained in terms of different organisational culture types discussed in chapter two of this research report. As indicated in the preceding sections on public sector organisational performance management and accountability and incentives, the market and adhocracy organisational culture types essentially reflect organisational cultures found in the private sector while the hierarchy culture typifies a public sector organisational culture. The public sector organisational mindset and attitudes

discussed in this analysis seem to accord with the rigid, hierarchical and bureaucratic culture of the public sector.

Organisational culture consists of a set of shared values, norms, attitudes, beliefs, assumptions and code of conduct which guide the relationships and behaviour of members of the organisation (Obiekwe, 2018). It guides organisational behaviour and actions (Odor, 2018) and influences how people think and act in the organisations (Karapancheva, 2020). Organisational culture can also be described as "a dynamic system of shared values, beliefs, philosophies, experiences, habits, expectations, norms and behaviours that give an organization its distinct character" (Priyadharsan and Nithiya, 2020, p.692).

Organisational culture has a bearing on people's behavior and attitude in the organisations and gives them a distinct sense of belonging and organisational identity (Shin & Shin, 2022). In this regard, organisational culture has been singled out as a key factor for technology adoption in organisations (Mohtaramzadeh et al., 2018). Digital transformation has succeeded in organisations which have made quick cultural transformation and transition to adapt to the fourth industrial revolution (Lee, 2020).

In this regard, the literature seems to support the empirical findings. Resistance to change has been identified in the literature as a barrier to digital transformation and this underscores a need for the organisations to create a conducive and enabling culture for digital transformation (Cichosz et al., 2020). Many organisational failures in implementing digital technologies could be attributed to their inability to change their employees' mindset (Pradana et al., 2022). Digitalization requires attitudes that allow organisational adaptation and change as well as openness to new possibilities (Rambabu & Pilli, 2018).

Organisations and their employees should "see digital change not as a threat but as a great opportunity to adapt, learn, relearn, evolve and progress" (Rambabu & Pilli, 2018, p.127). Culture change associated with digital transformation therefore requires both a shift in employees' mindset and continuous organisational innovation (Lee, 2020). Organisations need to change their mindset to be able to leverage different digital technologies to drive digital transformation (Abd-Rabo & Hashaikeh, 2021). In this regard, Gimpel et al. (2018) has identified digital mindset as a critical dimension or aspect of digital transformation.

The overall conclusion to be drawn from the analysis is that the empirical findings seem to accord with the literature that the prevailing mindset and attitudes play a major role in the success or failure of digital transformation within the organisations. Finally, the last conclusion to be drawn from this analysis is that the prevailing public sector mindset and attitudes appear to be an impediment to digital transformation in the public sector.

6.2.7. Organisational skills

The empirical data analysis has identified a shortage of digital skills as a major barrier to digital transformation in the public sector. The empirical data analysis further brought to the fore the fact that, while the public sector has various training programmes, such programmes lack specific focus on digital skills. Furthermore, while the current demands related to the 4IR require a new set of skills, the empirical data suggests that many people in the public sector do not have such skills and that the public sector is not doing enough to equip its employees with such 4IR digital skills

The empirical data attributes this shortage of digital skills in the public sector to a number of factors, which include leadership, age or generational profile of the public sector employees, loss of skills to the private sector, poor public sector

recruitment strategy, lack of resources and the neglect of the IT function. In this regard, the analysis suggests that the leadership lacks the will and determination to nurture talent and promote continuous learning and development of the public sector employees.

Related to the leadership issue is the issue of poor recruitment strategy and practices, which the empirical analysis also identified as a contributory factor to poor personnel appointment in the public sector and as an impediment to the public sector's ability to attract and retain skills. The age profile of the public sector, which, as the empirical data suggests, comprises many older people, also appears to be a barrier to digital transformation due to the inability of the older people to adapt to a 4IR digital era in terms of retraining and reskilling in digital skills. Based on the empirical analysis, the lack of competent and well-capacitated IT teams and the lack of customised digital skills training programmes also seem to create barriers to digital transformation in the public sector.

The literature points to the importance of skills as one of the critical success factors for digital transformation. In this regard, Gimpel et al. (2018) and Ivancic et al. (2019) have identified digital skills as one of the key dimensions or aspects of digital transformation. As part of digital transformation, organisations need to develop competencies and capabilities (Saarikko et al., 2020) to be able to leverage different digital technologies.

With a digital culture being "a system of new knowledge, skills, competencies …." (Khitskov et al., 2017, p.861), organisations are required to develop or acquire a new set of skills and collaboration and networking are critical to the development of digital skills (Rambabu & Pilli, 2018). In this regard, Duerr et al. (2018) contends that digital organisations demonstrate open mindset by developing and acquiring new skills, including digital skills which are important in this digital era. Overall, the empirical and theoretical analysis seems to concur that digital

transformation requires a new set of skills, including digital skills. Based on the analysis, it therefore appears that the lack of skills (including digital skills) is a barrier to digital transformation in the public sector.

6.2.8. Organisational learning and innovation

From the empirical analysis, digital transformation came out as a form of innovation linked to organisational ability to learn, adapt and innovate. According to the empirical analysis, the hierarchical, bureaucratic and rigid public sector environment, coupled with the inability of public sector officials to be open-minded and think outside the box, makes it difficult for the public sector to become a dynamic, learning and innovative organisation able to adapt and embrace 4IR digital technologies. The inability of the public sector to leverage and use massive data at its disposal to improve its operations and service delivery stands out from the empirical data analysis as a classic example of a public sector organisational learning failure. Data forms an important cornerstone of digital transformation (Aslanova & Kulichkina, 2020).

The data analysis suggests that, while the public sector remains conservative and sticks to its old traditional ways of doing things, the private sector appears more open to new ideas and new innovative ways of doing things and improving operational efficiencies through the application of digital technologies. The data analysis further suggests that the private sector's open-mindedness and innovative mindset are a function of organisational survival in the competitive environment compared to the public sector which does not have such competitive pressures as it operates in a non-competitive environment.

Like the theoretical analysis of the concepts of organisational performance management and accountability, organisational incentives and organisational mindset and attitudes discussed in the preceding sections of this chapter, the concept of public sector organisational learning and innovation is also a cultural

issue which could be better explained in terms of different organisational culture types discussed in chapter two of this research report. To reiterate the point, the market culture is competitive and results-oriented (Goncalves et al., 2020) and adhocracy culture is underpinned by creativity, innovation and entrepreneurship (Okatan & Alankus, 2017; Rukh & Qadeer, 2018) as well as experimentation, agility, risk taking and individual initiative (Goncalves et al., 2020). As indicated in the preceding sections of this chapter on public sector organisational performance management and accountability, organisational incentives and organisational mindset and attitudes, the market and adhocracy organisational culture types essentially reflect organisational cultures found in the private sector while the hierarchy culture typifies a public sector organisational culture.

Duerr et al. (2018) contends that digital organisations "adopt a failure culture, i.e. allowing [employees] to test risky ideas without being sanctioned, to motivate employees to try out new things and come up with novel solutions" (p.5132). A failure culture allows employees and organisations to learn from mistakes (Duerr et al., 2018) as innovation is critical to organisational success in the 21st century (Shayah & Zehou, 2019). Innovation constitutes one of the key dimensions of digital transformation (Ivancic et al., 2019)

Organisational agility, innovation, adaptability and modernisation require a transformation of the outdated organisational bureaucratic structures and cultures to enable organisational learning, adjustment and faster adaptation to change (Goncalves et al., 2020). Innovation requires a supportive and enabling organisational culture and the right skills and incentives (Okatan & Alankus, 2017). To be innovative, organisations need to transform or change their culture (Shayah & Zehou, 2019). Digital transformation and innovation require organisational culture that nurtures and promotes teamwork (cooperation and collaboration), experimentation, risk taking and learning from failure in order to succeed (Singh et al., 2017).

However, in contrast to the private sector, the public sector is unable to learn from better models of innovation (Moussa et al., 2018). Conservative solutions and the lack of resources, investment, experimentation and incentive system, as well as resistance to change constitute some of the key barriers to public sector innovation, which also impede public sector efficiency and effectiveness (Moussa et al., 2018). Organisations with a hierarchical culture display a lack of innovation (Liao, 2018) and this organisational culture type could hinder digital transformation and innovation (Muller et al., 2019). In this regard, the inability of the public sector to match business sector innovation (Wimmer et al., 2020) could therefore be attributed to the rigid, hierarchical and bureaucratic attributes associated with a public sector organisational culture.

The overall conclusion to be drawn from the analysis is that, unlike the private sector, it appears that the public sector has not embraced organisational learning and innovation and this could be attributed to the public sector's rigid, hierarchical and bureaucratic environment as well as the mentality, mindset and attitudes of public sector officials, which seem to stifle organisational learning and innovation and impede the public sector's ability to adapt and embrace digital transformation.

6.2.9. Collaboration and partnership

The empirical data analysis has identified the concept of collaboration and partnership as a critical success factor for successful implementation of digital transformation in the public sector. In this regard, the data analysis has identified two dimensions to the concept of collaboration, namely internal collaboration between business units within the public sector organisations and intergovernmental collaboration between the public sector organisations.

The data analysis has further identified strategic partnerships with the private sector organisations and research institutions as a critical mechanism for sharing of 4IR knowledge and skills and to enable the public sector to leverage private sector skills to drive public sector digital transformation. However, the empirical data analysis points to the lack of both internal organisational collaboration and intergovernmental collaboration within the public sector, mainly reflected through fragmentation of public sector planning due to silo-based mentality and mindset as well as in-ward thinking orientation of the public sector officials.

The literature points to a critical role of collaboration and partnerships in driving digital transformation in the organisations. Digital transformation and innovation require organisational culture that nurtures and promotes teamwork (cooperation and collaboration) (Singh et al., 2017). According to Ivancic et al. (2019), the development of ecosystem involving cooperation and partnerships is a key dimension or component of digital transformation.

Digital organisations use cross-functional teams and internal and external collaboration to promote faster organisational innovation, agility and competitiveness (Duerr et al., 2018). Cross-functional teams, which are a common practice in digital organisations, minimise or reduce potential conflicts and confusion between various functions and promote faster innovation while physical and virtual collaboration breaks down boundaries and allows people to easily share knowledge (Duerr et al., 2018).

Collaboration with startup firms is also important to inject entrepreneurial mindset and facilitate knowledge exchange and innovation in the organisations (Duerr et al., 2018).Furthermore, creating shared platforms with partners promotes greater innovation, capabilities and sharing of data while involving and collaborating with customers provides direct feedback loops and facilitates interactions and 'co-creation' of products with customers in the innovation value chain (Duerr et al.,

2018). Collaboration is also critical to the development of digital skills (Rambabu & Pilli, 2018).

Based on the analysis, it appears that the rigid, hierarchical and bureaucratic public sector environment militates against collaborations and partnerships in the public sector. The hierarchical, bureaucratic organisational culture is internally focused (Rukh & Qadeer, 2018) and based on siloed configuration (Bhatti et al., 2020). Departmental and functional silos militate against the institutionalisation of a digital culture within the organisations (Lee, 2020). In conclusion, the analysis seems to suggest that the public sector organisational cultural environment and a silo-based mental orientation of the public sector officials militate against public sector collaborations and partnerships, which, in turn, impede digital transformation in the public sector.

6.2.10.   Digital technology adoption

The empirical data analysis suggests that it is imperative for the public sector to adapt and embrace 4IR digital technologies as a matter of necessity in order to remain relevant in this digital era. In this regard, the empirical data analysis has identified some of the digital technologies currently being used in the public sector including cloud computing for virtual data storage, smart metering technologies for certain municipal services, virtual meeting platforms such as Microsoft Teams and Zoom, automation of some business processes and digitization of certain services such as job application, business licensing, development application, tax e-filling and e-learning services as well as the use of robotic technology in some public hospitals to perform surgeries. The data analysis however seems to suggest that the use of 4IR digital technologies is still in its infancy in the public sector and that the public sector is still lagging behind the private sector in terms of adoption and application of sophisticated digital technologies to operate their business and deliver services.

The data analysis further suggests that there are certain sophisticated digital technologies that could be used in the public sector based on their massive possibilities and opportunities in terms of their various use cases and related benefits to the public sector. Such technologies include artificial intelligence (including machine learning), blockchain technology, internet of things, data analytics, cloud computing, robotics and 3D printing to improve public sector efficiency and effectiveness. Based on the analysis, the examples of the benefits associated with such technologies include better communication between government and the citizens, real-time data and efficient decision making, improved service delivery efficiency, convenience and speed, improved crime prevention, improved public infrastructure delivery, integrated public transport ticketing system and improved housing delivery through the use of 3D printing technology.

Most profoundly, the data analysis further suggests that 4IR digital technologies could also be used to drive the concepts of smart government and smart cities and also as key tools to reduce organisational hierarchies for efficient decision making and to help government respond to sustainability, climate change and disaster management issues with 3D printing technology being just one example of technologies that could deliver faster, cost-effective and environmentally friendly public housing projects.

The literature places the adoption and application of digital technologies at the centre of digital transformation. Sainger (2018) has identified technological adoption as a key organisational dimension of digital transformation. Digital technologies constitute one of the driving forces of digital transformation (Verhoef et al., 2021). Digital technologies bring about a paradigm shift allowing organisations to integrate technology into their core business functions and processes to improve organisational responsiveness and performance to meet their customer needs (McLaughlin, 2017). Digital technologies are also driving the transformation of organisations and challenging traditional business models

(Sánchez, 2017). Digital transformation impacts organisations in terms of "the transformation of the customer experiences, the transformation of business processes, and the change of business models" (Mahraz et al., 2019, p.923). The role of an IT function in the digital organisations has also undergone a fundamental shift from a traditional support function to a new role of a business creator and partner in the innovation and new product development value chain (Duerr et al., 2018).

Beside the private sector organisations, digital transformation is also causing disruption to the public sector organisations (Marks et al., 2020) including changes in citizens' expectations about public services (Mergel et al., 2019). In this 21st century, governments need to leverage technology to modernise operations and improve citizen and stakeholder experiences (Huang & Karduck, 2017). In this regard, a digital organisational culture involves "digital approaches and multichannel capabilities" (Hie, 2019, p.52). The organisations which adapt to rapid changes in digital technologies are better poised to survive and thrive in this complex modern environment (Rowles and Brown, 2017).

For a successful implementation of digital transformation, organisations should promote innovation and experimentation with new technologies and business models to provide customer-centric products and services (Mhlungu et al., 2019). Building a digital organisation requires a holistic perspective and integration of technology across the whole organisation as well as paradigm shift in the role of IT from a business support function to a key driver of organisational performance and competitiveness (McLaughlin, 2017). In this regard, McLaughlin (2017) has identified key technology capabilities required for a success of a digital organisation. These key capabilities include the organisational ability to align technology to business strategy and integrate it into the core business processes of the organisation to build a responsive customer-centric organisation (McLaughlin (2017).

Overall, certain key conclusions could be drawn based on the empirical and theoretical analysis. The first conclusion is that, compared to the private sector, the public sector appears to be in its infancy phase in relation to the adoption and application of digital technologies in its core business functions and processes. The second conclusion is that, while the public sector seems to be using some digital technologies, albeit at a rudimentary level, it appears not to have embraced the fundamental transformation and paradigm shift that come with the adoption and application of digital technologies. In short, it appears that the public sector has not embraced digital transformation.

As a result, it seems that the public sector is missing out on the immense opportunities, benefits and possibilities associated with the application of more sophisticated digital technologies such as artificial intelligence (including machine learning), blockchain technology, internet of things, data analytics, cloud computing, robotics and 3D printing, which could be deployed to improve public sector efficiency and effectiveness as well as citizen and stakeholder experience. These technologies could further be used to drive the concepts of smart government and smart cities as well as reduce organisational hierarchies for efficient decision making and help government respond to sustainability, climate change and disaster management issues.

Lastly, it appears that digital transformation (i.e. adoption, integration and application of digital technologies across core organisational functions and business processes) has become a matter of strategic imperative to both reposition the public sector in this complex 21st century environment and improve public sector efficiency and effectiveness as well as citizen and stakeholder experience.

6.2.11. Technology investment

From the interview data analysis, it appears that digital technologies are costly in terms of both capital and operational costs, including ongoing maintenance costs. In this regard, the data analysis suggests that, in contrast to the private sector, the public sector has not prioritised investment in 4IR research and innovation, digital technology infrastructure and software applications as well as related human capital investment in terms of skills acquisition, development and retention.

The data analysis further suggests that the ineffectiveness of public sector technology agencies and the lack of investment in public sector IT capacity demonstrate poor public sector investment in technological capabilities. Strategic repositioning and repurposing of the public sector IT function from the routine traditional IT activities to focus more on 4IR digital technologies also emerged from the data analysis as a key issue of strategic importance. From the data analysis, it therefore appears that a combination of these technology investment-related issues constitutes a major barrier to digital transformation in the public sector.

The literature points to the importance of investment in technology capabilities to drive digital transformation. For a successful implementation of digital transformation, organisations should promote innovation and experimentation with new technologies and business models to provide customer-centric products and services (Mhlungu et al., 2019). Building a digital organisation requires a holistic perspective and integration of technology across the whole organisation as well as paradigm shift in the role of IT from a business support function to a key driver of organisational performance and competitiveness (McLaughlin, 2017). In this regard, McLaughlin (2017) has identified key technology capabilities required for a success of a digital organisation. These key capabilities include the organisational ability to align technology to business

strategy and integrate it into the core business processes of the organisation to build a responsive customer-centric organisation (McLaughlin (2017).

Overall, the literature seems to support the empirical findings on technology investment and the repositioning and repurposing of organisational IT functions as key success factors for digital transformation. Finally, the key conclusion that could be drawn from the empirical and theoretical analysis is that it appears that the success of digital transformation in the organisations depends on technology investment and the strategic repositioning and repurposing of the organisational IT functions from the routine traditional IT activities to focus on the core business of the organisations. In short, the analysis suggests that technological capabilities play a critical role in driving the success of digital transformation.

6.3. Conclusion

This chapter has provided the analysis and discussion of the research findings (empirical findings) in terms of the literature review and theoretical framework (theoretical analysis) discussed in chapter two of this research report. The chapter discussed the empirical and theoretical analysis in terms of broad thematic areas presented in chapter five of this research report in response to the research questions and the objectives of the study. The broad thematic areas are: organisational strategy and leadership; organisational structure; organisational systems and processes; organisational performance management and accountability; organisational incentives; organisational mindset and attitude; organisational skills; organisational learning and innovation; collaboration and partnership, digital technology adoption; and technology investment.

Based on the empirical and theoretical analysis, a number of key conclusions could be made. Firstly, it appears that the research findings accord with the literature on the critical role of organisational strategy and leadership in ensuring the success of digital transformation in the organisations. It also appears that the nature of strategic leadership required for digital transformation speaks more to

transformational leadership with specific focus or emphasis on business and technology leadership. The analysis also seems to support the overall conclusion drawn from the empirical research findings that a lack of a clear strategy and poor strategic leadership constitute major barriers to digital transformation in the public sector.

The research findings paint a picture of a hierarchical, bureaucratic and rigid public sector organisational configuration while the literature paints a completely different picture of a decentralised, cross-functional and collaborative organisational structure as an ideal or suitable organisational model to facilitate effective digital transformation in the organisations. This analysis therefore appears to support the empirical research findings that the rigid, hierarchical and bureaucratic nature of the public sector organisational configuration impedes the organisational ability of the public sector to adapt and embrace digital transformation.

It also appears that the bureaucratic and outdated nature of the public sector systems and processes underpins or undergirds a hierarchical, bureaucratic and rigid organisational culture of the public sector, which then hampers the public sector's ability to adapt and embrace digital transformation. The literature also seems to suggest a hierarchical organisational culture as a key factor that could explain the empirical research findings on a compliance-based public sector performance and accountability culture, which appears to militate against digital transformation, which, at its core, is about great customer experience and superior organisational performance and results.

Based on the literature review, it further appears that a poor system of public sector organisational incentives is a function of an organisational culture, which does not promote an enabling and conducive environment for learning, innovation and performance. The analysis also seems to suggest that a rigid, hierarchical, bureaucratic and compliance-based public sector organisational culture is antithetical to incentives required for digital transformation; hence a

public sector organisational culture constitutes a barrier to digital transformation. The inverse of this conclusion therefore suggests that an improved system of organisational incentives would constitute an essential element of critical success factors for digital transformation in the public sector. Furthermore, the empirical findings seem to concur with the literature that the prevailing mindset and attitudes play a major role in the success or failure of digital transformation within the organisations. In this regard, the prevailing public sector mindset and attitudes appear to be an impediment to digital transformation in the public sector.

The empirical and theoretical analysis further seems to concur that digital transformation requires a new set of skills, including digital skills. Based on the analysis, it therefore appears that the lack of skills (including digital skills) is a barrier to digital transformation in the public sector. Another key conclusion to be drawn from the analysis is that, unlike the private sector, it appears that the public sector has not embraced organisational learning and innovation and this could be attributed to the public sector's rigid, hierarchical and bureaucratic environment as well as the mentality, mindset and attitudes of public sector officials, which seem to stifle organisational learning and innovation and impede the public sector's ability to adapt and embrace digital transformation. Furthermore, it appears that the public sector organisational cultural environment and a silo-based mental orientation of the public sector officials militate against public sector collaborations and partnerships, which, in turn, impede digital transformation in the public sector.

With regard to digital technology adoption, certain key conclusions could also be drawn based on the empirical and theoretical analysis. The first conclusion is that, compared to the private sector, the public sector appears to be in its infancy phase in relation to the adoption and application of digital technologies in its core business functions and processes. The second conclusion is that, while the public sector seems to be using some digital technologies, albeit at a rudimentary

level, it appears not to have embraced the fundamental transformation and paradigm shift that come with the adoption and application of digital technologies. In short, it appears that the public sector has not embraced digital transformation.

As a result, it seems that the public sector is missing out on the immense opportunities, benefits and possibilities associated with the application of more sophisticated digital technologies such as artificial intelligence (including machine learning), blockchain technology, internet of things, data analytics, cloud computing, robotics and 3D printing, which could be deployed to improve public sector efficiency and effectiveness as well as citizen and stakeholder experience.

At a much broader strategic level, the analysis suggests that these technologies could further be used to drive the concepts of smart government and smart cities as well as reduce organisational hierarchies for efficient decision making and help government respond to sustainability, climate change and disaster management issues. Based on the analysis, it further appears that digital transformation (i.e. adoption, integration and application of digital technologies across core organisational functions and business processes) has become a matter of strategic imperative to both reposition the public sector in this complex 21st century environment and improve public sector efficiency and effectiveness as well as citizen and stakeholder experience.

Finally, the literature seems to support the empirical findings on technology investment and the repositioning and repurposing of organisational IT functions as key success factors for digital transformation. In this regard, the key conclusion that could be drawn from the empirical and theoretical analysis is that it appears that the success of digital transformation in the organisations depends on technology investment and the strategic repositioning and repurposing of the organisational IT functions from the traditional IT activities to focus on the core business of the organisations. In short, the analysis suggests that technological capabilities are critical to the success of digital transformation.

CHAPTER SEVEN: CONCLUSION

7.1. Introduction

This research sought to address certain research question and sub-questions. The main research question was formulated as follows: *how does organisational culture affect digital transformation in the public sector*? This main research question was further amplified through the following two key research sub-questions: a) *what are the key factors that drive organisational culture in the public sector* and b) *how do those factors affect digital transformation in the public sector?*. Based on the above research questions, the main research aims or objectives of the study were articulated as follows: a) to identify key factors that drive organisational culture in the public sector, b) to explore how such factors affect digital transformation in the public sector, and c) to highlight theoretical and practical implications of the study to contribute to knowledge and management practice.

Both the presentation and the discussion of the research findings in chapter five and six of this research report were structured in terms of broad thematic areas that responded to the research questions. For the purpose of completeness, the broad thematic areas are: organisational strategy and leadership; organisational structure; organisational systems and processes; organisational performance management and accountability; organisational incentives; organisational mindset and attitude; organisational skills; organisational learning and innovation; collaboration and partnership, digital technology adoption; and technology investment. This chapter presents overall conclusions from the research, makes specific recommendations, and finally highlights the limitations of this research as well as recommendations for further research.

7.2. Research conclusions

Based on this research, a number of key conclusions could be made. Firstly, it appears that the research findings accord with the literature on the critical role of organisational strategy and leadership in ensuring the success of digital transformation in the organisations. It also appears that the nature of strategic leadership required for digital transformation speaks more to transformational leadership with specific focus or emphasis on business and technology leadership. Organisation-wide perspective and approach to digital transformation requires a strong business and technology leadership (McLaughlin, 2017). The analysis also seems to support the overall conclusion drawn from the empirical research findings that a lack of a clear strategy and poor strategic leadership constitute major barriers to digital transformation in the public sector. The success of digital transformation depends on a clear digital strategy (Schwertner, 2017).

The research findings paint a picture of a hierarchical, bureaucratic and rigid public sector organisational configuration while the literature paints a completely different picture of a decentralised, cross-functional and collaborative organisational structure as an ideal or suitable organisational model to facilitate effective digital transformation in the organisations. This analysis therefore appears to support the empirical research findings that the rigid, hierarchical and bureaucratic nature of the public sector organisational configuration impedes the organisational ability of the public sector to adapt and embrace digital transformation. Digital organisations use cross-functional teams and decentralised responsibilities and decision making models to promote faster organisational innovation, agility and competitiveness (Duerr et al., 2018). A traditional hierarchical organisational culture could hinder digital transformation and innovation (Muller et al., 2019).

It also appears that the bureaucratic and outdated nature of the public sector systems and processes underpins or undergirds a hierarchical, bureaucratic and rigid organisational culture of the public sector, which then hampers the public sector's ability to adapt and embrace digital transformation. The literature also seems to suggest a hierarchical organisational culture as a key factor that could explain the empirical research findings on a compliance-based public sector performance and accountability culture, which appears to militate against digital transformation, which, at its core, is about great customer experience and superior organisational performance and results.

Based on the literature review, it further appears that a poor system of public sector organisational incentives is a function of an organisational culture, which does not promote an enabling and conducive environment for learning, innovation and performance. The public sector faces challenges in creating appropriate incentives and a conducive environment to promote performance (Kalimullah et al., 2017). The analysis also seems to suggest that a rigid, hierarchical, bureaucratic and compliance-based public sector organisational culture is antithetical to incentives required for digital transformation; hence a public sector organisational culture constitutes a barrier to digital transformation. The inverse of this conclusion therefore suggests that an improved system of organisational incentives would constitute an essential element of critical success factors for digital transformation in the public sector.

Furthermore, the empirical findings seem to concur with the literature that the prevailing mindset and attitudes play a major role in the success or failure of digital transformation within the organisations. In this regard, the prevailing public sector mindset and attitudes appear to be an impediment to digital transformation in the public sector. Many organisational failures in implementing digital technologies could also be attributed to their inability to change their employees' mindset (Pradana et al., 2022). Digitalization requires attitudes that allow organisational adaptation and change as well as openness to new possibilities

(Rambabu & Pilli, 2018). Organisations and their employees should "see digital change not as a threat but as a great opportunity to adapt, learn, relearn, evolve and progress" (Rambabu & Pilli, 2018, p.127). Culture change associated with digital transformation requires both a shift in employees' mindset and continuous organisational innovation (Lee, 2020).

The empirical and theoretical analysis further seems to concur that digital transformation requires a new set of skills, including digital skills. A digital culture requires a new set of skills (Rambabu & Pilli, 2018). Based on the analysis, it therefore appears that the lack of skills (including digital skills) is a barrier to digital transformation in the public sector. Another key conclusion to be drawn from the analysis is that, unlike the private sector, it appears that the public sector has not embraced organisational learning and innovation and this could be attributed to the public sector's rigid, hierarchical and bureaucratic environment as well as the mentality, mindset and attitudes of public sector officials, which seem to stifle organisational learning and innovation and impede the public sector's ability to adapt and embrace digital transformation.

The hierarchical organisational culture is associated with incremental change (Goncalves et al., 2020). Organisations with a hierarchical culture display a lack of innovation (Liao, 2018). Public sector organisations lack innovation culture (including digital innovation) due to complex bureaucratic and regulatory environment in which they operate (Opland et al., 2021). Digital transformation and innovation require organisational culture that nurtures and promotes teamwork, experimentation, risk taking and learning from failure in order to succeed (Singh et al., 2017). A failure culture allows employees and organisations to learn from mistakes (Duerr et al., 2018) and learning facilitates adaptation and innovation (Goncalves et al., 2020).

Furthermore, it appears that the public sector organisational cultural environment and a silo-based mental orientation of the public sector officials militate against public sector collaborations and partnerships, which, in turn, impede digital transformation in the public sector. With regard to digital technology adoption, certain key conclusions could also be drawn based on the empirical and theoretical analysis. The first conclusion is that, compared to the private sector, the public sector appears to be in its infancy phase in relation to the adoption and application of digital technologies in its core business functions and processes. The second conclusion is that, while the public sector seems to be using some digital technologies, albeit at a rudimentary level, it appears not to have embraced the fundamental transformation and paradigm shift that come with the adoption and application of digital technologies. In short, it appears that the public sector has not embraced digital transformation.

As a result, it seems that the public sector is missing out on the immense opportunities, benefits and possibilities associated with the application of more sophisticated digital technologies such as artificial intelligence (including machine learning), blockchain technology, internet of things, data analytics, cloud computing, robotics and 3D printing, which could be deployed to improve public sector efficiency and effectiveness as well as citizen and stakeholder experience.

At a much broader strategic level, the analysis suggests that these technologies could further be used to drive the concepts of smart government and smart cities as well as reduce organisational hierarchies for efficient decision making and help government respond to sustainability, climate change and disaster management issues. Based on the analysis, it further appears that digital transformation (i.e. adoption, integration and application of digital technologies across core organisational functions and business processes) has become a matter of strategic imperative to both reposition the public sector in this complex 21st century environment and improve public sector efficiency and effectiveness as well as citizen and stakeholder experience.

Finally, the literature seems to support the empirical findings on technology investment and the repositioning and repurposing of organisational IT functions as key success factors for digital transformation. The role of the IT function in the digital organisations has undergone a fundamental shift from a traditional support function to a new role of a business creator and partner in the innovation and new product development value chain (Duerr et al., 2018). In this digital era, organisations need to "recognise IT as an essential part of digital innovations" (Duerr et al., 2018, p. 5133).

In this regard, the key conclusion that could be drawn from the empirical and theoretical analysis is that it appears that the success of digital transformation in the organisations depends on technology investment and the strategic repositioning and repurposing of the organisational IT functions from the traditional IT activities to focus on the core business of the organisations. In short, the analysis suggests that technological capabilities are critical to the success of digital transformation.

Overall, there appears to be a common thread that runs through all the findings of this research. Based on this research, it appears that the nature and character of the public sector organisational culture is closely intertwined with the nature and character of the public sector organisational strategy and leadership; organisational structure; organisational systems and processes; organisational performance management and accountability; organisational incentives; organisational mindset and attitude; organisational skills; organisational learning and innovation; collaboration and partnership, digital technology adoption; and technology investment in the public sector. It appears from this research that these issues are deeply institutionalised and systemic in nature. In the final analysis, it appears from this research that cultural barriers to digital transformation in the public sector are driven by more complex, multi-faceted and nuanced human, institutional and systemic factors.

7.3.   Research contribution

This research makes both theoretical and practical contribution. In terms of theoretical contribution, the research contributes to the existing body of knowledge in two fundamental respects. Firstly, the research sheds more light on how organisational culture affects digital transformation in the public sector. Secondly, the research exposes key organisational factors, nuances and intricacies at play regarding the nexus between organisational culture and digital transformation in the public sector.

In terms of practical contribution to management practice, the research provides useful insights to managers, especially public sector managers, about key factors related to organisational culture, which affect or create barriers to digital transformation in the public sector. The research further provides a broader perspective to help managers take a holistic multi-faceted view and approach when dealing with issues of organisational culture in the context of digital transformation in the public sector. Overall, the research contributes to a better understanding of how organisational culture (and its underlying factors) affects digital transformation in the public sector.

7.4.   Research recommendations for managers

In thinking about ways or strategies to improve the success of digital transformation in the public sector, it is important that public sector managers consider: 1) developing a clear vision and strategy for digital transformation in the public sector; 2) fostering intergovernmental collaborations and strategic partnerships with the private sector and knowledge institutions (including institutions of higher learning) for technology innovation, knowledge sharing and skills transfer; 3) prioritising public sector strategic investment in relevant digital technologies and related capabilities to modernise public sector systems and improve public sector operational efficiency and effectiveness as well as citizen

and stakeholder experience; 4) repositioning and repurposing the strategic focus of public sector technology agencies and IT functions from the traditional transactional support activities to focus on core business functions; 5) investing in digital skills development and upskilling programmes for public sector officials; 6) designing a scare and critical skills incentive system or scheme to attract and retain digital skills in the public sector; and 7) investing in technology leadership and change management programmes to empower leaders and managers in the public sector.

7.5. Research limitations

This study has three main limitations. The first main limitation is that the research findings and conclusions of this study relate and apply to the public sector context and therefore have limited value in the non-public sector contexts. The second main limitation of the study relates to the fact that the study was pitched at a broader public sector level and therefore does not provide an in-depth analysis of specific public sector organisation(s). The third limitation pertains to the fact that the qualitative nature of the study means that its findings and conclusions are based on the qualitative research philosophy or paradigm and methodology.

7.6. Recommendations for further research

Based on this study, there are three key areas worth considering for further research. The first one relates to a quantitative research with a larger sample to test the relationship between organisational culture and digital transformation in the public sector. The second key area of further research pertains to a need for a comparative case study of public and private sector organisations to understand how competitive and non-competitive factors influence digital transformation in these sectors. The third area of further research relates to a need for in-depth studies to understand how each of the specific thematic areas

or concepts identified and discussed in this study (e.g. organizational strategy and leadership) affects digital transformation in the public sector.

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Appendix 1: Research interview guide

1) Tell me about your work and experience in the public sector.

2) Share with me your own understanding of the Fourth Industrial Revolution (4IR) and its associated technologies and their relevance to the public sector.

3) How would you describe or characterise the public sector's response or attitude to the 4IR and its technologies?

4) Tell me about any 4IR digital technologies you are aware of which are currently being used / implemented in the public sector or any plans / initiatives / strategies by the public sector to leverage 4IR digital technologies to improve public services and communication with the citizens and stakeholders.

5) Based on your own experience, to what extent and how do you think the public sector is using data in its business operations and public service delivery?

6) As far as you know, what is the public sector doing to equip its employees with the necessary skills to apply 4IR digital technologies in their work?

7) Based on your own experience, what would you describe as key factors / drivers of organisational culture in the public sector?

8) In your opinion, how do these key factors / drivers of public sector organisational culture affect the ability of the public sector to embrace and implement 4IR digital technologies?

9) In your view, what are the key 4IR digital technologies that you think could improve public service delivery and/or public sector operations and explain how?

10) In your opinion, what are the key internal organisational factors / challenges / barriers that hamper the ability of the public sector organisations to embrace and implement 4IR digital technologies in their business operations and service delivery?

11) Finally, what do you think the public sector organisations need to change or do to address the current challenges / barriers in order to maximise the opportunities presented by 4IR digital technologies?

Appendix 2: Informed consent form

I am conducting research on a topic *'exploring organisational culture and digital transformation in the public sector'.* Our interview is expected to last for an hour and will help us understand how organisational culture affects digital transformation in the public sector. Your participation is voluntary and you can withdraw at any time without penalty. By signing this letter, you are indicating that you have given permission for:

- The interview to be recorded
- The recording to be transcribed by a third-party transcriber, who will be subject to a standard non-disclosure agreement
- Verbatim quotations from the interview may be used in the report, provided they are not identified with your name or that of your organisation
- The data to be used as part of a report that will be publicly available once the examination process has been completed, and
- All data to be reported and stored without identifiers

If you have any concerns, please contact my supervisor or me. Our details are provided below:

Researcher's name: Supervisor's name:
Email: Email:
Phone: Phone:

Signature of the participant: _____
Date: _____

Signature of the researcher: _____
Date: _____