A Digital Strategic Alignment Model for Enhancing Sustainable Performance in Saudi Water Companies

Thesis submitted in fulfilment of the requirements for the degree of

Doctor of Philosophy

Khalid Nasser Dehaish

Victoria University, Melbourne
College of Business
Field of research: 3507 – Strategy, Management and Organisational Behaviour

May 2022

Abstract

The view on business strategy has changed significantly over time. In the past, a functional-level strategy prevailed in which IT strategy was subordinate to, and needed to align with a deliberate business strategy. Recently, the rapid development in digital technologies has left no industry untouched, and digital transformation has become an enabler and differentiator for businesses. Therefore, IT strategy transcends the view of alignment and moves towards a fusion of business and IT strategies, which is coined as digital business strategy. But its alignment with organisational design is yet to be realised to achieve sustainable business performance, particularly in the Saudi water industry.

In Saudi Arabia, the water industry is undergoing a program of privatisation, large-scale restructuring and tremendous digital transformations to meet the needs of stakeholders (i.e. the government, shareholders, employees, partners, customers and society). This industry is fragmented within the public and private sectors wherein Saudi water companies are responsible for the supply of potable water, collection and treatment of wastewater and have government mandate to reorganise using new digital technologies, which would benefit the industry and be financially, socially and environmentally feasible for all. However, the water industry has had little research in the use of digital business strategy and its alignment process with organisational design that will lead to sustainable business performance. Therefore, the question is what extent the digital strategic alignment between digital business strategy and organisational design factors enhances sustainable business performance?

Drawing on information processing view and knowledge-based view, this research aims to explore the impact of digital business strategy on organisational design factors, namely, structure, processes, people and rewards, to identify the success factors needed for digital strategic alignment that improves sustainable business performance in water companies. The research adopted the Star model of organisational design (Kates & Galbraith 2007) that includes these factors and used a qualitative approach with two case studies (Saudi public and private water companies). Qualitative data were collected using interviews, focus groups and document analysis, in addition to reviewing the existing literature. The data were analysed using a content analysis approach with a computer-aided open-access tool (QCAmap) developed by Mayring (2014).

Through this study, 24 propositions were developed, 18 critical success factors (CSFs) were explored, and six criteria and nine metrics for sustainable business performance were identified. The 18 CSFs were divided into three groups—strategic, organisational and digital factors. Strategic factors include a shared digital strategic vision, shared digital strategic objectives, top management support, knowledge integration, simultaneous incremental–comprehensive development, digital partnerships management, quality management with key performance indicators (KPI), and change management. Organisational factors include agile structures, shared digital units, task redetermination, unified digital processes, unified digital flows of information, renewed digital skills and knowledge and digital governance in addition to the existing organisational design factors (i.e., people and rewards). Digital factors include integrated digital solutions, digital centralisation, and interoperability and compatibility. Together all help shape the novel digital organisational design to achieve digital strategic alignment. Thus, this study developed a Digital Strategic Alignment Model (DSAM), which includes all CSFs for the digital strategic alignment process that ensures sustainable business performance.

Three factors, namely, renewed digital skills and knowledge, change management, and quality management with KPIs, support people and rewards in the existing organisational design literature as they influence organisational design factors to improve performance. The other (additional) 15 CSFs can be considered as novel knowledge contributions to elaborate the organisational design theory in the context of digital business strategy and sustainable business performance. However, there remain other factors to consider. Therefore, this study emphasises on future research in that these CSFs need quantitative investigation using survey to test how these CSFs affect the triple bottom line of sustainability. Practically, it informs managers that achieving digital strategic alignment is key to process improvement that benefits organisations, employees and users.

Keywords: Digital Business Strategy; Digital Organisational Design; Digital Strategic Alignment Model; Sustainable Business Performance.

Declaration

I, Khalid Nasser Dehaish, declare that the PhD thesis entitled ‘A Digital Strategic Alignment Model for Enhancing Sustainable Performance in Saudi Water Companies’ is no more than 80,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.

I have conducted my research in alignment with the Australian Code for the Responsible Conduct of Research and Victoria University’s Higher Degree by Research Policy and Procedures.

All research procedures reported in the thesis were approved by the [Victoria University Human Research Ethics Committee—HRE20-126).

Signature ……………………………………….. Date …………………………………

Dedication

To my mother who supported and mentored me a lot ….

To my father, my sisters & brothers, for their endless love & support …

To my colleagues for their help & encouragement, with deepest appreciations…

Publications

A journal article in preparation

Dehaish, K., Shee, H., & de Vass, T., a digital strategic alignment model for enhancing sustainable performance in Saudi water companies. To be submitted to a higher ranking journal in the field of strategy and organisational behaviour.

Acknowledgements

Firstly, I would be thankful to Allah, who helps me to complete this PhD thesis.

I would also like to express my appreciations to some people for assisting me during my doctoral study in Australia. First, I would thank my principal supervisor, Associate Professor Dr. Himanshu Shee, for his outstanding supervision, insightful suggestions, and on-going support throughout this journey. I would thank my associate supervisor Dr. Tharaka de Vass for his motivation, cooperation, and constructive comments. I also would like to thank my friends at Victoria University for their friendship and support.

Finally, I would like to acknowledge the support of the Victoria University, in the form of guidance, advice, and academic assistance.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

AI	artificial intelligence
CDO	chief digital officer
CEO	chief executive officer
CRM	customer relationship management
CSF	critical success factor
DMZ	district metering zone
DSAM	Digital Strategic Alignment Model
FDI	foreign direct investment
GIS	geographic information system
HR	human resources
IoT	Internet of Things
IPC	information processing capabilities
IPR	information processing requirements
IPV	information processing view
IT	Information technology
ITU	International Telecommunication Union
IWPP	independent water and power plant
KBV	knowledge-based view
KPIs	key performance indicators
MBV	market-based view
MDM	Metering data management
MEWA	Ministry of Environment, Water and Agriculture
ML	machine learning
NTP	National Transformation Program
NWC	National Water Company
NWS	National Water Strategy
OMS	open metering system
OPEX	operating expense
OT	operation technology
RBV	resource-based view
ROI	return on investment
RPA	robotic process automation

SAM	Strategic Alignment Model
SAMM	Strategic Alignment Maturity Model
SCADA	supervisory control and data acquisition
SDGs	Sustainable Development Goals
SRM	Supplier relationship management
TBL	triple bottom line
UN	United Nations
VUHREC	Victoria University Human Research Ethics Committee

Chapter 1: Introduction

1.1 Research Background and Motivation

During the 1990s, the rapid development of information technology (IT) and continuous improvements in the cost and performance ratios of technologies encouraged firms to employ IT strategy to support their business strategy, but the two strategies needed to align. This view led to the emergence of the concept of IT strategic alignment (Henderson & Venkatraman 1993; Luftman 2000), which continues to be an important topic in both strategy and IT literature because it has been shown to positively influence performance (Gerow et al. 2014).

However, digital devices and applications have become an integral part of our everyday life (Teubner & Stockhinger 2020), highlighting a phenomenon known as digitalisation, the impact of which has transformed industries and society at large (Yoo 2010). Digital technologies are defined as the integration of information, computing, communication and connectivity, for example, smart mobile devices, social media, cloud computing, big data and the Internet of Things (IoT) (Bharadwaj et al. 2013). Thus, being able to take full advantage of such digital technologies and transform to digital business this can help achieve a competitive advantage (Bharadwaj et al. 2013; Gong & Ribiere 2021; Kretschmer & Khashabi 2020).

The digital transformation in today's work settings has significant implications for alignment (Coltman et al. 2015). Incumbent organisations, benefiting from integrated digital technologies, undergo tremendous digital transitions in their organisational processes (Balakrishnan & Das 2020; Cui & Pan 2015), resources and services (Cha, Hwang & Gregor 2015; Sklyar et al. 2019), and their integration into their business strategy (Ukko et al. 2019). This creates a turbulent environment in these organisations. Therefore, Bharadwaj et al. (2013, p. 472) indicate that the role of the IT strategy, which is treated as a functional-level strategy—aligned and subordinated to a deliberate business strategy—should be changed to one that reflects a fusion between the two strategies. They call it the digital business strategy, defined as an 'organisational strategy formulated and executed by leveraging digital resources to create differential value'.

With digital business strategy being focused on improving business processes and organisational activities across organisational boundaries (Matt, Hess & Benlian 2015), all the functional areas and processes are housed under the umbrella of digital business strategy with deployment of digital resources (Bharadwaj et al. 2013). Rai et al. (2012) posit that digital business strategy relies on timely information exchange through digital platforms across organisations. Thus, the digitally equipped organisations will have the potential to connect and exchange services with customers and partners in real time.

In this respect, alignment between business and IT strategies no longer exists as the two strategies are now fused into one digital business strategy (Bharadwaj et al. 2013; Chi et al. 2018; Sutherland 2020). However, alignment is not only related to these two strategies, but also involves the alignment between other factors of organisational design, such as people, processes, structures and rewards (Kates & Galbraith 2007). For example, the Strategic Alignment Model (SAM) by Henderson and Venkatraman (1999) and the Strategic Alignment Maturity Model (SAMM) by Luftman (2000) involve such factors. Therefore, this study argues that the digital business strategy and organisational design factors still need to be aligned. However, there is a scarcity of knowledge on how the digital business strategy is formulated and implemented, and also aligned with organisational design factors (Kahre, Hoffmann & Ahlemann 2017; Kretschmer & Khashabi 2020; Llamzon, Tan & Carter 2022), referred to in this thesis as digital strategic alignment.

While prior studies have treated strategic alignment as an end-state or process approach (Benbya & McKelvey 2006), recent studies focus on the process approach in the highly dynamic context of digital business strategy. For example, Yeow, Soh and Hansen (2018) built on the digital business strategy view by suggesting an alignment process model as an iterative and continual process of simultaneously developing and reconfiguring organisational and IT resources. Although the model stresses the response to environmental changes in the strategy formulation process using the dynamic capabilities approach, it does not explicitly inset and explain the formulation process in the empirical analysis; thus, its support is fundamentally derived from theoretical discussion (Walraven et al. 2018). In addition, it does not highlight the factors required in the alignment model. The current study aims to explore the impact of the digital business strategy on organisational design factors to identify the factors needed for the digital strategic alignment process that ensures sustainable business performance. The study claims that these factors could potentially extend the applicability of the organisational design model proposed by Kates and Galbraith (2007)—in the context of digital business strategy—and benefit organisations, employees and users, especially in the water industry. The focus on this industry is because of the following reasons.

While almost all industries have begun to explore digital technologies, it remains a fundamental challenge for many incumbent water companies to formulate and implement a corresponding digital business strategy and transform their existing businesses for the digital age. For example, Matt, Hess and Benlian (2015, p. 340) note that 'digital business strategy often describes desired future business opportunities for companies that are partly or fully based on digital technologies, they do typically not include (organisational) transformational insights on how to reach these future states'. Thus, the transformative impact of digitalisation particularly affects processes that require little physical interaction and products and services that are typically based on information.

This is particularly true for many incumbent companies within the water industry (Mounce 2020; Stoffels & Ziemer 2017). Many of the world's leading water companies have been around for decades. They enjoy high prestige, low staff turnover and healthy margins. As natural monopolies in the water industry, in which high costs for infrastructure, production and distribution, the water companies generally feel safe and insulated from competition (Mounce 2020). However, innovators are disrupting the old business models, and there is little room for complacency with threats such as decentralised and distributed digital technology arising. Thus, there is no reason why water companies cannot learn from innovators, engage with new digital thinking, and embrace innovation to develop their processes, structures, people and rewards in order to deliver new digital solutions that benefit all.

A further issue is that the water industry is not generally perceived as a 'cool' industry, partly due to it is not being at the forefront of the digital technology adoption curve (Mounce 2020). In contrast, new digital technologies are a hot topic, particularly as cloud computing, IoT, big data, machine learning (ML) and artificial intelligence (AI) begin to proliferate into industrial application. This means that a career in the water industry generally is not a top priority for digital professionals, and it is difficult to attract them (Mounce 2020). In addition, many start-ups in the water industry have emerged, capturing market share with innovative digital business models, although start-ups can rarely compete financially, with, for example, Google, for hiring coders, developers, graphic designers and tech engineers. Nor can potential return on investment compete. Finally, the digital technology-induced change in customer behaviour challenges traditional water services, for example, the physical branches of a water company. Thus, many utilities are transforming their activities and processes to create value through digitalisation.

In sum, the use of digital technology is imperative to address many of these developments. Water utilities need to formulate and implement a corresponding digital business strategy that aligns with organisational design factors. However, there remains a lack of knowledge on how to align digital business strategy with organisational design that will lead to sustainable business performance, particularly in the water industry. This study, therefore, positions itself at the intersection of the organisational design factors, including recent developments and characteristics of the Saudi water industry, and digital business strategy. The next section highlights the current developments in the Saudi water industry.

1.2 The Saudi Arabia’s Water Industry

The water industry engages in water engineering, water treatment, water and wastewater plant construction, equipment supply and specialist water treatment, water efficiency improvement, and water supply and monitoring. The Saudi’s water industry not only provides potable water and wastewater services to the community but also supplies water to agricultural and industrial sectors. These services are typically operated by public and private water companies. Hence, stakeholders’ pressure on these companies is expected to increase in the next few years as climate change shrinks the availability of water globally and populations continue to grow (Tiseo 2022).

As mentioned early, the transformative impact of digitalisation particularly affects the water industry because many services are based on information. Today, most processes require little physical interaction and can be fully digitised. For example, digital meter reading, billing and payment processes no longer require human intervention. The emergence of such digital processes provides a strong indication that this industry has already started to undergo a digital transformation, which has given rise to digital strategies. Having been introduced approximately within the last decade and driven by digital strategies and innovation, digital water services has been portrayed as a growing variety of water services, particularly by leveraging digital systems for the purpose of offering improved experience to customers at a lower cost. Therefore, a comprehensive digital shift in water industry systems is required by considering these services holistically across all organisational components to meet rapidly changing global challenges and minimising the impact on the environment, public health and the quality of life (Mounce 2020). The importance of such a transition to the water industry is becoming increasingly apparent (Caffoor 2010), especially in driest countries such as Saudi Arabia.

As Saudi water organisations are responsible towards the society and the environment, the government puts pressure on these organisations to measure sustainability. Dyllick and Hockerts (2002, p. 131) define sustainability as 'meeting the needs of a firm's direct and indirect stakeholders … without compromising its ability to meet the needs of the future stakeholders as well'. The country is also facing serious challenges due to unsustainable use of water resources. Urban water and sanitation services incur a high cost to the government, yet the service levels are sub-optimal. In 2020, the water coverage in Saudi cities was 82%, and the wastewater coverage was 65% (U.S.-Saudi Business Council 2021). In addition, the Saudi's water industry is further impeded by inadequate institutional setting and governance mechanisms. Saudi Arabia has limited reserves of exploitable non-renewable groundwater and low recharge rates due to arid conditions (2.8 billion cubic metres [bcm] in the Arabian Shield). The water requirement in Saudi Arabia was 24.8 bcm in 2015, which has been steadily growing annually at 7% (MEWA 2020).

Urban water consumption per capita also presents opportunities for improvement, which can be driven mainly by reduction in losses in the water networks (est. by more than 25% in different regions) and by instituting price signalling and incentives to conserve water (MEWA 2020). Given the heavy reliance on desalination (60% of total urban water supplied) and current subsidies, this sector is imposing a heavy burden on the Saudi economy. Relatively high production unit cost is further exacerbated by significantly high transmission costs of pumping water from the coasts inland. The sector is highly depended on fuel, and desalination also has a large environmental footprint. Therefore, the government, through the National Water Strategy 2030 (NWS), is undergoing a program of privatisation, large-scale restructuring and tremendous digital transformations in the industry in order to address these challenges and meet the needs of stakeholders (shareholders, employees, partners, customers and society) (MEWA 2020).

NWS is handled by a number of governmental institutions and public and private water companies engaged in the field of water production, transmission, and distribution. Since 1972, the Saline Water Conversion Corporation (SWCC) has been responsible for producing and supplying desalinated sea water in Saudi Arabia. SWCC supplies water to the Ministry of Water and Electricity and later to the National Water Company (NWC) for distribution. The Water and Electricity Company (WEC) was founded in 2003 and changed its name to the Saudi Water Partnership Company (SWPC) in 2019, to purchase water from private companies and to sell the purchased water to SWCC. These projects are operated under Independent Water and Power Projects (IWPP), in which the private company only owns a percentage of the project, while the rest is owned by SWPC. Marafiq Company is the utility for the Royal Commission for Jubail and Yanbu cities. It provides integrated power and desalinated water supply to four industrial cities, acting as off-taker for IWPPs and distributing water and power to its largely industrial customer base. There are also a number of private water providers with significant facilities serving commercial and residential customers. Thus, the government relies largely on the public and private water companies to produce, transmit and distribute water (MEWA 2020). The next section presents the research questions, aim and objectives to address the knowledge gap in the literature.

1.3 Research Questions, Aims and Objectives

The thesis aims to address the following overarching question:

How does digital strategic alignment between digital business strategy and organisational design factors enhance sustainable business performance?

This was broken down into the sub-questions:

> RQ1: How does digital business strategy affect the factors of organisational design, namely, structure, processes, people and rewards?
>
> RQ2: What are the CSFs that help align a digital business strategy with organisational design in water organisations?
>
> RQ3: How do the CSFs of digital strategic alignment enhance sustainable business performance?

The research aim is to explore the impact of digital business strategy on organisational design factors (structure, processes, people and rewards) to identify the CSFs needed for digital strategic alignment that ensures sustainable business performance.

This was broken down into the following sub-objectives:

1. To explore the impact of digital business strategy on organisational design factors.
2. To identify the CSFs of digital strategic alignment (new digital organisational design factors) that support sustainable business performance.
3. To develop a digital strategic alignment model (based on a novel digital organisational design) to help improve sustainable business performance.

1.4 Contribution to Knowledge and Statement of Significance

1.4.1 Contribution to Knowledge (Academic Contribution)

Digital business strategy comes as an alternative to traditional business strategy (Bharadwaj et al. 2013). However, digital business strategy still requires alignment with organisational design factors in order to obtain the full potential of digital resources and improve business performance (Sia, Soh & Weill 2016). Coltman et al. (2015) stated that the emergence of digital business strategy has created a need to improve our understanding of alignment. Li et al. (2016) also noted that effective digital alignment between business, infrastructure and digital strategies requires e-leadership capabilities. Furthermore, Karlsson and Wåhlin (2017) believe that earlier research has focused on the alignment between business strategy and IT strategy, and there are limited studies so far that have addressed alignment in the context of digital business strategies.

Likewise, Kahre, Hoffmann and Ahlemann (2017) recommend that future researchers use existing strategic alignment models to explore the factors of organisational design appropriate to achieving 'digital alignment'. Rahrovani (2020) demonstrated that the organisation's intended strategy differs from the realised strategy, which can affect digital alignment; this supports the notion that 'alignment is a moving target' (Coltman et al. 2015, p. 340). Kretschmer and Khashabi (2020) conclude that digital strategy has effects on organisational design that should be explored and considered. More recently, Llamzon, Tan and Carter (2022) suggest the need to increase focus on structural alignment, highlighting how digital business strategy is implemented in practice. Earlier, Haußmann et al. (2012) state that the context of digitalisation changes the information processing capabilities and requirements in an organisation design, and therefore, the information processing view (IPV) theory proposed by Galbraith (1974) can underpin the context to address the gap.

Accordingly, this study contributes to the knowledge by bridging the gap in the literature and providing empirical support for elaborating the organisational design theory in the context of digital business strategy. The contributions of this research are summarised as follows:

- The study uses the IPV theory to explore the impact of digital business strategy on organisational design factors, highlighting the key role of information flow. It suggests either to reduce the need for information processing, or to increase the capability for information processing by leveraging digital resources.
- To our knowledge, it is the first study to investigate the factors or conditions needed for digital strategic alignment in organisations using the organisational design model proposed by Kates and Galbraith (2007), which could potentially extend the applicability of the model—in the context of digital business strategy.
- This research extends the existing literature on digital business strategy and organisational design theory with empirical findings and justifications for the effect of the CSFs of digital strategic alignment on sustainable business performance, which is defined as viable sustainability practices measured by economic, social and environmental criteria. The research findings bridge a significant gap in the literature because previous studies have paid less attention to digital strategic alignment that supports sustainable business performance, and this serves as a useful reference in the literature.
- This study also draws upon the knowledge-based view (KBV) as a supportive theory to theoretically and empirically link knowledge considerations with digital strategic alignment. Developing a digital business strategy entails constant knowledge sharing within organisations, and externally with digital partners (Herden 2020; Holgeid et al. 2019). Thus, the KBV that involves knowledge integration in the phases of strategy formulation and implementation (Grant

1996a, 1996b, 2018) is appropriate for exploring the CSFs of digital strategic alignment. Hence, future research would benefit from distinguishing between these relationships and opening new research opportunities.

- Using the two complementary theories of the IPV and the KBV, the research framework has been developed to create a better understanding of how digital business strategy changes organisational design in water organisations. The two theories are used in this study not only to complement each other in regard to information flow and knowledge considerations for digital alignment, but also to enable organisations to sustain their business performance. Both the IPV and the KBV are used to enhance the strategic alignment literature by identification of CSFs of digital strategic alignment in water utilities. Digital strategic alignment is needed to explain complex business practices (e.g. internal and external digital integration) in water utilities that are currently transforming themselves into digital service providers. This means that knowledge integration and information flow through organisational design serve as a cornerstone upon which to develop digital strategic alignment that ensure sustainable business performance. Thus, future studies would benefit from demonstrating the complementary relationship of the IPV and KBV approaches to digital business strategy and organisational design factors in this study.

1.4.2 Practical Contribution

Practically, the research provides insights for managers about the significant benefits arising from digital strategic alignment. Managers need to understand that possession of digital resources (e.g. IT hardware and software), unless deployed and aligned with functional areas, may not achieve their strategic objectives. A faulty or malfunctioning process will deliver wrong results, and stakeholders will experience extreme dissatisfaction. This will affect the financial performance negatively. Thus, any organisation may have financial power to acquire digital resources, but managers need to ensure that these resources are aligned with proper organisational practices. All the stakeholders must also realise that the organisational design should be revamped if the need arises. They need to coordinate between processes, people, structures and rewards within an organisation to obtain a unified output through integration of digital solutions and their digital strategy. Therefore, this study argues that sustainable business performance can be achieved only when organisations ensure an effective digital business strategy aligned with a dynamic digital organisational design. Those who cannot manage to assimilate the digital business strategy with organisational design will lag behind in the competition and, more importantly, will lose customers.

Accordingly, this study provides a comprehensive investigation of the CSFs for digital strategic alignment between digital business strategy and organisational design, which will be helpful for organisations that typically lack knowledge of how to scope and implement their digital strategies in today's dynamic environment (Gimpel et al. 2018). Thus, managers can use the results of the study to develop more comprehensive action plans for achieving digital strategic alignment and translating this alignment into sustainable business performance.

1.5 Research Methodology: An Outline

This research adopts a constructivist–interpretative paradigm with a qualitative approach by using interviews with managers, focus groups and documents, in addition to reviewing the existing literature, followed by in-depth analysis through content analysis. The empirical data collection phase consists of a two-stage process. The first stage is an initial exploratory study of the literature to gain initial understanding of best practices in the process of aligning the formulation and implementation of digital business strategy with organisational design. The second stage is a case studies approach that entails an exploration of two water companies (i.e. National Water Company and Marafiq Company) in the Saudi water sector, focusing specifically on collecting qualitative data on its processes for formulating and implementing a digital business strategy and its alignment process with organisational design. This research adopts a content analysis approach to analyse data by using the abductive approach, which is a mixture of inductive and deductive approaches, allowing a continuous interplay between theory and empirical data interpretation (Dubois & Gadde 2002, 2017). Especially, the research seeks to explore new factors required for digital strategic alignment that ensures sustainable business performance in water organisations. The research methodology adopted in this research is illustrated in Chapter 3.

1.6 Ethical Considerations

As this study involves online interviews with 31 managers of two organisations (with participation on a voluntary basis), in addition to online focus groups, Ethics Committee approval was obtained (Appendix A: Ethics Approval—HRE20-126). The companies were given an information sheet for the research study (see Appendix B) and proper authorisation was obtained from them before conducting online interviews, online focus groups and collecting documents.

1.7 Dissertation Outline

The thesis is organised and divided into six chapters as follows:

Chapter One (Introduction). This chapter introduces the research background and motivation. It also highlights the current developments in the Saudi Arabia's water industry and provides the research questions, aim, objectives and contributions, as well as the dissertation outlines.

Chapter Two (Literature Review). This chapter provide a detailed review of the literature on the conceptions and taxonomies of strategy. It also presents the relationship between IT strategy and business strategy and the strategic alignment between them, as well as the transition from traditional business strategy to digital business strategy. It highlights the well-known models of strategic alignment in the literature and discusses the related work in the field of strategic alignment between organisational design and digital business strategy to provide a comprehensive view of how to achieve digital strategic alignment in water organisations and improve sustainable business performance. Furthermore, it discusses the theoretical foundations for the research (IPV and KBV) and presents the proposed theoretical framework of this research by explaining the nature and direction of the suggested relationships.

Chapter Three (Research Design and Methodology). This chapter describes and justifies the applied methodology. The data collection and validation strategy in naturalistic settings is outlined, and the analysis strategy of the empirical data to support both the digital strategic alignment process and the elaboration of the organisational design theory is presented.

Chapter Four (Data Analysis and Results). This chapter first presents the findings of the exploratory study (within-case data and cross-case analysis), which include the themes that support the existing organisational design factors, and additional themes that elaborate the organisational design theory. Then, it presents the comparative (quantitative) analysis of the identified CSFs for digital strategic alignment in the two Saudi water companies. Following that, it identifies the criteria used for selecting CSFs of digital strategic alignment and supporting literature. Next, it presents the selected CSFs and the revised theoretical framework. This is followed by summarising the key findings of the exploratory studies and the elaboration of the organisational design theory.

Chapter Five (Discussion). This chapter presents an overview of the selected companies, and challenges and strategic drivers for achieving digital strategic alignment in water companies. It also discusses the key findings of the cross-case analysis (gap analysis). The implications of the key findings to the organisational design theory and the existing theories (IPV and KBV) are discussed under four issues. These include the planned and emergent nature of digital business strategy in water contexts, misalignment between existing organisational design factors and realities of digital business strategy development, divergent perspectives between digital business strategy and the idiosyncrasies of the water companies' practices (public and private), and external influences and the digital strategic alignment process. Consideration is also given to the research evaluation and validation, and the analytical generalisability of these findings to other water companies, in addition to recommendations to achieve the process of digital strategic alignment in water companies.

Chapter Six (Conclusions, Contributions and Limitations). This chapter presents the conclusions of the research, and the achievement of the research aim and objectives. The theoretical and practical contributions, limitations and suggestions for future directions are also discussed.

1.8 Conclusion

This chapter aims to provide a clear introduction to the importance of the research study—digital strategic alignment in the context of digital business strategy. It discusses the importance of digitalisation in the context of the water industry. The chapter also presents the research motivation and how it has inspired the research study. Next, the researcher clearly addresses the research aim and outlines the objectives necessary for achieving the aim, as well as the research questions. After that, the thesis layout has been provided to aid systematic construction and presentation of the research thesis.

Chapter 2: Literature Review

2.1 Introduction

Literature reviews aim to manage the progress of prior studies of a given research stream. By aggregating and analysing existing studies, they can provide an orientation of knowledge and help to uncover what is known and what is not known. Consequently, an identification of research gaps is possible, and future research directions can be highlighted. Thus, this chapter presents a review of existing literature, which underpins the first research objective—to explore the impact of digital business strategy on organisational design.

This chapter consists of 14 sections. The literature review methodology is presented in Section 2.2. The definition of strategy and strategy taxonomies are discussed in Section 2.3 and Section 2.4 respectively. The transition from traditional business strategy to digital business strategy is presented in Section 2.5. Following that, Section 2.6 presents a critical review of existing strategic alignment models for digital business strategy. Section 2.7 presents fundamentals of organisational design and change. Digital business strategy in incumbent water organisations is discussed in Section 2.8. CSFs for digital strategic alignment are presented in Section 2.9. The sustainable business performance framework used in this research is presented in Section 2.10. Then, strategic analysis frameworks, including the KBV and IPV are discussed in Section 2.11. In Section 2.12, distinguish is made between conventional strategic alignment and digital strategic alignment. Section 2.13 presents an initial theoretical framework for this research based on the literature findings. The chapter conclusion is presented in Section 2.14.

2.2 Literature Review Methodology

A literature review is a useful and meaningful tool at the beginning of any research (Paré et al. 2015; Webster & Watson 2002). However, many recommendations have emerged over time on how to conduct a literature review (Webster & Watson 2002) along with methodological differences (Wolfswinkel, Furtmueller & Wilderom 2013). Paré et al. (2015) identify nine types of literature reviews: narrative, scoping/ mapping, meta-analyses, qualitative systematic reviews, umbrella/overview, theoretical, realist/meta-narrative, descriptive and critical. While the descriptive type is a structured approach to identify existing knowledge on a certain topic, the critical type is to analyse existing knowledge and reveal inconsistencies, contradictions, controversies and weaknesses.

In this study, the literature review adopts the descriptive type, and also critically discusses the extant literature on strategic alignment (as a broad topic) to provide a comprehensive view of digital strategic alignment that enhances sustainable business performance. Thus, it uses the aspects of the descriptive type: (1) a summary of prior knowledge is provided, (2) the research question is relatively broad, (3) the search process is comprehensive, (4) the identified literature is representative (via pre-set selection criteria), and derived from conceptual and empirical nature, and (5) synthesis and analysis of the literature are thematically centred around a given theoretical framework (Paré et al. 2015).

According to Boell and Cecez-Kecmanovic (2015) a systematic search process is important to provide a rigorous, comprehensive, unbiased, objective, transparent, reliable and replicable review. Accordingly, a researcher should provide clear information on how the literature are selected, assessed and presented. This also requires outlining the research questions, search sources, search terms, search approach and inclusion/exclusion criteria. Then, the researcher can perform the actual search. In this research, the main research question is 'how does digital strategic alignment between digital business strategy and organisational design factors enhance sustainable business performance?'. According to the search approach of Webster and Watson (2002) the selected articles takes place by reading the title, keyword, and abstract first. The criterion for selecting the relevant articles is an explicit linkage to digital business strategy, organisational design factors, and sustainable business performance. This also requires reviewing the citations of all relevant articles, which usually include articles that are not in English (with translation) and applying the same selection criteria.

The search terms (e.g., digital business strategy, digital transformation strategy, digital strategy or strategies, digitalisation, digitisation, organisational/organisation design, sustainability, sustainable business performance, water utilities and companies) were used by drawing on 60 peer-reviewed journals and 14 conferences in the fields of strategic management, organisation studies, organisational design, digital and IT studies. In the process, Google Scholar, Saudi Digital Library, EBSCO, Science Direct and Web of Science were used as they complement each other. Thus, this process resulted in the final sample of 127 peer-reviewed articles and 24 conference papers, as well as some books and publications from well-known institutes such as Harvard Business Review (HBR) and Massachusetts Institute of Technology (MIT) Press (published between 1947 and 2022). The next section presents various definitions of business strategy in the literature.

2.3 The Concept of Business Strategy

The concept of strategy is broad and offers a range of definitions. Some scholars have analysed various definitions of strategy to reach consistent conclusions. Bracker (1980) analysed 17 strategy definitions published between 1947 and 1979 and concluded that business strategy has two characteristics: an environmental analysis used to determine a firm's position in its industry, and the firm's resources used to achieve its major goals. In a recent study, Mishra and Mohanty (2020) analysed 273 definitions of strategy published from 1938 to 2015, using the content analysis approach to identify different approaches to strategy from the definitions, and also the dominance of approaches in different periods. They found that the concept of strategy has changed many times during this period. These changes have been captured by researchers in different definitions proposed from time to time, and development of the concept of strategy continues (Mishra & Mohanty 2020). For example, Porter (1980) proposed the positioning school of strategy (also known as the market-based view [MBV]). He defines strategy as 'defining and communicating the company's unique position, making trade-offs, and forging fit among activities' (Porter 1996, p. 77).

However, the concept of strategy is multidimensional and can vary with different terminology, such as schools of thought, perspectives, frameworks and models. One of the most widely used definitions of strategy was provided by Chandler (1962, p. 13), who defined strategy as 'the determination of the basic long-term goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals'. According to Chaffee (1985), this definition emphasises developing strategy in a systematic, methodical manner following well-directed or sequential actions intended to achieve long-term goals. Similarly, Mintzberg (1978) agrees with Chandler's definition in terms of explaining strategy as being developed consciously and purposefully and made in advance. Thus, long-term planning was the key factor considered in Chandler's definition (Hax & Majluf 1988).

However, Drucker (1954) argued that the strategy of an organisation is its ‘theory of business’. He defined business strategy as ‘analysing the present situation and changing it if necessary. Incorporated in this is finding out what one’s resources are or what they should be’ (Drucker 1954, p. 17). Likewise, Andrews (1971) states that strategy is the purposes, objectives, or goals and major plans and policies for achieving these goals, and defining what business the firm is in or is to be in. Hofer (1973, p. 3) defines strategy as being ‘concerned with the development of a viable match between the opportunities and risks presented in the external environment and the organisation’s capabilities and resources for exploiting those opportunities’. In short, ‘virtually everyone writing on strategy agrees that no consensus on its definition exists’ (Chaffee 1985, p. 89). Accordingly, this thesis defines a strategy as a firm’s vision, mission and strategic objectives, which require analysing external opportunities and threats, internal strengths and weaknesses, selecting a particular level of strategy on which to focus (Erwee 2003) and developing a long-term implementation plan in which key performance indicators are measured (Mueller & Hersperger 2015; Schultz B, Keiner & Schmid 2003).

2.4 Strategy Taxonomies

The field of strategy involves ideas of what, how and why firms think about formulating and implementing their business strategies. This section first discusses the different views of strategy formulation and implementation, and the approaches to strategy, whether deliberate or emergent (or a combination of the two). Then, it presents the levels of strategy, as well as the concept of IT strategy.

2.4.1 Business Strategy Formulation and Implementation

Mintzberg and Waters (1985) state that strategy includes two key stages: strategy formulation and strategy implementation. They define the formulation stage as a process of developing the strategy (Where are we now? Where do we want to be?), including internal and external factors analyses of the organisation and its industry, and the specification of strategic objectives (Mintzberg & Waters 1985). Further, Zahn (1979) states that the company’s ability to formulate a strategy is more developed than its ability to implement the strategy (How can we reach the objectives set?).

In a more systematic view, Chakravarthy and Lorange (1991) identify a planning system, including three key steps for the strategy formulation process. The first step is the objectives-setting process. While strategic objectives refer to the firm's strategic intent in the long term and represent a more sustainable challenge, goals are specific statements for certain deadlines (Chakravarthy & Lorange 1991). Ideally, goals should be clearly stated and objectively measurable so that performance against them can be precisely evaluated (Goold & Quinn 1990; Hrebiniak & Joyce 1984). According to Locke et al. (1981), more specific goals can lead to better performance. If they can be achieved, they can move the firm closer to meeting its objectives (Chakravarthy & Lorange 1991).

Embedded in the strategic objectives should be the firm's vision (Chakravarthy & Lorange 1991). In other words, the vision should be divided into strategic objectives. According to Goold and Quinn (1990), strategic objectives should include financial and non-financial objectives, which will offer an overall view of a firm. The process should be made by the chief executive officer (CEO) and top management team and based on the analyses of external and internal factors. When the objectives are decided, the top management team invites and negotiates top divisions and strategic business units (not including functional departments) to set goals aligning with these objectives that can be supported with the firm's resources (Chakravarthy & Lorange 1991). The significant outcome of the objectives-setting process is to build common knowledge across the firm's hierarchy of objectives and goals that are deliberated for all organisational levels.

The second step of the deliberate process is the strategic programming step. It refers to the agreement and cooperation between managers on a set of strategic projects and initiatives. It aims to let top managers invite their functional managers to identify implementation plans to achieve the strategic objectives selected in the first step. These programs require a long-term financial plan. A 5-year financial plan is common (Chakravarthy & Lorange 1991).

The third step is the budgeting process, in which top management supports both the strategic and the operational financial plans of the organisational units. To correctly implement the strategic projects, a firm needs to monitor, control and build learning systems that provide continuous information flow on both the appropriateness of a budget and the efficiency with which the budgets are implemented (Chakravarthy & Lorange 1991). Thus, it is a step-by-step approach to strategy formulation.

However, Boyd et al. (2012) argue that there is no universal strategy formulation approach applicable to all organisations as organisations are different and face different situations requiring different ways of management. Hambrick and Cannella (1989) also argue that planning and analysing the required changes for the implementation phase should be done in the formulation phase to ensure that the strategy is viable. Thus, people's involvement in the strategy formulation and consensus about the strategy are important for the success of the implementation process. Herein, it is called the comprehensive planning process of strategy, which comprises aspects of the formulation that will affect the success of the implementation process (Prieto & de Carvalho 2018).

In a general sense, strategy implementation is 'the process that turns plans into action assignments and ensures that such assignments are executed in a manner that accomplishes the plan's stated objectives' (Kotler 2001, p. 659). Nathan (2010, p. 38) also states that 'strategy implementation is about getting the strategy as formulated accomplished through employee initiatives … strategy formulation without a dedicated plan for implementation will amount to little'. Thus, the implementation plan should include making key decisions for organisational change, assigning tasks to people, and allocating resources and schedules to achieve the strategic goals (de Wit & Meyer 2020).

2.4.2 Deliberate versus Emergent Business Strategy

Traditionally, strategy formulation is divided into two main processes of planning, (deliberate) planned changes and (emergent) unplanned changes. Implementation of planned changes typically has clearly defined strategic objectives and constructed mechanisms to pursue a strategy (Mintzberg 1979). In unplanned changes, implementation comes as a result of continual changes in the business environment (Mushore & Kyobe 2019). A combination of the two approaches is also a third approach of strategy, which is a deliberately emergent strategy (Mintzberg & Waters 1985) that involves a dynamic (flexible) process of continual change (Steensen 2014). Moncrieff (1999) suggests three main strategic outcomes for the deliberately emergent strategy: (i) implementation of earlier strategic intent, (ii) a deliberate response to issues emerging within the competitive and changing environment, and (iii) The results of the actions of people, working in ignorance of the strategy or of how they contribute to its implementation. These outcomes permit for adaptation and learning through continuous interaction between the stages of strategy formulation and strategy implementation, and thus the stages are constantly adjusted in light of past experience (Mintzberg & Lampel 1999).

However, Mintzberg and Waters (1985) note that the more deliberate strategies tend to emphasise central control and hierarchy; the more emergent ones open a way for collective action and convergent behaviour. They also define deliberate strategy, also known as planned strategy or intended strategy, as the intended actions an organisation plans to take to achieve its objectives. It may be realised or unrealised, and in this case, new objectives are developed (Mintzberg & Waters 1985). In contrast, emergent strategy occurs when companies engage in unplanned actions that evolve from past patterns in the business environment (de Wit & Meyer 2020). This approach cannot be ignored, and organisations must encourage emergence to occur in order to gain insight into the future and sustain business performance (King 2008).

All real-world strategies need to mix these approaches in some way 'to exercise control while enhancing learning' (Mintzberg, Ahlstrand & Lampel 1998, p. 11). Mintzberg and Waters (1985) called it a deliberately emergent strategy, one in which organisations formulate general boundaries but not the details. In this approach, comprehensive planning is a continuous process and does not have the purpose of outlining an envisioned final state of development (Mueller & Hersperger 2015). Thus, this approach needs periodic updating as it aims to ensure good performance of implementation that typically is measured by key performance indicators (KPIs) (Mueller & Hersperger 2015; Schultz B, Keiner & Schmid 2003).

In the literature, there are also a set of strategy formulation and implementation approaches. Alam et al. (2018) find that comprehensive and adaptive planning can help manage the effects of internal and external factors that shape organisational responses to digital strategy. Kretschmer and Khashabi (2020) suggest the co-development approach of digital strategy and structures, while earlier, Rajagopalan and Rasheed (1995) support the logical incremental method of strategy implementation and Quinn (1978) proposes a broad strategic approach of logical incrementalism. This approach blends rational planning and incremental adaptation to gain the benefits of both. A logical incremental approach of implementation is a series of small changes towards agreed objectives. Each stage is related to earlier developments and adjustments in ways that are recognisable to the organisation's people (Rajagopalan & Rasheed 1995).

The dual approach not only captures the benefits of the objective clarity associated with the planned implementation, but also ensures the continued commitment of the various stakeholders' interests within the organisation to strategic objectives. Therefore, the combined approach may result in better business performance compared with separate rational or incremental implementation approaches because of its more comprehensive view of the challenges associated with implementing strategic and organisational changes (Mintzberg, Ahlstrand & Lampel 1998). Hence, Andrews, Beynon and Genc (2017) encourage this approach to improve a firm's effectiveness and efficiency.

2.4.3 Levels of Strategy

Many scholars clearly distinguish between the levels of strategy (e.g. Andrews 1971; Chaffee 1985; de Wit & Meyer 2020; Grant 2016; Hofer & Schendel 1978; Johnson et al. 2014). The most common distinction is between the functional-, business- and corporate-level strategies. However, de Wit and Meyer (2020) propose four levels of strategy, in descending order of organisational hierarchy: network-level strategy, corporate-level strategy, business-level strategy and functional-level strategy. At each level, the strategy has specific objectives, stakeholders and scope, which should meet the requirements of internal and external alignment (de Wit & Meyer 2020).

Alignment, at the functional level, means having an overarching functional strategy that integrates various functional sub-strategies such as human resources (HR), operations, marketing and IT strategies (de Wit & Meyer 2020). The objective of functional-level strategy is not to create a competitive advantage, but to achieve it through 'strategies directed at improving the effectiveness of functional operations within a company' (Hill, Jones & Schilling 2016, p. 12). At business-level strategy, which is also known as 'competitive strategy' (de Wit & Meyer 2020; Grant 2016), companies align the integration of the functional-level strategies with internal and external factors to gain a sustainable competitive advantage over their rivals (de Wit & Meyer 2020). Corporate-level strategy differs from business-level strategy; it helps decide what business areas to compete in, while business-level strategy helps decide how to compete within a particular business (Chaffee 1985).

At the corporate level, a company acts as one tightly integrated unit requiring strategic decisions, including diversification of products and services, vertical or horizontal integration, geographical scope, new ventures, acquisitions, and the allocation of resources between the different businesses of the company (de Wit & Meyer 2020; Grant 2016; Johnson et al. 2014). A network-level strategy is that in which a company builds a shared strategy with external partners through strategic alliances, joint ventures and value-adding partnerships (de Wit & Meyer 2020). Thus, the four levels of strategy must be aligned with each other to create value for the company.

2.4.4 Information Technology Strategy

As noted earlier, functional-level strategy focuses on specific strategies for certain functional areas. IT strategy, which is a functional-level strategy within an organisation, refers to the 'investment, deployment, use, and management of IS' (Chen et al. 2010, p. 235). Chen et al. (2010) evaluated 48 articles and found three definitions of IT strategy: (1) a supportive tool for business strategy, (2) a key plan of the IT department, and (3) a shared view on IT within the firm. A firm's IT strategy represents 'its entire investment in IT, including people dedicated to providing IT services, whether centralised, decentralised, distributed, or outsourced. Examples of these investments include hardware, software, networks, computers, training, support personnel, programmers, databases, point-of-sale systems, etc.' (Weill & Broadbent 1998, p. 24). In short, IT strategy is a functional-level strategy that supports business strategy for reducing operational costs and improving efficiency within a firm (Burg & Singleton 2005).

2.5 The Transition from Traditional Business Strategy to Digital Business Strategy

As presented in the previous sections, business strategy summarises a firm's vision, mission and strategic objectives, and sets an implementation plan for a long period (Chen et al. 2010). By doing so, the firm focuses on creating a competitive advantage over its competitors (de Wit & Meyer 2020; Mithas, Tafti & Mitchell 2013). However, during the 1990s, the rapid development of IT and continuous improvements in the cost and performance ratios of technologies encouraged firms to employ IT strategy to support their business strategy, but the two strategies needed to align. This view led to the emergence of the concept of IT strategic alignment (Henderson & Venkatraman 1993; Luftman 2000), which continues to be an important topic in both strategy and IT literature, as it has been shown to positively influence performance (Gerow et al. 2014).

However, in the last decade, products, services and technologies have become digitally connected for value creation that transcends physical boundaries (Rigby 2014). This integration transforms organisations into more cross-functional entities, in which external digital processes ‘enable work to be carried out across boundaries of time, distance and function’ (Bharadwaj et al. 2013, p. 472). This creates a turbulent environment in these organisations and has significant implications for alignment (Coltman et al. 2015).

2.5.1 Digital Business Strategy View

To keep up with digital development, the concept of digital business strategy was first introduced by El Sawy et al. (2010) and Mithas and Lucas (2010), and further developed by Bharadwaj et al. (2013). The scholars believe that instead of viewing IT strategy as subordinate to a business strategy, the two strategies need to be integrated into one digital business strategy in a firm. They argue that IT strategy should be viewed as much more than just a functional-level strategy because digital technologies can be integrated into almost every organisational area, which helps organisations to innovate more digital connections and generate a differential value while gaining a competitive advantage over rivals. Grounded in the resource-based view (RBV) and dynamic capabilities theory, Bharadwaj et al. (2013) propose a general view of digital business strategy as an emerging concept at the intersection of strategic management and information systems (IS) management. They call for more contributions to the digital business strategy from both academic domains (Bharadwaj et al. 2013; Mithas, Tafti & Mitchell 2013).

Since then, many studies (e.g. Chanias, Myers & Hess 2019; Holgeid et al. 2019; Holotiuk & Beimborn 2017; Park & Mithas 2020; Sia, Soh & Weill 2016; Stoffels & Ziemer 2017; Ukko et al. 2019; Yeow, Soh & Hansen 2018) have appeared discussing digital business strategy and presenting standard and systematic approaches to digital business strategy in organisations. However, to the best of our knowledge, digital business strategy has not yet been used in the context of organisational design and sustainable business performance. Therefore, digital business strategy needs more research in this regard.

Bharadwaj et al. (2013, p. 472) define digital business strategy as ‘an organisational strategy formulated and executed by leveraging digital resources to create differential value’. According to Rai et al. (2012), digital business strategy depends on sharing rich information through digital resources such as cloud computing, platforms and apps, inside and outside a firm. This allows processes and multi-functional strategies to be interconnected with the support of inter-firm digital capabilities. According to Bharadwaj et al. (2013), the digital business strategy is more comprehensive than other functional strategies and surpasses the separate and subordinate perspectives of the IT and business strategies by creating a joint approach, thereby leveraging internal and external resources for a competitive advantage instead of internally focused actions such as the IT strategy. Bharadwaj et al. (2013) identified four key themes to help formulate and implement a digital business strategy: scope, scale, speed, and sources of value creation and capture.

Scope defines the products, services, digital technologies and business activities that are implemented and integrated within a firm's direct control and ownership. Scale, fundamentally driven by digital innovation (Huang et al. 2017), enables firms to scale their digital resources up/down, thereby adapting to increased demand. It allows firms to analyse the data derived from such resources and create a competitive advantage; in particular, digital technologies can be internally and externally integrated, requiring more cooperation, digital partnerships and alliances. Speed, related to agile adaptations to changing business environments, focuses on the speed of product launches, decision-making, supply chain orchestration and network formation. Sources of value creation and capture refer to increased value from information, multisided business models, coordinated business models in networks, and value appropriation through architectural control (Bharadwaj et al. 2013). Digital business strategy necessarily changes a firm's structure, processes, practices and coordination. Therefore, this study argues that digital business strategy needs a novel digital organisational design, which involves different factors—from traditional organisational designs—that should be dynamically aligned with the digital business strategy as a continuous process to sustain business performance.

2.5.2 Digital Business Strategy and Organisational Design Factors

A competitive advantage of using digital business strategy is mainly related to a firm's structure, processes, people, culture and stakeholder's interests, rather than focusing only on IT-related technical issues (Bharadwaj et al. 2013; El Sawy et al. 2016; Li et al. 2018). Digital business strategy and associated digital technologies transform socio-technical structures, which were previously mediated by non-digital technologies or relationships, into ones that are mediated by integrated digital solutions and relationships (Stoffels & Ziemer 2017; Yoo et al. 2010).

In water companies, for example, the transition from reactive maintenance to predictive maintenance using a network of connected sensors enables field operators to detect technical issues before they occur in water distribution networks, which improves the maintenance schedules and enhances the reliability of the networks system (Mounce 2020). Digital business strategy goes beyond hierarchical structures and involves organising new social-technological structures with innovative digital solutions that are jointly and constantly developed. Simply put, digital business strategy is about continuous management of change in processes (Balakrishnan & Das 2020; Cui & Pan 2015), structures, people, operational routines (Chen, Pan & Ouyang 2014; Singh, Klarner & Hess 2020), resources, capabilities, and services (Cha, Hwang & Gregor 2015; Sklyar et al. 2019). All these factors are key components of organisational design, which need an ongoing alignment with the digital business strategy.

Organisational design can unleash a combination of technologies, processes, structures and people skills that differentiate a firm to create a competitive advantage, which is the main purpose of (digital) business strategy (Burton, Obel & Håkonsson 2020; Galbraith 2011; Kates & Galbraith 2007). As any strategy change needs a change of organisational design (Burton, Obel & Håkonsson 2020; Dosi, Nelson & Winter 2000), digital business strategy needs to be aligned with organisational design factors. Matt, Hess and Benlian (2015, p. 341) note, 'with different digital technologies in use and different forms of value creation, a structural change is needed to provide an adequate basis for the new processes. The structural change refers to a variation in the company's organisational design'. Therefore, this research argues that digital business strategy needs a novel digital organisational design, which involves different factors from traditional organisational designs. These factors should be dynamically aligned with digital business strategy as a continuous process to improve sustainable business performance.

However, to the best of our knowledge, there is no study that specifically addresses this issue. Therefore, the main research question is: 'How does digital strategic alignment between digital business strategy and organisational design factors enhance sustainable business performance?' To answer the question, the following section discusses the findings of the literature on the existing strategic alignment models to align digital business strategy with organisational design, ensuring sustainable business performance.

2.6 A Critical Review of Existing Strategic Alignment Models for Digital Business Strategy

Traditionally, strategic alignment focuses mainly on the fit between two strategies—business and IT—to create a competitive advantage and improve business performance (Karpovsky & Galliers 2015; Reich & Benbasat 2000). Chan and Reich (2007, p. 300) defined alignment as 'the degree to which the business strategy and plans, and the IT strategy and plans, complement each other'. They also stated that alignment has been treated as (1) the end-state approach—measurable at a single point in time, which focuses on the antecedents, measures and outcomes of strategic alignment (Luftman 2003; Trienekens, Kusters & Cuenca 2014)—and (2) the process approach—focused on the continuous alignment of managing business and IT, which assumes that alignment can never be completely achieved as long as the business environment is dynamic and continually changing (Chan & Reich 2007; Shao 2019).

The dynamic nature of digital technologies, which emerge and develop rapidly, leads to new information processing requirements in firms and necessitates continuous strategy change (Esmail, Al-Rejal & Mohtar 2018). Therefore, alignment is crucial as an improved or managed process over time (Luftman, Lyytinen & Zvi 2017). However, practical research on the alignment process is currently inadequate, particularly with the organisational complexity that emerges from the digital business strategy (Park & Mithas 2020; Zhang et al. 2019). Therefore, the following question arises: How is alignment achieved in the digital business strategy context? The following sub-sections discuss the differences between the two approaches of alignment (i.e. end-state and process approaches) to digital business strategy in the existing strategic alignment models.

2.6.1 Strategic Alignment Models as an End-State

Research on strategic alignment first emerged from the MIT90s Framework, which was developed by Rockart and Morton (1984) and Morton (1991), as a part of the 'Management in 90s Project' at MIT. The goal of the framework was to examine IT-led organisational transformation, as well as enhancing business performance by aligning five forces (much like Galbraith's Star Model), namely, strategy, structures, management processes, technology, and individuals and roles, with its external business environment factors, namely, technological and socioeconomic factors. The MIT90s Framework shows that ‘IT is a key enabler of strategic direction and that an important issue is to find the link between strategic ideas and the application of IT’ (Rockart & Morton 1984, p. 91). Thus, the MIT90s framework cannot be used for digital business strategy because it focuses on IT as a function to lead organisational transformation, considering the strategic alignment as an end-state approach.

On the basis of the MIT90s model, Henderson and Venkatraman (1993) developed the SAM, which is considered one of the most influential models in the literature (Chan & Reich 2007; Coltman et al. 2015). According to the SAM, alignment emerges from the form of fit between business strategy, IT strategy, business infrastructure and processes, and IT infrastructure and processes. This model considers IT strategy an enabler to the business strategy (Henderson & Venkatraman 1993).

However, the SAM has been criticised for being a purely conceptual model, which makes it unable to analyse and identify the level of alignment in practice (Gerow, Grover & Thatcher 2015; Luftman, Lyytinen & Zvi 2017). Similarly, Maes et al. (2000) criticise the SAM because it emphasises the direct mutual influences between IT and business, while these relationships are much more complicated. Furthermore, Smaczny (2001) criticises the SAM as being a mechanistic view of an organisation, which makes it difficult to quickly respond to rapidly changing business environments, especially with the emergence of digital technologies in recent times.

According to D'Cruz, Timbrell and Watson (2015), the SAM depends on two strategies, business strategy and IT strategy (not digital business strategy), in enabling the IT transformation in business, and this, in turn, does not take into consideration the widespread use of integrated digital technologies that affect various functions of an organisation and transform the ways in which existing functional tasks are executed. Moreover, organisations are increasingly formulating digital business strategies, which use new digital technologies, to transform their businesses ‘by exploiting pervasive digital connections and assets external to the organisation’ (D'Cruz, Timbrell & Watson 2015, p. 3). The digital assets are not all owned or controlled by an organisation, and the organisation can make partnerships with other companies to leverage their digital assets (e.g. cloud services). Therefore, strategic alignment between the business strategy and IT strategy using the SAM is no longer sufficient with the wide use of digital business strategies.

2.6.2 Strategic Alignment Maturity Model as a Process

Luftman (2000) developed the SAM further, together with the inhibitors and enablers of strategic alignment (Luftman, Papp & Brier 1999), to create a mechanism to measure the level of strategic alignment maturity in organisations. He evaluated 25 companies from Fortune 500 companies, which resulted in the SAMM. This model comprises six criteria: communication, value, governance, partnership, scope and architecture, and skills. Each is assessed by a set of measurements to determine the level of strategic alignment maturity (Luftman 2000).

In 2017, Luftman updated the SAMM to include a shift from an end-state (static) approach to a more dynamic evaluation process of alignment. This transition allows the SAMM to improve the alignment maturity between business and IT on a continuous basis (Luftman, Lyytinen & Zvi 2017). However, as the SAMM is based on the SAM, which both take into account the two domains, business strategy and IT strategy, to obtain strategic alignment between business and IT (as two separate functions), it is not applicable to digital business strategy, which integrates business strategy and IT strategy as one strategy in an organisation.

2.6.3 Yeow's Aligning Process Model

In a qualitative case study, Yeow, Soh and Hansen (2018) studied different alignment actions required to achieve an ongoing alignment process with a digital strategy by applying the dynamic capabilities approach to aligning. Their study resulted in an aligning process model. They conceptualise alignment as a dynamic capability consisting of the three capabilities (sensing, seizing and transforming) and identify alignment actions within each capability. They find that digital strategy is a planned and emergent strategy, and any misalignment between the digital strategy and organisational resources leads to more tensions, and this can be addressed by the alignment process model (Yeow, Soh & Hansen 2018). However, although the model stresses the response to environmental changes in the strategy formulation process using the dynamic capabilities approach, it does not explicitly inset and explain the formulation process in the empirical analysis, and thus, its support comes fundamentally from the theoretical discussion (Walraven et al. 2018). In addition, it does not clarify the factors required in the alignment model in the context of digital business strategy, which the current research aims to achieve.

However, the current research view is in consonance with the findings of Yeow, Soh and Hansen (2018) that digital business strategy is an 'endless journey' and not a digital transformation project. Recent literature recognises that digital transformation strategies are a process consisting of different stages (Nwankpa & Roumani 2016; Soluk & Kammerlander 2021; Zaoui & Souissi 2020) and building dynamic capabilities for the ongoing strategic renewal of organisations (Warner & Wäger 2019). However, current discussions still fall comparably short on investigating the role of organisational design and dynamic capabilities in the stages of the digital transformation process.

A notable exception is the study of Konopik et al. (2022) that connects the digital transformation process with organisational design and dynamic capabilities by describing the process as a sequence of sensing, seizing and transforming mechanisms. In the sensing mechanism, the key objective of organisational design capabilities is to support the flow of information and knowledge across business units through initiatives related to infrastructure and knowledge management. In the seizing mechanism, organisational design capabilities leverage the intra-organisational infrastructure to facilitate the flow of information within an organisation and with external partners, requiring a clearly recognisable organisational structure. The transforming mechanism is mainly related to the adoption of internal (functional) structure and knowledge management such as a team-based structure and decentralisation. Thus, with the dynamic capabilities approach, organisational design must adapt to support digital transformation strategies (Verhoef et al. 2021).

2.6.4 Organisational Design as a Dynamic Alignment Model

The organisational design has its theoretical roots in the IPV theory proposed by Galbraith (1974, 1977). Based on the IPV, Galbraith (1977, 2000, 2011) and Kates and Galbraith (2007) developed the Star model of organisational design. This model can be viewed as a chain of choices and decisions that collectively refer to the process of aligning strategy, structure, processes, people and rewards to create an effective organisation capable of achieving the business strategy (Galbraith, Downey & Kates 2002; Kates & Galbraith 2007). The model adopts the idea of the dynamic alignment process between the factors of organisational design to achieve an equilibrium that improves business performance (Galbraith 2000). Thus, it views an organisation as a set of intertwined dynamic components, as shown in Figure 2.1.

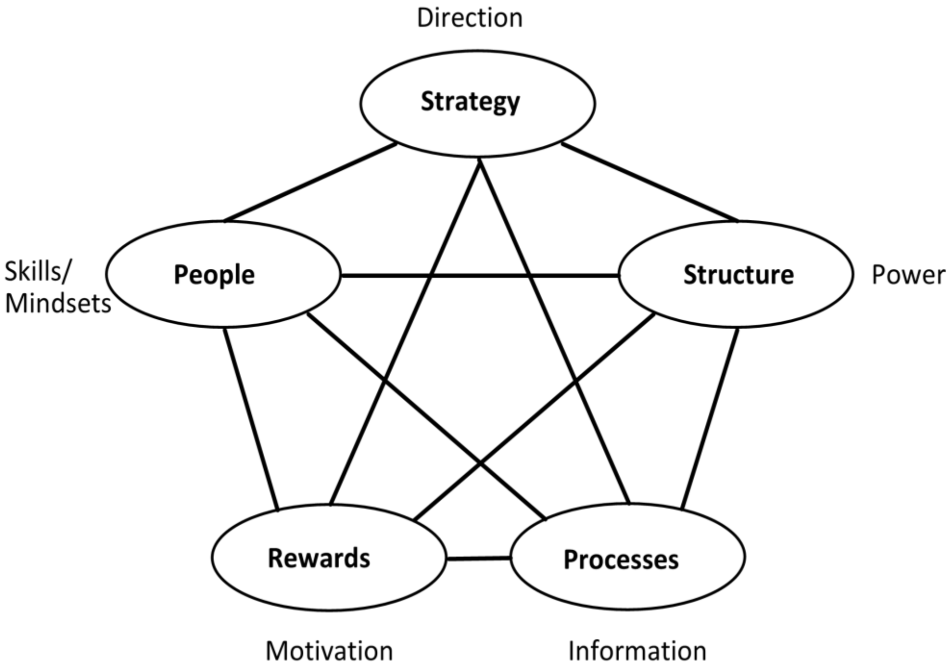


Figure 2.1: The Star model of organisational design (Galbraith 2000)

In this model, *Strategy* is the first element, which must be addressed first. Strategy delineates the basic direction of an organisation through its mission, values and objectives. It also determines the activities, products, services and business markets, as well as the value to be provided to the customers (Galbraith 2011). The overall purpose of strategy is to unleash organisational capabilities (combination of technologies, processes and people skills that differentiate a firm), which can create a competitive advantage (Kates & Galbraith 2007). There are also three sources of competitive advantage, namely, capabilities, business models and business portfolio. Strategy, which includes these dimensions, needs an alignment with other organisational design factors in order to be executed well.

Structure can be viewed as a map that determines the location of decision-making power (Galbraith 2011). Structure involves four dimensions: (1) Specialisation means the type and number of job specialties utilised in performing the tasks. (2) Shape (or the span of control) means the number of people in each department. A large number of a department's people creates a flat organisational structure with few levels. (3) Distribution of power has two dimensions; vertical dimension means the centralisation or decentralisation of decision-making. Lateral dimension means the movement of decision-making power to the relevant departments. (4) Departmentalisation refers to the standard basis for shaping departments in the organisational structure. This includes functions, products, services, information flow processes, customers, markets and geography. These dimensions are often reflected in common forms of organisational structures, such as functional structures, geographical structures, product-based structures, customer-market-based structures and matrix structures. In the matrix structure specifically, two or more of these structures report to the same manager (Galbraith 2011).

Processes are designed around the flow of information throughout an organisation (Galbraith 2011). They are vertical and horizontal (lateral). Vertical processes are carried out from top to down and vice versa. These processes are centrally concerned with collecting information from departments about their needs for strategic planning purposes and making decisions regarding budgets, and resources allocation. Lateral processes are related to the information flow processes such as the fulfilment of a customer order or new product development, which can be implemented in many ways, such as IT, individuals or teams. Processes should be designed as mechanisms for reducing information processing requirements (Galbraith 1974).

Rewards refer to salaries, promotions, stock options, bonuses and so forth (Galbraith 2011). Rewards incentivise employees to perform their tasks and achieve the firm's strategic objectives and goals. The reward systems not only improve the lateral processes, but also support business policies and strategies. Therefore, Galbraith (2011) states that reward systems must be aligned with the organisational structure and processes to achieve the strategic direction.

People refers to HR policies related to selection, recruitment, rotation, promotion and training. Creating the employees' skills and mindsets is necessary to implement the chosen strategy. HR policies should be built on the organisational capabilities to implement the selected strategy (Galbraith 2011). A flexible organisation requires flexible people, and therefore, HR policies should simultaneously develop people and organisational capabilities (Galbraith 2000, 2011).

Finally, the Star model acknowledges that strategy drives organisational structures, while processes are built on organisational structures, which in turn influence the execution of reward systems and HR policies (Galbraith 2011).

There are also other dynamic models of organisational design. With the aim of aligning the organisational design factors with business strategy, researchers have not only used the Star model, which can achieve the alignment in organisations, but also tested it and built on it (e.g. Burton, Lauridsen & Obel 2002; Burton & Obel 2018; Connor, McFadden & McLean 2012; Håkonsson et al. 2012; Kayaga, Kingdom & Jalakam 2018; Sepehri et al. 2011; Simons 2005).

For example, Burton, Obel and Håkonsson (2015, 2020) integrate and extend the Star model using the IPV and the multi-contingency theory (Burton & Obel 2004) to introduce the Diamond model of organisational design. This model initially consisted of five components, fully tested in practice, namely, goals, strategy, structure, process and people, and coordination, control, and incentives. It views an organisation as a dynamic entity, which allows the researcher to assume that changes in organisational design could occur because of the selected strategy (Burton, Obel & Håkonsson 2015). Later, Burton, Obel and Håkonsson (2015) extended the five components of the Diamond model into 13 elements. However, the Diamond model does not use digital business strategy instead of business strategy, which makes it unsuitable for today's digital business environment.

In the water industry, Kayaga, Kingdom and Jalakam (2018) examined the key factors of organisational design, namely strategy, structure, processes/systems, people and IT for five water companies from Europe, Africa, and Southeast Asia, and found a link among these factors and performance of the water utilities. They conceptualise effective organisational designs as the ones that address organisational deficiencies by consciously aligning organisational design factors with a well-articulated strategy.

In short, the dynamic alignment models of organisational design do not clash with the use of digital business strategy instead of traditional business strategy, as any strategy change needs a change of organisational design (Burton, Obel & Håkonsson 2020). Therefore, this study adopts the Star model of organisational design by Kates and Galbraith (2007). Although the model has been successfully applied in many digital technologies (Galbraith 2014; Raj & Seamans 2019), its applicability in the context of digital business strategy is not sufficiently developed to obtain detailed propositions. To the best of our knowledge, the model has not yet been used in the context of digital business strategy and sustainable business performance, making it appropriate to explore its impact on organisational design in the context of water utilities, and elaborate the model accordingly.

2.7 Fundamentals of Organisational Design and Change

In a review of seminal articles on organisational design and change, the literature shows some key principles. First, there is no one way to organise a firm (Galbraith 2000, 2011). Effective organisational design is contingent upon both the strategic intent which the firm is seeking to achieve and the tasks that have to be managed (Lansley, Sadler & Webb 1974). Second, Drago (1997) finds that the use of long-term objectives was positively associated with the use of mission and vision, and the use of short-term objectives was positively associated with actions planning. Third, task uncertainty, which is defined as the difference between the information required to fulfil a task and the amount of information the decision makers possess (Galbraith 1974, p. 28), is a key in determining the appropriateness of a specific organisational design. Task uncertainties stem from many sources such as the economy, legislations, markets, suppliers, the nature of the task itself and the digital technologies employed. The higher the task uncertainty the less appropriate are organisational structures designed to achieve a high level of control over the firm's employees only goes so far (Lansley, Sadler & Webb 1974).

Fourth, Jaques (1990) states that hierarchical structures have been seen as the source of inefficiency, and what firms need is not simply flatter structures but an understanding of how hierarchical structure functions and its relationship to the complexity of tasks and how firms can use them to achieve an effective deployment of people. For example, manager-subordinate relationships in which a manager must add value to and be held accountable for the work of subordinates. Firms have had to succeed despite hierarchical structures rather than because of them (Jaques 1990). Fifth, an information processing system, which is the process of dealing with information, is embedded in a firm's formal and informal decision-making process, which can create and sustain a competitive advantage. This system can be seen as a socially complex system, and thus can be imperfectly imitable (Barney 1991).

Last, organisational change is "a set of behavioural science-based theories, values, strategies, and techniques aimed at the planned change of the organisational work setting for the purpose of enhancing individual development and improving organisational performance, through the alteration of organisational members' on-the-job behaviours" (Porras & Robertson 1992, p. 723). In addition, Weick and Quinn (1999) find that continuous organisational change is a small continuous adjustments process, created simultaneously across business units, which can cumulate and create substantial change. To understand the organisational change process, it is important to understand how it unfolds over time and how time and timing affects it (Van de Ven & Poole 2005). Sturdy and Grey (2003) also emphasize that organisational change should be seen as a process ('changing' rather than 'change') because the changing environment requires the knowledge of how to lead organisational change rapidly and effectively. For instance, the implementation of digital technology is a process of undertaking organisational changes, as existing organisational design factors will be impacted by this implementation. Thus, it has become apparent that studies should take these principles into account during the process of organisational change in order to ensure implementation success.

The following section provides a detailed discussion of the findings of the literature on the organisational design factors in the context of digital business strategy and how these factors can be developed to achieve digital strategic alignment that enhances sustainable business performance, mostly in incumbent water organisations.

2.8 Digital Business Strategy Uptake in Incumbent Water Organisations Design

The inspiration from the fast-paced evolution of digital technologies, and the desire of incumbent organisations to use these technologies to improve performance, have encouraged the emergence and adoption of digital business strategy over the past decade (Holgeid et al. 2019). This, in turn, has led to the study of the necessary changes in the factors of organisational design as a result of the use of digital business strategy, instead of traditional business strategy. The published studies on digital business strategy and organisational design factors present interesting findings, which are briefly discussed in the following sub-sections.

2.8.1 Digital Business Strategy Formulation and Implementation

According to KBV, strategy formulation is the process of developing a strategy through knowledge sharing. The key to obtaining value from strategy formulation lies in how effective the knowledge-sharing process is and how the leverage can be used to create value for the firm (Grant 2016). The issue is whether a formal employee, customer or external partner is not important if the relationship generates value. In practice, however, strategy formulation cannot be separated from its implementation (Grant 2016). Nowhere is this more evident than in digital strategy formulation and implementation. According to Bharadwaj et al. (2013), the formulation of digital business strategy refers to the planning and design of products, services, processes and systems that have interoperability with other complementary digital platforms, and their deployment within the firm and externally with digital partners, as products and services, by leveraging digital resources. Hence, it is important to note that the formulation stage should include the knowledge-sharing process for exploiting the scope, scale, speed and value creation of digital business strategy to be successfully implemented.

To implement a digital business strategy, Carcary et al. (2017) find that organisations need to overcome the top five barriers: organisational culture (resistance to change), isolated implementation in business units, competing priorities, insufficient funding and digital skills shortages. Moreover, Chanias (2017) and Chanias and Hess (2016) found that organisations start to implement uncoordinated digital initiatives in various departments before a more holistic strategy is formulated, which creates further pitfalls at the stage of implementation. In this regard, the digital business strategy should not be implemented in the same way as traditional business strategy and IT strategy (i.e. IT initiatives in some units separately). In digital business strategy, any digital technology should be implemented to encompass the entire (related) organisational processes, which might reach far beyond an organisation's borders (Holgeid et al. 2019). It entails balancing exploration of new possibilities and full exploitation of digital resources (internally and externally) (Holgeid et al. 2019). This requires a high level of knowledge integration and lateral relationships between internal units and external partners, which in turn reduces information uncertainty, speeds up decision-making, and increases the efficiency of the decisions made (Gregory et al. 2018; Herden 2020; Li et al. 2021).

Li et al. (2021), whose study is underpinned by the IPV theory, state that IT business strategic vision facilitates mutual understanding between IT and business managers. Korachi and Bounabat (2020) also refer to the importance of the digital strategic vision and digital strategic objectives in digital strategies. At the digital strategy formulation stage, organisations need to develop a set of integrated digital technologies, which requires huge investments (Boniface 2022). These investments push organisations to pursuing multiple objectives at once (Bocken & Geradts 2020; Bonchek & France 2015; Mithas, Agarwal & Courtney 2012). For example, organisations can discover new opportunities as regards digital assets and activities outside their boundaries, recombined with their current processes and activities by digital experimentation (pilot projects), which can reduce costs, support new investments and improve the quality of outputs (Kretschmer & Khashabi 2020). Thus, under digital business strategy, quality management can measure the realised objectives and related investments, especially with the ever-changing digital technologies that require dynamic strategic alignment organised by quality management practices (McAdam, Miller & McSorley 2019).

Digital business strategy also presents new digital business models by taking advantage of shared digital resources (Bharadwaj et al. 2013; Mithas & Lucas 2010). Such resources not only support strategic objectives, as in the case of IT strategy, but also act as enablers for strategic objectives (Hess et al. 2016). However, the complicating factor is that most of today's digital business models are not independent but intersect and interoperate across different players (Bharadwaj et al. 2013), requiring effective partnerships that create competitive advantage through increasing the level of digital and knowledge integration among different parties. However, digital partnerships management has not been conceptualised in the context of organisational design theory by many studies. For example, Li et al. (2021) find that digital transformation-mindful organisations are more likely to establish digital technology-enabled external relationships management, which enhances their ability to respond promptly to environmental turbulence in the markets. Zomer, Neely and Martinez (2020) confirm that digitally transformed organisations invest heavily in increasing their digital partnerships and acquisitions.

Last, the involvement of top management teams in digital strategy formulation influences the process of strategic change (Singh, Klarner & Hess 2020), as it has a key role in supporting and communicating the strategy to all employees (who should be invested in digital decisions) at all organisational levels. Dong, Neufeld and Higgins (2009) identified three types of top management support, namely, resources provision, change management to enhance organisational receptivity, and vision sharing with lower-level managers to ensure a common understanding (knowledge) of an organisation's objectives. Similarly, Matt, Hess and Benlian (2015) state that top management support is recognised as being a key strategic factor in implementing a firm's digital strategy, because it affects the entire organisation and its implementation may result in resistance from different organisational areas of the firm. Likewise, Li et al. (2016) found that top management support is one of the most critical success factors for strategic alignment. As a top management team, the CEO, chief information officer (CIO) and senior business managers need to work closely together to formulate and successfully implement the digital business strategy and associated digital technologies (Herden 2020; Mithas & Lucas 2010; Sia, Soh & Weill 2016; Singh, Klarner & Hess 2020).

2.8.2 Integrated Digital Solutions with Digital Business Strategy

In the German water sector, Stoffels and Ziemer (2017) conducted a questionnaire survey of 86 participants (executive and middle managers, each representing a firm) in order to, among other objectives, provide key digitalisation priorities and challenges, and analyse the firms' digital business strategy. They found some interesting results. First, digital business strategy-enabled companies develop new digital business models, benefiting from innovative digital technologies. Second, the digital business strategy formulation stage can align digital technologies across multiple organisational functions and gain a sustainable competitive advantage. Third, investments in training can speed up the implementation of digital technologies. Fourth, knowledge about new digital technologies is not sufficient. Fifth, firms need to develop innovative, holistic and integrated digital solutions to cope with uncertain market conditions. This requires engaging in collaboration with partner firms. Sixth, top management support for digitalisation is required, which in turn enhances the new organisational culture and identity. Last, employees' involvement in the design and experimentation of new digital technologies reduces their resistance to change.

In the UK water sector, Mounce (2020) presents and discusses the relevant integrated digital technologies and their impact on sustainability. He concludes that the water sector still lags behind other industries in integrating new digital solutions. Utilities can benefit from the lessons learnt in other sectors and establish best practices and network infrastructures. The digitalisation of water utilities is no longer optional. It requires, first, support from top management, and then formulation of a digital business strategy with an implementation plan; second, building digital infrastructures that support future growth; third, focusing on business priorities that support the strategy and the investment in digital technologies; and last, developing in-house expertise and creating digital jobs (e.g. data scientists) within water companies (Mounce 2020).

In the Saudi water sector, as discussed in Section 5.2, most water stakeholders (the government, customers, partners, employees and society) are already connected with digital technologies, which have accelerated the collection and dissemination of real-time information to all stakeholders. Early engagement by bringing stakeholders into the formulation as early as possible encourages more collaboration and joint consideration around the ultimate digital vision (Mounce 2020). Customers' expectations around sustainability are driving behavioural changes in utility practices. Some customers already participate in water conservation, and they will be able to do that more and more as utilities digitise, making smart decisions about how they consume water by using new digital solutions. Some solutions allow water stakeholders greater access to information and improved rates of engagement. Thus, stakeholders are coming up with innovative solutions and thus leading the change rather than acting as recipients only (Mounce 2020). The integrated digital solutions are briefly discussed below.

2.8.2.1 Big Data Analytics

The availability of sensors, digital meters, digital data storage and transmission systems means that water utilities are able to collect more data than ever before (Mounce 2020). Collecting more data does not necessarily result in better information or knowledge, but big data offer a potential way to solve traditional problems via development and application of data-driven analysis (Mounce 2020). For example, social media networks with big data analytics can provide a better consumer understanding (Catlin, Patiath & Segev 2014), and enable firms to improve products and services in line with customer preferences (Bonchek & France 2015; Ross et al. 2016). The analysis of data can support decision-making and generate a sustainable competitive advantage (Erevelles, Fukawa & Swayne 2016). Big data analytics offers the capability to derive actionable value from a set of structured and unstructured data (e.g. sensory data) and execute the next best action based on predictive data science. Maximising the quality of data requires consideration of a unified chain of digital processes, for example, data sources, collection and storage and the expected data use. This means a move towards data-driven solutions (or a data-driven organisation). Mounce (2020) presents a vision for the digital integrated future, as illustrated in Figure 2.2.

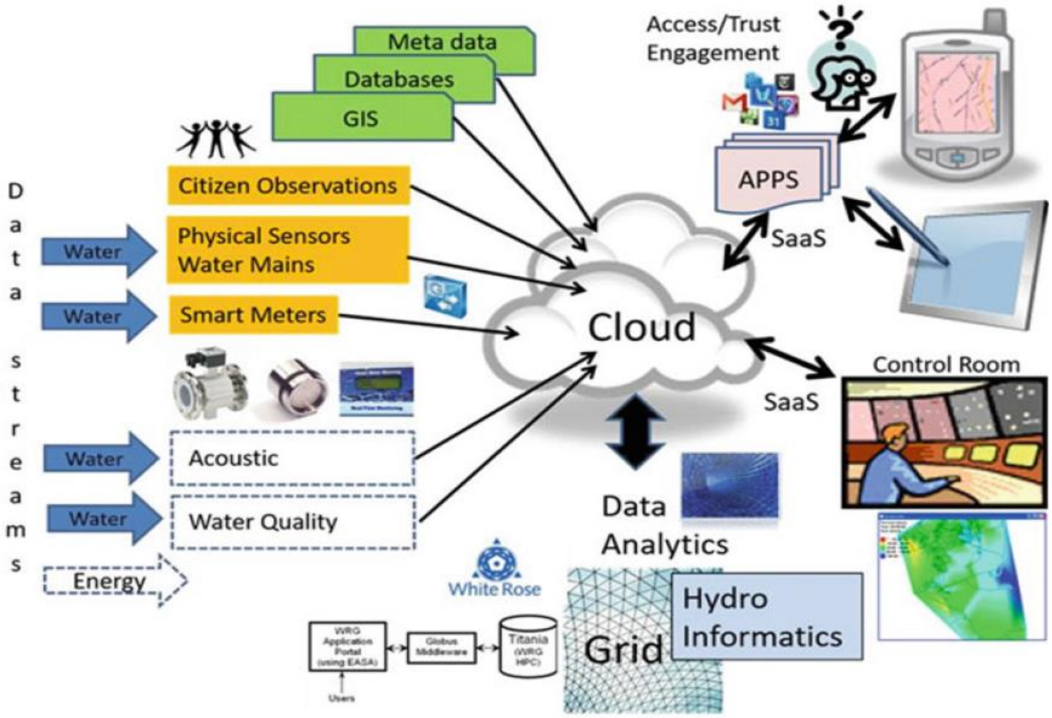


Figure 2.2: A vision for the digital integrated future (Mounce 2020)

2.8.2.2 Internet of Things

IoT sensors and objects are connected to the internet via the cloud, leading to the concept of ‘smart water networks’ (Mounce 2020). The data gathered from IoT platforms are expected to create value. As these capabilities advance, so does the ability to collect information from remote devices and correlate that information across diverse systems. A water infrastructure that can connect the monitoring and control systems (e.g. supervisory control and data acquisition [SCADA] system) to IoT platforms allows the use of the data the systems hold and helps achieve near real-time situational awareness.

2.8.2.3 Cloud Computing

Cloud computing is the provision of various digital services and infrastructures through the internet, including data storage, servers, databases, networking and software. It allows water utilities to rent instead of buy digital products and services. Cloud providers enable water utilities to store data on remote servers, and then access all the data via the internet. However, water utilities have been slow to utilise cloud services hosting because of perceived concerns about security. Security should not be a reason to not adopt cloud-based solutions—if the correct platforms are being leveraged. Of note, utilities are actually benefiting from the security built into the cloud, resulting in fewer security incidents than when using (internal) data centres (Mounce 2020).

Having infrastructure available on demand means new innovations can be developed and launched much faster than by deploying traditional IT infrastructure. Data are only stored inside the data centre (where they are more easily managed, protected and recovered) (Mounce 2020). Data from sensors distributed across assets in different sites are uploaded to the cloud for continual analysis. End-users can run the service on data over the cloud, and access and analyse the data and collaborate on diagnostic decisions related to the condition of a remote monitored asset (Mounce 2020). Cloud computing can be also used to process data collected from digital meters and billing systems in a reliable, secure and scalable manner (Ambre 2016; Vafamehr & Khodayar 2018). Adopting cloud computing is a cost-effective solution over the spending on IT legacy systems (Shee et al. 2018). Therefore, a digital business strategy is required to build the related linkages between the constituent parts of the company's and its partners' digital resources (including cloud services), as well as information exchange protocols (Bharadwaj et al. 2013).

2.8.2.4 Digital Metering Systems

The increasing use of digital water metering systems for monitoring networks in real time provides water utilities with an ever-growing amount of data on their business operations and infrastructure (Mounce 2020). Digital metering systems coupled with informatics improve customer services (Stewart et al. 2018). These systems include two digital technologies: digital meters that record water usage and a communication network system that can store and transmit real-time water use information (Stewart et al. 2010). A smart water network requires installing digital water meters at the property boundary in conjunction with intelligent end-use pattern recognition algorithms either in-built into the meter software or within a processing module at the utilities data centre. Such an end goal requires the ability to analyse collected data without human intervention (Mounce 2020).

However, there are some challenges facing water utilities, such as the integrated and open digital solutions, the difficulty to align between end-user and digital integration needs, and the lack of political and regulatory support (Mounce 2020). Digital solutions require compatibility, interoperability and standardisation. Compatibility is related to future versions of each system or app, which must be compatible with other systems that interact within the same environment (OmniSci 2021). Interoperability is the ability of two or more systems to exchange information and use the information that has been exchanged (IEC 61850 2013). This requires commitment from most stakeholders. Interoperability is related to standards (or standardisation) as these contain information, processes and guidelines, which organise smooth data flow within systems (Hauser & Roedler 2015). On account of the complexity of cybersecurity systems, which consist of various technologies and components from different vendors, a comprehensive standardised interoperability reference architecture is required, instead of a single standard.

An example for smart water networks is the seamless digital integration architecture for the open metering system (OMS). The OMS is a European standard that opens and standardises metering systems to guarantee the interoperability between digital metering systems (OMS-Group 2022). Today, most utilities use one open wireless network for many types of digital meters made by different manufacturers. Interoperability offers several gains, which are well documented in other industries (Harbor Research 2009). The benefits include lower transaction, maintenance, upgrade, and installation costs, as well as reduced risk of vendor lock-in and reduced negative effects of vendor bankruptcy (Arthur 1989; Lewis 2013).

In the water industry, the interoperability of digital solutions has not been realised yet. Hauser et al. (2016) state that there are only a few studies addressing interoperability in water utilities and emphasise that interoperability is an obstacle in this industry. Some studies (e.g. Hauser, Hild & Roedler 2013; Hauser & Roedler 2015; Howell, Beach & Rezgui 2021; Howell, Rezgui & Beach 2017; Kamunda et al. 2020) have been conducted to address the challenge of interoperability and deploy integrated digital technologies (between different actors) in water utilities. The deployment of integrated digital solutions requires holistic planning that ensures interoperability between digital systems in advance (Hauser et al. 2016). However, the deployment of integrated digital solutions is reported to be fragmented and lacking the interoperability necessary to realise its full potential due to issues concerned with standardisation, architecture, security, cost and unified approach (Borgia 2014). Thus, interoperability and compatibility are critical concerns raised by the literature for the success of integrated digital solutions in water utilities (Howell, Beach & Rezgui 2021; Howell, Rezgui & Beach 2017; Kamunda et al. 2020).

However, many researchers emphasise that firms need a holistic digital strategy and not only individual IT initiatives (i.e. isolated IT solutions in some areas of an organisation as in the case of IT strategy) (e.g. Berman & Dalzell-Payne 2018; Chanias 2017; Chanias & Hess 2016; Ross, Beath & Sebastian 2015). This means firms need to focus on investing in a wide range of digital technologies to reach a holistic, integrated digital solutions (Catlin, Patiath & Segev 2014). In the water industry, firms integrate digital technologies to build a digitally enabled infrastructure, thus holistically supporting their operation and achieving their sustainability objectives (Ivanov, Dolgui & Sokolov 2019).

The concept of integrated digital technologies is most commonly defined as the combinations of information, computing, communication and connectivity technologies (Bharadwaj et al. 2013). Li, Dai and Cui (2020) distinguish the integrated digital technologies, such as cloud computing, IoT and big data analytics, as the firm's information processing capabilities (IPC) and a digital supply chain platform as an information exchange channel to access external information. Such integrated digital technologies reshape business infrastructure and influence the organisational design and information flow within and across firms. Thus, they are transforming the social-technical structures in organisations (Bharadwaj et al. 2013; Stoffels & Ziemer 2017), and are a key factor in building central digital resources and services that make sense for digital business strategy.

The purpose of having centralised digital resources and services is to manage, preserve and articulate stakeholders and to facilitate employees' tasks (Tuamsuk & Subramaniam 2017; Walker & Keenan 2018). Centralised digital resources and services not only enhance the quality of firms' outputs but also make it possible for stakeholders to access information anywhere and anytime (Rahman et al. 2017). They also improve firms' ability to create, use and transfer knowledge effectively (Dremel et al. 2017; Herden 2020; Rahman et al. 2017; Saeed et al. 2016). Sklyar et al. (2019) find that within-firm digital centralisation plays a key role in the capability to organise and align digital services in response to customer needs. Therefore, centralised digital resources and services are essential with integrated digital solutions to improve performance.

2.8.3 Organisational Structures with Digital Business Strategy

Prior literature shows that organisational structures should follow strategy (Chandler 1990; Galbraith 2011). Contrary to the classical perspective, Kretschmer and Khashabi (2020) argue that structures are affected by the use of digital technologies in all stages of digital strategy. Therefore, a firm's structures need to be constantly re-constructed to align with its digital strategy. Using integrated digital technologies, a firm can reduce information to be processed, and internal and external coordination costs, and access new assets outside its boundaries. Thus, structure and digital strategy should be aligned and developed simultaneously to facilitate information flow and address such issues (Kretschmer & Khashabi 2020).

In the literature, there are some common practices for aligning digital business strategy and organisational structures. Some firms have rigid hierarchical structures governed by formal roles and responsibilities, while others have more agile and flexible structures wherein people communicate and collaborate in a less controlled manner. Jones, Gareth and George (2022) recommend that firms operating in uncertain environments should develop a highly agile, task-oriented structure. Agile structures have fewer layers (Zhao et al. 2018), and each element in a layer of a flat structure is connected to every other element in the layers directly below and/or above it, thereby providing improved communication and greater flexibility (Anumba, Baugh & Khalfan 2002). According to Nicholas (1994), to facilitate projects delivery, the traditional hierarchical structures must be overshadowed by flat structures and cross-functional teams. This improves communication, increases teamwork and builds trust. Sia, Soh and Weill (2016) find that firms, under digital business strategy, create teams from different departments (e.g. IT, marketing and production) to innovate digital solutions and achieve a better responsiveness in relation to customers. Thus, firms integrate digital solutions and processes, and develop people skills and knowledge through cross-functional teams. This highlights the important relationship between the digital business strategy and agile structures that include cross-functional teams.

When the organisational design factors that influence structures are considered, then the matrix structures, which combine the functional structures at the corporate level and cross-functional teams at the functional level, may seem to be more suitable for digital business strategy and information flow in the water organisations. The matrix structure provides the dual benefit of a high level of expertise generated by the functional structure, and agile organisation and teamwork, which benefit all. In addition, less rigid functional structures that support cross-functional teams working at the functional level may be important to keep a high level of specialised knowledge, which is often necessary to solve business problems in the water context.

Another common practice is the creation of digital governance mechanisms. Arkhipova et al. (2016) state that traditional IT governance is characterised by centralised governance structures, vertical communication and hierarchical culture, continuously aligning between IT and business, while digital governance focuses on horizontal communication, democratic culture and unified (unique) understanding between IT and business. Under digital strategy, Singh, Klarner and Hess (2020) demonstrate the importance of governance architectures (vertically and horizontally) in organisational design to implement digital transformation activities. Haque (2015) finds that not all decision-making power over the digital business strategy should be authorised at a single business department if the firm seeks to generate a sustainable value. This is consistent with the findings of Singh, Klarner and Hess (2020) regarding the role of the chief digital officer (CDO) in digital strategy. This role is not only to collaborate and interact with the other business departments, but also to facilitate digital alignment among them by articulating tasks, responsibilities and reporting structure, while ensuring that there is no overlap between the roles and responsibilities of the CDO and other IT and business managers (Haffke, Kalgovas & Benlian 2016; Hansen & Sia 2015; Horlacher 2016). Thus, structural governance is needed with digital business strategy.

Traditional positions and tasks are another issue related to the context of digital business strategy. According to Kretschmer and Khashabi (2020, p. 88), ‘an organisation consists of multiple agents working toward an overall goal and each contributing to achieving this goal’. The role of organisational design is to divide the common goal into smaller tasks, which can be carried out by groups of agents (units, departments and individuals), and to combine these tasks into the organisation-wide outputs. Today, many traditional positions and tasks are no longer needed as they are completed more effectively and efficiently through digital technologies (Kretschmer & Khashabi 2020). In water utilities, for example, digital meters send consumption data to digital billing systems without human intervention (Ambre 2016; Broussard 2018; Vafamehr & Khodayar 2018). Thus, organisations need to redetermine and redistribute the required tasks and people for the expected outputs, making some current tasks obsolete (Kretschmer & Khashabi 2020).

Another common practice is the creation of shared digital units. Yeow, Soh and Hansen (2018) conclude that organisations need to introduce new digital units (or departments) through which they align the new and existing business together. Galbraith (2014) also recommends organisations create digital units (under a central CDO) that bring together digitally skilled experts and talent to improve and speed up decision-making. According to MIT and Capgemini Consulting research (2012), to implement a digital business strategy successfully, organisations need shared digital units, which consist of independent units developing new digital solutions, processes and services for the entire organisation. These units reduce the redundancy of digital initiatives across the organisation and create unique processing centres, such as an analytics competency centre, aimed at increasing the efficiency of digital efforts. Shared digital units are more agile; therefore, experimentation is easier, and innovation is more effectively stimulated.

The responsibility of shared digital units is to design and develop a company's digital competencies necessary to overcome the shortage of digital skill sets. As digital business strategy requires people with high digital skills and knowledge, shared digital units can combine new expert employees in new digital technologies with existing employees to create balanced digital teams. Thus, shared digital units can select employees from different business units for training and for developing the digital business strategy (Tannou & Westerman 2012).

2.8.4 Digital Processes with Digital Business Strategy

The emergence of new digital technologies and its integration into organisations has resulted in significant changes to organisational processes (Bharadwaj et al. 2013). Today, new processes are designed, planned and implemented as digital processes, which go beyond the borders of a firm to reach customers and external partners in a shared digital work environment requiring a holistic digital business strategy (Wunderlich 2018).

According to Temido, Sousa and Malheiro (2014), water companies depend on primary and support processes in value chain activities. Primary processes are related to customer services, operation and maintenance, construction of water infrastructures, and development of new products and services. Support processes are related to finance, HR, procurement, facilities, and IT management. Thus, in water companies, with geographically dispersed business infrastructures (water sources, distribution networks and treatment plants), integrated digital solutions are important tools to provide timely and relevant information for field staff and decision-makers across various digital processes, enhancing efficiency and effectiveness (Temido, Sousa & Malheiro 2014).

In the designing stage of digital processes, Park and Mithas (2020) state that the processes capability is measured by achieving flexibility, speed and cost reduction. Messina (2018) also state that it is necessary to consider the three key features of any digital technology, namely, flexibility, adequacy and low cost, because the understanding of which type of changes should be applied to processes is a key factor in achieving alignment between integrated digital technologies and processes. Thus, it is not enough to digitise processes, but also necessary to optimise these processes to align with integrated digital solutions.

Moreover, digital governance is key for digital processes. Digital governance is most commonly defined as 'the employment of technology in governance practices' (Dunleavy et al. 2006, p. 3). These practices include establishing and implementing policies, procedures and standards for the development, use and management of information. Through digital governance, a firm can (a) determine and control digital processes used by data custodians in order to improve the data quality, reliability, security and availability of its services and (b) devise effective procedures for decision-making and for the identification of accountabilities with respect to data-related digital processes (Floridi 2018). Digital governance is a comprehensive framework for establishing accountability, roles, and decision-making authority for an organisation's digital presence—which includes its platforms, mobile apps, social channels, and digital-enabled products and services (Welchman 2015). It also plays a critical role in supporting the change of traditional organisational processes, pushing down digital decision-making, supporting a shared decision-making culture, and activating pervasive, horizontal and collaborative communications (DeLone, Migliorati & Vaia 2018). Therefore, digital governance is related to the area of structures, processes and relational mechanisms for an agile organisation in the digital transformation, which is likely to improve decision-making processes and information flow (Indriasari, Supangkat & Kosala 2020).

In digital processes, Weinrich (2017) highlights three flows of information: (1) within an organisation, (2) inside out of an organisation, and (3) outside in of an organisation. The internal information flow of an organisation refers to the flow of information across various functional areas within an organisation (Galbraith 1974). Based on digital business strategy, what can be digitised will be digitised to reduce costs and increase the quality of processes. Digitisation, improvement, integration and standardisation of processes are inevitable to allow information to be processed quickly (Catlin, Patiath & Segev 2014; Hess et al. 2016; Kamble, Gunasekaran & Gawankar 2018; Ross et al. 2016; Stoffels & Ziemer 2017; Teoh et al. 2022). Thus, digitally enabled internal processes are important to facilitate the flow of internal information and fulfil the needs of stakeholders.

The second information flow is the flow of information across an organisation's borders to reach external stakeholders. Grover and Kohli (2013) describe it as a balancing act of giving away just the right information to stakeholders. In today's digital interconnected world (and ubiquitous information), external stakeholders, such as customers or digital partners, are well informed and digitally empowered, but they want the organisation to be more transparent about the information it provides, such as product quality, features and security, in order to build trust with them (New 2010). However, caution should be exercised when identifying which and how a firm's information flows from the inside out (Granados & Gupta 2013).

The third information flow is from the whole business ecosystem into the organisation in which it operates. Today, an organisation operates within a business ecosystem and takes advantage of the shared digital platforms and processes, which become increasingly commoditised. Markus and Loebbecke (2013) distinguish between standardised digital processes and commoditised digital processes. Standardised processes are digital processes that employ open standards and may be tailored (by choice and extension) to an orchestrator's preferences. Commoditised digital processes are standardised digital processes that are performed in common by most actors within the business ecosystem, including competing orchestrators (Markus & Loebbecke 2013). In simple terms, commoditised digital processes refer to the standardised digital processes that are carried out in the same way using external digital resources and platforms, such as Oracle or SAP. Thus, organisations that use such digital processes need effective digital partnerships that can foster value creation (Teoh et al. 2022).

2.8.5 People with Digital Business Strategy

As digital technologies affect most, if not all, parts of organisational design, digital skills and knowledge are required (Hess et al. 2016; Kretschmer & Khashabi 2020). Organisations that adopt digital business strategy regularly identify what digital skills their employees and managers need (Kane et al. 2017). These organisations go far beyond training to create a digital environment wherein employees are eager to learn continuously, grow and gain new digital knowledge (Kane et al. 2016). People, in such organisations, think not only in terms of digital technologies and business, but also how to gain a deep knowledge of their digital business strategy, as well as the whole business ecosystems in which their organisation operates (Bonchek & France 2015). Thus, deep knowledge of digital business strategy is necessary to leverage internal and external digital resources and generate new value (Bennis 2013; Favaro 2016; Sia, Soh & Weill 2016).

It also important to align digital technologies, governance mechanisms and processes, as well as to implement and manage digital infrastructures in response to the digital business strategy (Haffke, Kalgovas & Benlian 2016; Hansen & Sia 2015; Mithas, Agarwal & Courtney 2012; Mithas & Lucas 2010; Valentine & Stewart 2015). Thus, firms need to overcome digital skill and knowledge shortages to implement such changes and improve performance (Balakrishnan & Das 2020; Boniface 2022; Carcary et al. 2017; Hess et al. 2016; Kane et al. 2017; Kane et al. 2016; Sutherland 2020).

In addition, dedicated digital training and hiring people with the digital skills and knowledge—from academic institutions or digital companies—are common practices under digital business strategies (Catlin, Patiath & Segev 2014; Hess et al. 2016; Matt, Hess & Benlian 2015). According to Kretschmer and Khashabi (2020), since digitally skilled employees work on tasks that align with their abilities, it is likely to lower their financial incentives, which would result in reducing the firm’s expenses. Integrated digital technologies provide an opportunity for managers to track accurately their employees’ performance, leading, ultimately, to higher productivity. Digitalisation of HR systems combined with data analytics provides transparent information to employees regarding their performance, providing them the opportunity to improve. Thus, digital strategy affects employees and managers, and then translates into benefits for the firm.

2.8.6 Reward with Digital Business Strategy

The impact of digital business strategy on reward systems is rarely the focus of attention in the literature (Weinrich 2017). However, there are some interesting findings regarding the common reward practices adopted under a digital business strategy. Kane et al. (2017) find that the organisations that adopt digital business strategy evaluate the performance of their employees. Such organisations set up digital mechanisms and procedures for paying performance-based incentives (Kane et al. 2016). Matt, Hess and Benlian (2015) emphasise that a firm needs to identify specific people to be responsible for digital business strategy, and thus, rewards are directly related to the goals, targets and progress of the digital business strategy. Today, the availability of real-time data and the analysis of employees', managers' and projects' performance contributes to the verification of work progress and exact billable hours (Kretschmer & Khashabi 2020). Integrated digital technologies provide digitally enabled monitoring ability, which can be useful for paying performance-based incentives (Kane et al. 2016; Kretschmer & Khashabi 2020).

In summary, there are clear impacts of digital business strategy on organisational design factors. Therefore, the digital strategic alignment process is now a necessity to address these influences, improve efficiency, and serve organisations, their people and society. However, this process requires CSFs associated with organisational design. The following section discusses the concept of CSFs adopted for this study.

2.9 Critical Success Factors for Digital Strategic Alignment

The concept of CSFs was first discussed by Daniel (1961), who argued that each industry will have three to six success factors, and these factors involve some (sub-factors) tasks that need to be implemented well for an organisation to be successful. Based on Daniel's work, Rockart (1979) further developed the concept of CSFs:

> The limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organisation. They are the few key areas where things must go right for the business to flourish. If results in these areas are not adequate, the organisation's efforts for the period will be less than desired. As a result, CSFs are areas of activity that should receive constant attention from management, as they are subject to constant change (p. 85).

The concept of CSFs has been widely applied to a diverse range of business areas, such as projects management, strategic management and alignment (e.g. Bergeron & Begin 1989; De Sousa 2004; Engert & Baumgartner 2016; Kurti, Barolli & Sevrani 2013; Tan et al. 2007). CSFs are considered important for achieving strategic alignment, and thus are given most attention in the literature and practice (Atkinson 1999). In practice, firms use CSFs to constantly focus on a few factors that ensure the success of the business. This helps the firms to understand the key managerial or organisational areas in which they invest their resources, efforts and time (Kurti, Barolli & Sevrani 2013).

Although the extensive research on alignment has resulted in a large number of CSFs that mostly achieve strategic alignment between business strategy and IT strategy, there is still a lack of knowledge about the CSFs for the digital strategic alignment process between digital business strategy and organisational design (Kahre, Hoffmann & Ahlemann 2017). To date, several studies (e.g. Galbraith 2014; Kretschmer & Khashabi 2020; Raj & Seamans 2019; Tannou & Westerman 2012) have been conducted to investigate the impact of digital business strategy on one or two factors of organisational design. However, the digital strategic alignment process requires CSFs of organisational design to ensure sustainable business performance.

This study, therefore, draws upon the work of Boynton and Zmud (1984, p. 17), who state that CSFs are ‘the few things that must go well to ensure success for a manager or an organisation, and, therefore, they represent those managerial or enterprise areas that must be given special and continual attention to bring about high performance’. Challenges and barriers, when they are adequately addressed and managed, can act as CSFs. On the basis of the above statements, the present study defines CSFs as digital organisational design factors (key factors and sub-factors) that are necessary for an organisation to achieve digital strategic alignment between digital business strategy and organisational design, which in turn enhance sustainable business performance based on economic, social and environmental dimensions. The following section discusses sustainable business performance in this study.

2.10 Sustainable Business Performance in this Research

As incumbent water organisations are becoming more responsible towards society and the environment, this puts pressure on these organisations to measure sustainability. Especially, there have been calls for water infrastructure investments to be based on sustainable digital solutions to meet an increase in population, climate change and digital changes (Kamunda et al. 2020). Dyllick and Hockerts (2002, p. 131) define sustainability as 'meeting the needs of a firm's direct and indirect stakeholders … without compromising its ability to meet the needs of the future stakeholders as well'. More specifically, sustainability refers to 'a strategic and profit-driven corporate response to environmental and social issues caused through the firm's primary and secondary activities' (Salzmann, Ionescu-Somers & Steger 2005, p. 27). In the literature, therefore, many frameworks have been developed to measure sustainability in organisations.

One of the well-known frameworks is the TBL, proposed by Elkington (1998, 1999), which includes three sustainability dimensions, namely, economic, social and environmental performance. While Friedman (1970) argue that sustainable economic performance is the most important dimension in a firm, Jones, Grant and Kramar (2010), Epstein and Buhovac (2014), Cole and Aitken (2019) and Pedroso et al. (2021) argue that all three dimensions are equally important for a firm. The current study argues that sustainable business performance should be evaluated by the three integrated dimensions, and thus leading a firm to achieve economic prosperity, social justice and environmental quality simultaneously (Epstein & Buhovac 2014).

Hourneaux, da Silva Gabriel and Gallardo-Vázquez (2018) state that many studies use TBL as their conceptual reference. These studies (e.g. Boyle 2014; Boyle et al. 2013; Brattebø et al. 2013; Cantele, Tsalis & Nikolaou 2018; da Cruz & Marques 2013; Geyler et al. 2018; Kamble, Gunasekaran & Gawankar 2018; Liu & Mukheibir 2018; Li, Dai & Cui 2020; Marques, da Cruz & Pires 2015; Ponce Romero, Hallett & Jude 2017; Temido, Sousa & Malheiro 2014) developed and tested a set of criteria for measuring sustainable business performance in organisations.

However, previous literature has reached inconsistent conclusions about measuring corporate sustainability performance. Hawn and Ioannou (2016) find that internal and external corporate social responsibility (CSR) actions jointly have a significant positive impact on market value, and misalignment between internal and external actions is likely to negatively influence the economic performance. Wijen and Chiroleu-Assouline (2019) also find that there is an omission of interrelated sustainability issues and the pursuit for the best standards is expected to fail in the absence of right criteria and a comprehensive understanding of causes, effects and adopter behaviour. They conclude that many standards with very similar characteristics confuses stakeholders and should be avoided. There are also some scholars discuss sustainability performance in terms of standardization (Brunsson, Rasche & Seidl 2012), and social and environmental ratings and rankings by non-government and government organisations (Chatterji & Toffel 2010). These studies indicate the importance of what exactly standards and ratings cover and measure and how consistent they are to improve sustainability performance.

Based on the research aim (exploring the CSFs for digital strategic alignment that enhances sustainable business performance), the current study adopts the TBL framework as a theoretical basis to study the relationship between the CSFs of digital strategic alignment and sustainable business performance that is composed of three dimensions—economic, social, and environmental performance—in addition to a set of sustainable business performance criteria related to the water industry proposed and tested in the literature (Brattebø et al., 2013; Cantele et al., 2018; Epstein and Buhovac, 2014; Epstein and Roy, 2001; Fleming, 2008; Li et al., 2020).

For a clear definition of sustainable business performance in this study, two considerations should be given priority. First, economic sustainability refers to a firm's ability to make profits to ensure long-term survival (Fernando, Jabbour & Wah 2019). Second, in the context of digital business strategy, business sustainability is also connected to the firm's ability to process information and deliver products or services based on digital technologies and processes that do not harm the environment or society overall (Liboni, Liboni & Cezarino 2018). In the current study, therefore, sustainable business performance is defined as viable sustainability practices measured by economic, social and environmental criteria. These practices are a main interest of all stakeholders as they can help maintain the long-term health of a company's economic, social and environmental performance (Fernando, Jabbour & Wah 2019).

2.10.1 Economic Performance

In Saudi Arabia, the success of the water industry depends on the provision of water supply and the collection of wastewaters with an adequate quality level. Along with the economic performance, Saudi water companies evaluate themselves through the TBL lenses, centred on economic, environmental and social performance. The Ministry of Environment, Water and Agriculture of Saudi Arabia (MEWA), as a water regulator, uses an assessment approach for water companies in order to improve their performance. This approach includes more than 90 KPIs on various dimensions of water companies' activities, such as water quality, water supply, water conservation, water distribution network efficiency, effluent management, water access, customer services and energy consumption (MEWA 2022). Thus, these activities differentiate the water industry from other industries in terms of economic, environmental and social performance criteria.

In literature, economic performance has been framed in terms of value creation (Epstein & Roy 2001). Although some companies have applied concepts of shareholders value too narrowly, a complete analysis of value creation in water companies should consider the impact of products, services, processes and activities on their various stakeholders. Value creation is a broad concept, and recognises that shareholders value can be increased only by generating value for other stakeholders. Economic performance should be broadly evaluated to include a broad range of stakeholders as well as costs and benefits associated with the value creation to include it in decision-making processes (Epstein & Roy 2001).

The impact of the CSFs of digital strategic alignment may constitute significant cost and revenue drivers. Although these costs and benefits can relate to both social and environmental impacts, most companies focus primarily on the short- and long-term impacts on financial performance (Epstein & Roy 2001; Kaynak 2003; Koh et al. 2007; Lakhal, Pasin & Limam 2006; Sousa & Voss 2002). The financial short-term performance is the complex analysis of current costs and benefits, and this is poor (Vinaja 2019). The financial long-term performance is the manifestation of how a company contributes to the improvement of economic performance, while paying greater attention to environmental and social performance at the local, regional or global level (Vinaja 2019). Thus, value creation associated with the impact of the CSFs of digital alignment can come from lower costs, improved efficiency and increased financial benefits in the long term, which may create a positive reaction from stakeholders, who may benefit from its associated social and environmental benefits.

2.10.2 Social Performance

The social performance of a firm relates to the objectives that are important to the internal and external stakeholders (Epstein & Buhovac 2014), and are typically determined at the formulation stage of digital business strategy. The firm determines who its various stakeholders are and their relevant objectives. These usually include all impacts on the firm's stakeholders (Epstein & Roy 2001). However, since social performance objectives are often broad, firms focus on specific issues of priority, such as social responsibility, philanthropic contributions, gender diversity, increase in employment rate, wages and benefits, health and safety records, human rights issues, social relationships, and the transparency of information they provide (Epstein & Buhovac 2014). This permits better integration of that information (stakeholders' objectives and priorities) into the day-to-day actions and the institutionalisation of social concerns throughout the firm (Epstein & Roy 2001). Thus, firms can improve their social performance through their strategies and daily actions (Epstein & Buhovac 2014).

Water utilities play a critical role in social responsibility by ensuring the quality of water services, and the continuous supply of water to current and future generations (Cantele, Tsalis & Nikolaou 2018). As society considers water a public good, which is valuable for human beings, water companies must also offer appropriate conditions for fair public access and achieve good sustainable performance to gain public legitimacy (Cantele, Tsalis & Nikolaou 2018). In this respect, Fleming (2008) states that the social performance of water utilities should focus on the access to the services, the satisfaction of the stakeholders' needs and expectations, the public acceptance, and the relevant role in the community of these services. Brattebø et al. (2013) determined four main social performance objectives and their performance measures in water utilities in Table 2.1 below.

Table 2.1: Social performance objectives and measures

Social performance objectives	Performance measures
Access to urban water services	Physical service accessibility Economic service accessibility
Effectively satisfy the current users' needs and expectations	Quality of service Drinking water quality
Acceptance and awareness of water services	Willingness to pay Complaining Acceptance of new sources of water
Relevant role in community	Social responsibility Work conditions

Source: Adapted from Brattebø et al. (2013).

2.10.3 Environmental Performance

The environmental performance of a firm relates to the objectives that are important to its stakeholders, such as environmentalists, customers and society (Epstein & Buhovac 2014). These objectives are typically determined at the stage of digital business strategy formulation, in which the firm determines who its stakeholders are and their relevant objectives and impacts. They focus on the firm's contributions to minimising negative impacts that its operations and activities may have on the environment (Boiral, Henri & Talbot 2012; Campos et al. 2015; Clarkson et al. 2008; Epstein & Buhovac 2014). Therefore, firms can improve their environmental performance through their strategies and daily actions (Epstein & Buhovac 2014; Epstein & Roy 2001).

Water utilities play an important role in environmental sustainability by ensuring the protection of public health and environment, particularly by controlling the water and air pollution caused by their activities, as well as the protection of the water resources (Cantele, Tsalis & Nikolaou 2018). Water utilities also need to adopt innovative solutions that contribute effectively to environmental sustainability (Marques, da Cruz & Pires 2015; Monks et al. 2019; Mounce 2020; Stewart et al. 2018; Stoffels & Ziemer 2017). As stakeholders consider water a public good that is valuable for human beings, they share this need with water utilities for sustainable water management (Poch et al. 2020). Stakeholders will have greater confidence in the water services provided if these are made available in accordance with their values, preferences and ethical expectations (Moore

1995; Poch et al. 2020). Thus, water utilities need to improve the quality of water supplied, and reduce the use of water, energy and polluted materials.

Brattebø et al. (2013) determined the two main environmental objectives and their associated performance measures that should be evaluated in most water utilities, as shown in Table 2.2 below.

Table 2.2: Environmental performance objectives and measures

Environmental performance objectives	Performance measures
To optimise the use of water, energy and materials	Energy use Material use Final uses of efficiency
To minimise downstream negative impacts	Pollution prevention Pollution control

Source: Adapted from Brattebø et al. (2013)

The key issue is to reach innovative solutions that deliver the sustainability objectives. These solutions often arise from a shared vision and objectives, innovation in technology and processes, knowledge sharing, and internal and external collaborations, which translate into green practices. In Saudi Arabia, for example, the digital integration of SCADA, MDM and digital metering systems enabled NWC to analyse data and reduce non-revenue water levels by 3.4% in 2019 alone (GWI 2020). Liu et al. (2017), in their study of 120 households in Sydney, found that the water conservation rate of providing customers access to their information using a digital platform is 4.2%. By studying the impact of customers' access to their information via integrated digital solutions, Schultz, Javey and Sorokina (2018) found a 50% reduction in water leaks (down from 12% to 6%), and a 34% reduction in the length of time to fix the leaks. Indeed, water conservation through reducing water leaks, overall demand and non-revenue water will reduce the volume of water required to be sourced, and this may reduce the cost of wholesale water to the water utility. Moreover, Morote and Hernández-Hernández (2018), in their use of big data analytics and digital water meters in a water company in Spain, note that the detection of unauthorised water use (thefts) has increased. Hence, these practices fulfil stakeholders' needs, and in turn enhance sustainable business performance. The following section discusses a number of strategic analysis theories proposed by strategy scholars for the analysis of digital strategic alignment as a frame of reference in this study.

2.11 Analytical Theories for Digital Strategic Alignment

A sustainable business performance arises from sustainable competitive advantages (Peteraf 1993; Porter & Heppelmann 2014). A competitive advantage is gained when a firm develops or acquires unique sets of resources and competencies that allow it to outperform its competitors. Efficiency, quality, innovation and customer responsiveness are other examples of the sources of competitive advantage (Hill, Jones & Schilling 2016). Galbraith (1974), who proposed the IPV of organisational design, also suggests that relational (deliberate) planning, reducing uncertainty, increasing integration processes, and vertical and lateral relationships can be sources of competitive advantage. In this respect, Porter (1980) states that many types of competitive advantage in the literature can be summarised in two categories: lower costs and differentiation. He also states that a sustainable competitive advantage can lead an organisation's design to create barriers to imitation and substitution, and to adapt to the market changes and leverage new opportunities, such as technology (Porter 1980).

According to Mishra and Mohanty (2020), there have been dominant theories in the strategy research at different times, such as the MBV proposed by Porter (1980; 1985) and the RBV developed by Wernerfelt (1984) and Barney (1991). While the MBV focuses on developing a strategy that achieves the best alignment between a firm and its external environment to gain a sustainable market position (Porter 1980), the RBV gives a primary role to internal organisational resources, which firms develop and exploit as key drivers for achieving sustainable competitive advantage (Barney 1991, 2001; Hoopes, Madsen & Walker 2003). However, Hooley et al. (1996) state that the RBV only focuses on internal resources and ignores the firm's market position and external influences. There are also the capability-based view (CBV) (Amit & Schoemaker 1993; Grant 1991; Teece, Pisano & Shuen 1997) and the KBV (Grant 1996b; Murray 2000; Tiwana 2002) of strategy, which were derived from the RBV.

Another well-known theory is the dynamic capabilities theory, which was developed to address the main shortcoming of the RBV in terms of analysing external dynamic environments (Teece 2007; Teece, Pisano & Shuen 1997). Dynamic capabilities are 'the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments' (Teece, Pisano & Shuen 1997, p. 516). This theory suggests three generic dynamic capabilities, namely, sensing, seizing and reconfiguring. However, Easterby-Smith, Lyles and Peteraf (2009) state that it is difficult to empirically measure the dynamic capabilities that are the underlying organisational processes as well as the interrelated relationship between each dynamic capability and firm performance. Grant (1996b), who proposed the KBV, states that the process of sensing capability depends on individuals' knowledge and cognitive capabilities, and therefore, it does not consider the moods, emotions and experience of managers, which likely determine what the organisation's concerns are and how this organisation responds. Zack (1999), therefore, argues that the capability to learn, create and apply new knowledge is important for gaining and sustaining competitive advantage in organisations, and thus, the KBV can help overcome such criticisms. In the next two sub-sections, the KBV and the IPV are discussed.

2.11.1 The Knowledge-Based View

The KBV views a firm as 'a dynamic, evolving, quasi-autonomous system of knowledge production and utilisation' (Spender 1996, p. 59). Herden (2020) used the KBV to provide a theory-based explanation for the generation of competitive advantage from data analytics and to examine this explanation with evidence from confirmatory case studies. He finds that knowledge integration across organisational factors enhances the results of data analytics, improves decision-making processes, and creates competitive advantage. He also states that the KBV recognises the essential role of knowledge that achieves competitive advantage in firms and explains the firm's ability to create, transfer and integrate knowledge. While knowledge creation means how to develop new knowledge in the firm, knowledge transfer refers to the sharing of that knowledge without the receivers' ability to apply it. In contrast, knowledge integration refers to the sharing of that knowledge with the receivers' ability to apply it, and not necessarily possess it (Herden 2020). The created knowledge can be shared and integrated with other knowledge to continually create new knowledge as a source of sustainable competitive advantage (Barney 1991; Grant 1996a, 1996b; Okhuysen & Eisenhardt 2002).

To achieve a sustainable competitive advantage, the efficiency of knowledge integration should be realised. The efficiency depends on (a) the level of knowledge, (b) the frequency of integration of specialised and common knowledge, and (c) the organisational structures that reduce the communication required for integrating the knowledge (e.g. flat and agile structures) (Grant 1996a, 1996b; Herden 2020; Spender 1996). Grant (1996a, 1996b) also states that a sustainable competitive advantage requires a constant renewal of organisational capabilities, such as people and technology, because such advantage depends on an ever-increasing scope of knowledge integration. Thus, the KBV addresses issues of a firm's strategy, structures, culture, people and coordination to create a sustainable competitive advantage (Grant 1996a, 1996b, 2018).

Grant (1996a, 1996b) also identifies four mechanisms of knowledge integration: (a) directives and rules, by which explicit knowledge can be communicated between specialists and non-specialists, and tacit knowledge, which can be transferred into explicit knowledge by rules, formulas and technologies; (b) organisational routines as a mechanism for formal coordination; (c) sequencing, in which individuals integrate their specialised knowledge through sequential patterns of social interaction; and (d) teams for development, problem-solving and decision-making. The purpose of these mechanisms is to gain sustainable competitive advantage, which help sustain business performance.

However, Herden (2020) states that the teams' mechanism is embedded within lateral relationships that come from the IPV theory, which can be considered personal, social-interaction dependent, and less straightforward (Canonico et al. 2012; Galbraith 1974; Grant 1996a). While Thompson (1967) viewed sequential interdependence as technological determinism (imperative), especially in production activities, Grant (1996b) —who developed the KBV—asserts that sequential patterns can also be seen as social interaction (imperative), particularly with design processes and strategic planning. This is an important point to improve our understanding about sequential patterns of knowledge integration in the alignment process.

As this process requires reshaping an organisation based on innovative and integrated digital technologies and end-users' requirements, this leads us to think about the alignment process. In other words, what theoretical assumption are we making? What are the technological and social processes that underlie the organisational phenomenon? According to Markus and Robey (1988) and Rowe and Markus (2018), there are three schools of thoughts: technological imperative, organisational-social imperative, and emergent perspective or social-technology imperative (DeSanctis & Poole 1994). Indeed, the social-technology imperative acknowledges that the social interaction influences the design of digital technologies and their outcomes. It, therefore, requires the knowledge of dynamic organisational processes, as well as deep understanding about the interests of stakeholders and the features of technology (Rowe & Markus 2018). Since social-technology imperative considers the various influences affecting an organisation's design as a result of digital technological change, it is closer to achieving the research objectives.

Based on the social-technological imperative, the digital business strategy formulation and implementation process is linked to strategic, digital and organisational contexts to encompass social and technological processes of an organisation. These processes, in essence, involve all the social aspects that are relevant to the complete process of introduction of a specific digital technology into the organisation. Therefore, it is a decision by the organisation to formulate a need to implement the digital technology (e.g. mobile apps) as part of the digital strategic alignment process in the organisation. Focusing on the decision support process, which requires the integration of digital technologies into organisational processes at all levels of the organisation, the IPV displays the most relevant and leading theory for the integration.

2.11.2 The Information Processing View

The basic proposition of the IPV, presented by Galbraith (1974, p. 28) as a way of viewing an organisation as an information processing system, is that 'the greater the uncertainty of the task, the greater the amount of information that has to be processed between decision-makers during the execution of the task'. He believed that information flow depends on task uncertainty—if the task is well understood before its performance, much of the activity can be pre-planned. Thus, the IPV assumes that an organisation is designed simultaneously with its deliberate strategy to correctly utilise its scarce resources, which will likely improve decision-making and minimise task uncertainty (Burton, Obel & Håkonsson 2020; Galbraith 1974).

IPV highlights three key concepts: information processing requirements (IPR), information processing capabilities (IPC), and the alignment between the two concepts to achieve optimal performance (Galbraith 1973). Firms need to reduce IPR by creating appropriate structures and self-contained tasks to establish decision-making power where the information exists (Galbraith 1974). Thus, processes should reduce the uncertainty and equivocality in the information by reducing the amount of irrelevant information included (Li et al. 2021); thus, IPR stems from processes embedded within structures.

IPC refers to an organisation's capability to gather, integrate, interpret, store and transmit information in the context of the decision-making process (Mani, Barua & Whinston 2010; Roberts & Grover 2012; Tushman & Nadler 1978). Hierarchical or lateral relationships (e.g. between business and IT experts) also enhance IPC by generating additional information through information exchange, thus reducing the information's uncertainty and equivocality (Li et al. 2021; Srinivasan & Swink 2018). Therefore, IPC is the primary enabler in making decisions, improving efficiency, and gaining a competitive advantage (Cao, Duan & Cadden 2019).

Several studies demonstrated the importance of aligning IPR and IPC to improve performance (Li et al. 2021; Moser, Kuklinski & Srivastava 2017; Winkler, Kuklinski & Moser 2015). Therefore, organisations must apply various IPC integrations—technologies, people, structures and processes—for different IPR groupings—type, quality and quantity of information required to be processed—to obtain the required alignment between IPC and IPR and achieve sustainable performance (Zack 2007).

As the research study is based on the complementarity of IPV and KBV theories, it is important to better understand the fundamental differences between information and knowledge for strategic analysis. Information consist of data and facts concerning natural or social events and the consequences of these events under given situations (Carlisle 2002). On the one hand, there is a limited number of natural or social events in the world. These events might occur and may not be expected by organisations. On the other hand, knowledge is limitless, and is 'constantly replenished with streams of new ideas' (Leonard-Barton 1995, p. 3). In the KBV literature, knowledge is considered a 'justified true belief' (Nonaka & Takeuchi 1995, p. 21). One of the inputs to the decision-making process is information, and therefore, it can also be used to justify beliefs. However, information depends on knowledge for this interpretation. Therefore, information is relevant in the light of knowledge as knowledge can be added to or changed on the basis of new information (Carlisle 2002).

According to the KBV, a firm's strategy is not seen as a top-down process in which strategy formulation and implementation are separate, as is the case with the IPV approach, but it can be continually developed with the emergence of new good ideas anywhere in the firm (Grant 2016, 2018). The KBV focuses on human interaction in making the best possible use of vision, innovation and ambition as key human features

(Carlisle 2002). In contrast, the IPV emphasises the rationality in human thinking and information processing (Williamson 1985). While the IPV assumes that people are by nature rational thinkers who will implement work through which they can obtain maximum benefits for minimum time and effort (Carlisle 2002), the KBV delves deep into human interactions, knowledge integration mechanisms and organisational factors depending on the differences between information and knowledge to provide a more realistic view to create sustainable business performance. Therefore, the KBV clearly has the potential to support the IPV theory in this study as they are not incompatible and there are obvious complementarities (Carlisle 2002).

According to Carlisle (2002), who established a theoretical approach to compare and use the IPV and KPV in research, information is as important as knowledge in organisations, but on its own it is not sufficient to ensure sustainable business performance. The characteristics and differences between information and knowledge and their relationships with strategic objectives setting, planning and implementation can highlight their important roles to achieve a sustainable business performance. Based on Carlisle's (2002) approach, the research will clarify how the two understandings (IPV and KBV) of strategy are compatible and that there are clear complementarities on which this research depends.

For instance, IPV presumes that people are by nature rational thinkers who will implement work through which they can get maximum benefits for minimum time and effort, while the KBV suggests that people are creative, visionary, and collectively ambitious. The KBV also seeks to develop superior capabilities for exploiting knowledge while focusing on issues of internal organisational factors, whereas IPV puts much attention to information flow in analysing organisations as a means of achieving the efficient deployment of scarce resources. Thus, the current study adopted Carlisle's (2002) approach because the role of IPV and KBV theories to strategy affects our understanding of what organisations need to sustain business performance.

2.12 Distinction between Conventional Strategic Alignment and Digital Strategic Alignment

This research distinguishes between conventional strategic alignment and digital strategic alignment in three comparisons as follows.

2.12.1 The Existing Models of Conventional Strategic Alignment

The existing strategic alignment models, such as SAM and SAMM, focus on alignment between business strategy and IT strategy to achieve a positive effect on performance (Gerow et al. 2014; Henderson & Venkatraman 1999; Luftman 2000). These models were a reasonable choice at that time because the IT capabilities were limited and used within a company (Hess et al. 2016), but the emergence of new digital technologies, which go beyond borders of firms, has forced significant changes to business strategy and processes (Bharadwaj et al. 2013; Wunderlich 2018). Thus, the alignment between business strategy and IT strategy no longer exists as the two strategies are now fused into one digital business strategy (Bharadwaj et al. 2013; Chi et al. 2018; Sutherland 2020).

However, the strategic alignment models (SAM and SAMM) are not only related to the two strategies, but also involve the alignment between other factors in an organisation, such as people, processes, structures and infrastructures. Therefore, this study argues that digital business strategy and organisational design factors still need to be aligned. Figure 2.3 illustrates the state of alignment after the emergence of digital business strategy and changing the concept of strategic alignment from being fit between business strategy and IT strategy, and the factors of organisational design, to digital strategic alignment between organisational design and digital business strategy.

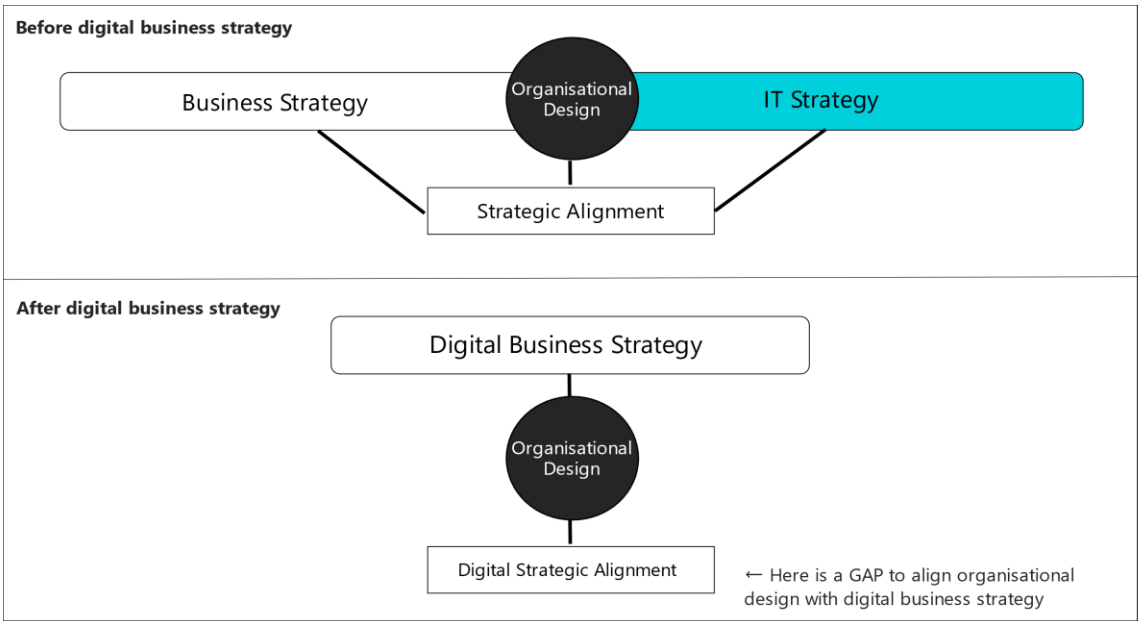


Figure 2.3: The state of alignment with the emergence of digital business strategy (Source: the researcher)

2.12.2 Knowledge Gaps and Conceptualisation of Digital Strategic Alignment

To define the concept of digital strategic alignment in this study, it is important first to discuss the gap in the literature. Coltman et al. (2015) state that the emergence of digital business strategy has created a need to improve our understanding of alignment. Li et al. (2016) note that effective digital alignment between business, infrastructure and digital strategies requires e-leadership capabilities. Although their study deals with the concept of digital alignment, it does not define this concept. Kahre, Hoffmann and Ahlemann (2017) recommend that future researchers use existing strategic alignment models to explore the factors of organisational design appropriate to achieving 'digital alignment'.

From a social-technology perspective, Winby and Mohrman (2018) state that the impact of digitalisation on organisational design requires an updated approach to address the resulting gap between the technology and the people of digitally enabled organisations, and thus, traditional organisational design frameworks need to be updated to align the stakeholder interdependencies and digital impacts. Holgeid et al. (2019) also refer to aligning digital business strategy with organisational design as of utmost importance to improve performance. They encourage future researchers to study this relationship with a focus on value creation.

In addition, Rahrovani (2020) demonstrates that the organisation's intended strategy differs from the realised strategy, which can affect digital alignment; this supports the notion that 'alignment is a moving target' (as a process) (Coltman et al. 2015). Kretschmer and Khashabi (2020) also state that digital strategy has effects on organisational design that should be explored and considered. More recently, Llamzon, Tan and Carter (2022) suggest the need to increase focus on structural alignment explaining how digital business strategy is implemented in practice. Thus, the digital strategic alignment process—between digital business strategy and the other factors of organisational design—is now a necessity.

However, there are similar conceptualisations of the traditional organisational design alignment process. The Star model of organisational design adopts the idea of the alignment process between strategy, structure, processes, people and rewards to create an effective organisation capable of achieving the business strategy (Galbraith, Downey & Kates 2002; Kates & Galbraith 2007). The dynamic equilibrium between these factors can improve business performance (Galbraith 2000, 2011). Likewise, Kayaga, Kingdom and Jalakam (2018) conceptualise effective organisational designs as the ones that address organisational deficiencies by consciously aligning organisational factors with a well-articulated strategy. They found a link between the organisational design factors and performance of water utilities. Thus, in this study, a clear definition of the digital strategic alignment process can be conceptualised in relation to organisational design factors, including digital business strategy, and sustainable business performance.

Considering the above literature and the research results, the digital strategic alignment can be conceptualised as a continuous dynamic process that aims to (1) support a deliberately emergent digital business strategy, (2) adapt integrated digital solutions in response to social and technological requirements, (3) shape digital architecture-based organisational design, (4) dynamically address organisational deficiencies, and (5) sustain business performance over time. This enables organisations to achieve their stakeholders' interests, exploit new opportunities and cope with ever-changing market conditions.

2.12.3 The 'Theoretical Science' of Digital Strategic Alignment

Conventional models of strategic alignment have been criticised for the lack of theoretical support for the organisational issues of alignment (Bergeron, Raymond & Rivard 2001). Most strategic alignment studies have been conducted on the basis of the literature of strategic alignment and contingency theory. Such bases do not provide comprehensive theoretical support for the processes, coordination and control mechanisms through which organisations create and sustain the alignment (Chan & Reich 2007).

Recently, well-established theories, such as the RBV, KBV and IPV, have been used as robust theories that address these issues, support the theoretical research on alignment issues and explain how alignment improves performance (e.g. Kearns & Sabherwal 2006; Srinivasan & Swink 2018). The digital business strategy was based on two theories, namely, the RBV and the dynamic capabilities, providing holistic theoretical support for research in this field (Bharadwaj et al. 2013). The KBV was originated from the RBV. The KBV is also useful for digital strategic alignment because it links knowledge considerations to alignment issues of organisational design and business performance (Grant 1996a, 1996b, 2018; Kearns & Sabherwal 2006). The IPV considers the extent to which the information flow and processing is effective, given structures, processes, people and coordination issues. Therefore, this research adopts the IPV and KBV as theoretical foundations of the research. The next section presents the theoretical framework of the study.

2.13 The Research Theoretical Framework

The initial theoretical framework for this study adopts the Star model of organisational design proposed by Kates and Galbraith (2007). It involves five major interrelated organisational components, namely, strategy, people, structure, rewards and processes. The Star model is suitable for this study for the following reasons. First, the idea of alignment is fundamental to this model, which is based on the IPV. Second, each factor of the organisational design should work well to support the strategy. Misalignment in any of these factors will result in lower performance. Third, the model views an organisation as a dynamic entity, wherein changes in organisational design could occur because of the choice of the firm’s strategy. Last, it is suitable to analyse any component within an organisation as a unit of analysis (Kates & Galbraith 2007), whereby the current research moves from the strategic level towards the operational level of analysis. The theoretical framework for the research is presented in Figure 2.4 below.

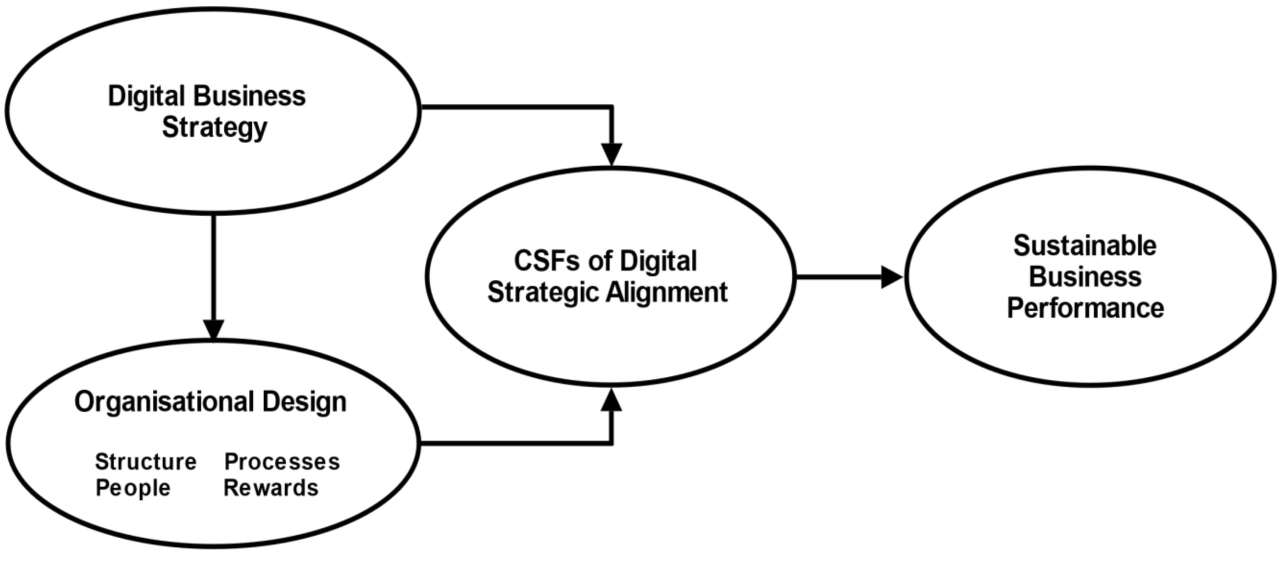


Figure 2.4: The initial theoretical framework for the research (Source: the researcher)

From the IPV perspective, the alignment between (digital) business strategy and organisational design factors facilitates information flow across functional areas within an organisation and externally with others (Galbraith 1974). Kahre, Hoffmann and Ahlemann (2017) argue that the scope, scale, speed and value creation of digital business strategy proposed by Bharadwaj et al. (2013) are the preferred approach in the literature to better understand a firm's digital business strategy and the motivation to reconfigure the organisation design. Holgeid et al. (2019) believe that linking digital strategy with organisational design is of utmost importance for improving business performance. Thus, this study applied the view on digital business strategy (Bharadwaj et al. 2013) in the Star model of organisational design proposed by Kates and Galbraith (2007) to help delineate the CSFs of digital strategic alignment that enhances sustainable business performance.

According to Ketokivi and Choi (2014), this study can be considered a theory elaboration as it seeks to identify additional factors that could potentially extend the applicability of the organisational design model—in the context of digital business strategy—and benefit organisations, employees and society, especially in the Saudi water sector.

Marques, da Cruz and Pires (2015) state that in water utilities, sustainable business performance is usually assessed using the TBL proposed by Elkington (1998, 1999). Utilities need to dynamically align the digital business strategy with organisational design. The proposed relationship was based on three factors. First, the digital business strategy principle encourages firms to use digital resources efficiently, leading to reduced costs and increased revenues (Bharadwaj et al. 2013; Yeow, Soh & Hansen 2018). The optimal use of resources often drives firms to improve alignment (Yeow, Soh & Hansen 2018). Second, the alignment process can enhance sustainable business performance if firms consider sustainability requirements during strategy formulation and implementation (Engert & Baumgartner 2016). Third, identifying CSFs requires an assessment of their positive impact on sustainable business performance. Thus, this research adopted the TBL as a theoretical basis to study this relationship based on three dimensions—economic, social and environmental performance—in addition to a set of sustainable business performance criteria related to the water industry proposed and tested in the literature (Brattebø et al. 2013; Cantele, Tsalis & Nikolaou 2018; Epstein & Buhovac 2014; Epstein & Roy 2001; Fleming 2008; Li, Dai & Cui 2020).

In summary, our analytical framework used the Star model of organisational design (Kates & Galbraith 2007), the view of digital business strategy (Bharadwaj et al. 2013), and the TBL (Elkington 1998, 1999) to explore the CSFs of digital strategic alignment underpinned by the IPV (Galbraith 1974) and the KBV (Grant 1996b). To the best of our knowledge, the model has not yet been used in the context of digital business strategy and sustainable business performance, making it appropriate to explore its impact on organisational design in the context of water utilities, and elaborate the model accordingly.

2.14 Conclusion

The findings of the literature review can be summarised in some key points. First, the alignment between digital business strategy and organisational design factors needs further investigation (Kahre, Hoffmann & Ahlemann 2017; Kretschmer & Khashabi 2020; Llamzon, Tan & Carter 2022). Second, integrated digital technologies affect the organisation inside and out. Many studies do not deal with such technologies in a holistic way (i.e. under digital business strategy), as is often emphasised (Ross, Beath & Sebastian 2015). Third, organisational structures become increasingly agile and decentralised (Weinrich 2017) as digital strategies have eliminated some traditional tasks and positions (Kretschmer & Khashabi 2020). Fourth, literature suggests that digitisation, improvement, integration and standardisation of processes are inevitable to allow information to be processed quickly and to reduce IPR (Catlin, Patiath & Segev 2014; Hess et al. 2016; Kamble, Gunasekaran & Gawankar 2018; Ross et al. 2016; Stoffels & Ziemer 2017; Teoh et al. 2022). Fifth, digital business strategy needs skilled employees and managers (Kane 2017; Kane et al. 2017; Kane et al. 2016; Kretschmer & Khashabi 2020). Last, reward systems do not warrant much attention in the literature, but there is focus on linking people’s rewards to the goals and progress of the digital business strategy (Matt, Hess & Benlian 2015).

In the water industry, water companies have begun to demonstrate a strong interest in digital business strategy, but there is a scarcity of knowledge on how digital business strategy is formulated, implemented and aligned with organisational design factors in water contexts. The issue related to digital strategic alignment lies in the immaturities of digital business strategies for implementation and the underdeveloped digital and organisational factors—no linkages among these are recognised in the extant literature. Therefore, the understanding of digital business strategy and its alignment process is truly necessary for water companies to transform into digital-enabled organisations and enhance sustainable business performance.

The gap in our understanding can be interpreted across two academic domains: strategic studies and IT studies. Strategic studies have historically been strategic-centric, disregarding the technological influence. Likewise, in the field of IT studies, strategic organisational practices and human interactions are often ignored. Therefore, the combined insights from the IPV (Galbraith 1974) and the KBV (Grant 1996b), including the social-technology imperative for knowledge integration processes (Rowe & Markus 2018), are used to address this issue in Chapter 4 and discussed in Chapter 5. In addition, to support the research theoretical framework involving the Star model of organisational design (Kates & Galbraith 2007), the view of digital business strategy (Bharadwaj et al. 2013) and the TBL (Elkington 1998, 1999) are adopted. Seeking to build a robust research design that achieves the research objectives, the next chapter presents how data were collected and analysed, the inquiry method, and the underpinning philosophical position.

Chapter 3: Research Design and Methodology

3.1 Introduction

At the beginning of a research study, researchers often face many options regarding how to capture the phenomena they want to investigate. The term ‘research design’ in this research is used to capture the interacting elements of research philosophy, research methods and data analysis that together constitute the whole research process. The choice of these elements and the strategy for combining them are formative to produce a study capable of providing a novel contribution to knowledge. Developing a coherent research structure to drive the research process should be considered an essential step for any research. Therefore, the researcher must give very clear explanations and justifications as to the philosophical positions, methodological approaches and analytical choices made.

This chapter consists of seven sections. The first section is an introduction that illustrates the purpose and structure of the chapter. Following that, three sections present the methodological considerations, which include philosophical positions, research approaches, and research methods (quantitative and qualitative). The five section provides a discussion of the research methodology adopted for the study. It discusses different research approaches and identifies the best research method that might help address the research objectives and be compatible with the philosophical position of the research. In addition, it contains clear justifications for selecting the research method. The six section presents the research design which includes the data collection and analysis strategies. It also provides details about ethical considerations and data access. The last section summarises the research methodology and design adopted for the study.

3.2 Research Philosophy

Research philosophy is defined as ‘the nature of knowledge’, and also refers to a system of assumptions that develop knowledge (Lee, Bill & Saunders 2017; Saunders, Lewis & Thornhill 2019). The researcher’s philosophical perspective influences the choice of the research methods to address the research questions (Greenwood & Levin 2007). An understanding of philosophical paradigms is important to help the researcher to identify, clarify and create proper research designs (Easterby-Smith, Thorpe & Jackson 2012).

Deciding on research design is necessary to both the philosophical paradigm underpinning the research and the knowledge contributions that the research is likely to provide (Dainty 2008). D'Cruz, Timbrell and Watson (2015) state three philosophies that are applicable in the context of digital strategy research. These philosophies are epistemology, ontology and axiology (Saunders, Lewis & Thornhill 2019).

3.2.1 Epistemological Position

Epistemology is the beliefs of the way knowledge is constructed (Boon & Baalen 2019; Hirschheim, Klein & Lyytinen 1995; Hofer 2001). In other words, it is the study of knowledge. Each philosophical perspective contains a certain epistemological position to the extent that certain paradigms of knowledge are most privileged or rejected. Accordingly, many epistemology issues confront the researcher in social science, for example, the possibility of knowledge—to what extent can a novel or genuine form of knowledge be achieved? The origin of knowledge influences its essence—whether it is derived from the conscious mind, or the human senses, or human experiences (Delanty & Strydom 2003). Thus, it is possible to differentiate between the nature, origin and limits of knowledge, and what constitutes truths. Three main perspectives of epistemology in social science, namely, positivism, interpretivism and realism, are discussed below.

3.2.1.1 Positivism

The positivist approach believes that reality (truth) is objectively given and can have quantifiable predictive features. It aims to identify reliable predictions of events or inquiries and to produce pure data and facts (Saunders, Lewis & Thornhill 2019). Under this approach, the researcher focuses on reducing the field of inquiry by concentrating on certain areas to gather measurable data. The discovery of the causal relationships, including quantifiable measures of variables, propositions and hypotheses testing, and the finding of inferences and conclusions about a phenomenon are essential for positivism (Orlikowski & Baroudi 1991; Saunders, Lewis & Thornhill 2019). As a social science philosophy, the positivist approach has been criticised from the interpretivist approach. The critique has concentrated on positivism's inadequate perspective on the nature of social reality. For example, Kuhn (2012) argues that the positivist approach cannot explain the way social reality is created and preserved, as well as how people's actions are interpreted.

3.2.1.2 Interpretivism

The constructivist–interpretative paradigm aims to gain understanding of a phenomenon in its real context, in which it is constructed and interpreted through different perceptions of people (Orlikowski & Baroudi 1991; Saunders, Lewis & Thornhill 2019). People's perceptions are often based on their own situations and experiences, meaning that there is no single reality but as many realities as different views (Saunders, Lewis & Thornhill 2019). Interpretivism lies in the belief that meanings are constructed from social interactions and adjusted through interpretive processes (Boland 1979). Such processes require the researcher to gain understanding of the socially constructed meanings and interpret these meanings in social scientific language (Blaikie 2007), which is constructed to capture social phenomena (Barrett & Orlikowski 2021; Orlikowski 2010).

However, the constructivist–interpretative paradigm has also been subject to criticism. The critique is that interpretive researchers dissociate themselves from any form of structural analyses (Rex et al. 1998). Giddens (1984) also argues that the significant and unintended result of people's actions reinforces beliefs, roles and meanings, and maintains the social structures and practices over time.

This research adopts the constructivist–interpretative paradigm because of the following reasons. First, 'meanings are constructed by human beings as they engage with the world they are interpreting' and, second, the collective generation and transmission of meaning (Crotty 2020, p. 43). Third, digital strategies may be perceived differently depending on the social context in which they are constructed and interpreted (D'Cruz, Timbrell & Watson 2015). While digital strategy can be seen as an external reality (ontology), it can be examined by investigating the way in which organisations construct meaning by collectively formulating and implementing digital strategy in a certain social and technological context. The interpretative paradigm in this research embodies this perspective of social reality.

3.2.1.3 Realism

Realists are pragmatic in their nature (Saunders, Lewis & Thornhill 2019). They believe that interpretivism and positivism are not necessarily opposing viewpoints (Hibberd 2010), and emphasise that there are many correct methods to science (Hirschheim, Klein

& Lyytinen 1995; Morgan 2005). Kuhn (2012) argues that one paradigm designed for research in normal science may overlook one aspect of the quality of human experience. Therefore, research in social sciences requires a willingness to adopt different paradigms and objectives, tolerance, and breadth of vision (Mumford 2006; Orlikowski & Baroudi 1991).

3.2.2 Ontological Position

Ontology is defined as the 'study of being' (Crotty 2020, p. 10). The ontological assumptions are concerned with the nature of the social world in which we investigate. These assumptions are those that answer the question, 'What is there that can be known about it?' (Guba & Lincoln 1994, p. 108). Dainty (2008) states that it means the conceptions of reality, and in a broad sense, it is objectivism or constructivism. Objectivists believe that social entities or objects exist autonomously (external) to the social actors interested in their existence and can be investigated as such (Bell, Bryman & Harley 2019). This belief is the foundation of the scientific method of investigation. The scientific method selects a number of elements, not all, in any given situation, and thus misses some pivotal or related elements. The selection is carried out to investigate the elements that can be subject to quantitative analysis. Therefore, the scientific method of inquiry is reductionist in its nature (Creswell 2018; Williamson, K & Johanson 2018).

In contrast, constructivists believe that social entities or objects of thought arise from the social actors' perceptions and their consequent actions as they are concerned with their existence. In the subjectivist school of thought, the philosophers surmise that social phenomena are constructed through social interaction, and therefore, they are in a constant state of development and revision (Babbie 2020; Bell, Bryman & Harley 2019). A researcher's epistemological beliefs about how to construct knowledge are linked to the ontological position (conceptions of reality). The positivism perspective is inextricably linked to the ontology of objectivism (a single objective reality), and in contrast, the interpretivism perspective is often linked to the constructivist ontology (multiple realities) as they agree that meaning is constructed by human beings, and they have the same goal of understanding the living experience (Crotty 2020).

The question here is whether the social reality is internal or external to the individual. In this research, the analysis of digital strategy (and its alignment process with organisational design) is interpreted through people's experiences in their work setting. The social reality through human perceptions is crucial. Therefore, it can be argued that the reality in social reality (in organisations) is internal reality and therefore follows the constructivist school of ontology.

3.2.3 Axiological Position

Axiology is concerned with values and ethics (Saunders, Lewis & Thornhill 2019). Axiology can be traced back to the ancient Greek word *axia*, which means 'value' (Alavi 2007). Therefore, axiology is the study of value, and investigating the value of knowledge comes from investigating the value it creates for people and their work contexts (Saunders, Lewis & Thornhill 2019). Hence, it can be achieved by investigating end-users' opinions through qualitative and/or quantitative research.

3.3 Research Approaches

In addition to the philosophical positions (epistemology, ontology and axiology), researchers must also define the research approach by which the researcher provides a clear direction for the research design and logic of enquiry and for data collection and analysis procedures (Williamson & Johanson 2018). Researchers consider the connections and interaction between a theory, a case study method and the phenomena when it comes to designing a research approach (Lee, Bill & Saunders 2019). Development in research depends on what phenomena the researchers are able to capture, and how to develop a new or existing theory or to test an existing theory to explain those phenomena or parts of them, as well as what research methods are used in the validation process. In the social science, three schools of thought aim to connect theory, research methods and empirical phenomena.

The first approach relies on a deductive approach under which the researcher starts with an existing theory that is often developed from the literature, and hypotheses are deduced from the theory and the researcher designs a research strategy to empirically test the existing theory (Saunders, Lewis & Thornhill 2019). The second uses an inductive approach under which the researcher begins collecting data to explore the phenomenon to generate a theory (often through a theoretical framework). The last one uses an abductive approach, wherein the researcher starts collecting data to explore the phenomenon, and then identifies themes to generate a theory or elaborate an existing theory, which the researcher subsequently tests through additional data collection, and the theoretical framework evolves simultaneously and interactively with observation (Saunders, Lewis & Thornhill 2019). The next three sub-sections discuss the three approaches and their implications for research.

3.3.1 Deductive Approach

Deductive research aims to identify generalisable laws using causal relationships between concepts and/or variables (Saunders, Lewis & Thornhill 2019). It has been criticised by followers of the inductive approach because of its tendency to build a rigid methodology and very restricted relationships and sequences between theories and empirical data, which do not permit alternative interpretations of what is going on (Bell, Bryman & Harley 2019; Saunders, Lewis & Thornhill 2019). In sum, this approach may not reflect the social reality of the phenomenon under research in its real context, and most likely to be underpinned by the positivist paradigm.

3.3.2 Inductive Approach

The inductive approach is an alternative research approach to developing, not testing, a theory, which is the inverse of the deductive approach (Saunders, Lewis & Thornhill 2019). In this approach, participants are chosen using a purposeful or theoretical sampling approach. It has been argued that a small sample size might be more appropriate than a large sample size, as in the deductive approach (Saunders, Lewis & Thornhill 2019). Researchers using the inductive approach are more likely to work with qualitative data to explain different views of a phenomenon (Goering & Streiner 1996; Saunders, Lewis & Thornhill 2019). In sum, the inductive research approach is most likely to be used by the interpretivist paradigm because of its relevance to humanities and its concentration on the importance of subjective interpretations.

3.3.3 Abductive Approach

The abductive research process aims to develop the understanding of a new social phenomenon. Dubois and Araujo (2004) suggest an iterative process of dialogue between the data collected and a mixture of existing theories and propositions to develop knowledge (Dubois & Araujo 2004; Dubois & Gadde 2002, 2017). The propositions or conceptual frameworks for the phenomenon under research evolve simultaneously with empirical observations towards the development of new knowledge. Therefore, it is possible to combine induction and deduction within the same research. It is also helpful to do so, although usually one or the other approach is dominant (Saunders, Lewis & Thornhill 2019).

In this process, new knowledge is created, but the generalisation of the new theory can only occur when applied and tested in further research studies (Spens & Kovács 2006). The importance of qualitative research, in the context of developing an existing theory, stems from the ability of researchers to rethink the phenomenon they investigate in line with existing theoretical accounts.

While the benefits of the abductive approach are that, first, it is flexible for use by researchers from different philosophical positions, some authors argue that a pure deductive approach or an abductive approach are very difficult to achieve, and therefore, researchers use some elements of abduction, if not all (Saunders, Lewis & Thornhill 2019). Second, it is based on an iterative process between empirical observations and theoretical inquiries, and therefore, it is vulnerable to achieving unexpected empirical evidence and unorthodox conceptual visions (Hossieni, Dehkordi & Aghapour 2012). Therefore, it has been proposed that abductive research must provide a clear description of the research process in addition to rigorously regarding research ethics to enhance the reliability of the study in question to render it possible for others to replicate the study and its results (Spens & Kovács 2006; Timmermans & Tavory 2012).

Saunders, Lewis and Thornhill (2019) highlight the differences between the three approaches in Table 3.1 below.

Table 3.1: Key differences between the deductive, inductive and abductive approaches

	Deduction	Induction	Abduction
Logic	In a deductive inference, when the premises are true, the conclusion must also be true.	In an inductive inference, known premises are used to generate untested conclusions.	In an abductive inference, known premises are used to generate testable conclusions.
Generalisability	Generalising from the general to the specific.	Generalising from the specific to the general.	Generalising from the interactions between the specific and the general.
Use of data	Data collection is used to evaluate propositions or hypotheses related to an existing theory.	Data collection is used to explore a phenomenon, identify themes and patterns, and create a conceptual framework.	Data collection is used to explore a phenomenon, identify themes and patterns, locate these in a conceptual framework, and test this through subsequent data collection and so forth.
Theory	Theory falsification or verification.	Theory generation and building.	Theory generation (or elaboration); incorporating existing theory, where appropriate, to build new theory or modify existing theory.

3.4 Research Methods

Research methods represent a step-by-step approach to collecting data. The research paradigms are categorised as positivist versus constructivist, where the constructivist paradigm advocates for qualitative research methods and the positivist paradigm addresses quantitative research methods (Tashakkori, Johnson & Teddlie 2020). Mixed methods research is where a researcher integrates constructivist (qualitative) and positivist (quantitative) research approaches within a single study (Creswell 2018). The nature of the research phenomenon and research questions guides the choice of the research methods, which may be qualitative or quantitative or mixed research methods (Tashakkori, Johnson & Teddlie 2020). Galliers (1992) states that typical quantitative methods include surveys, field experiments and laboratory experiments. In contrast, qualitative methods include ethnographic research, grounded theory, action research and case studies. The next sub-sections briefly discuss these research methods and their implications for research.

3.4.1 Quantitative Research Methods

The two main quantitative research methods are experimental research and survey. As a scientific research design, the experimental research method is often used in laboratories (Martin, MW & Sell 1979). It aims to test research hypotheses and measure variables and their relationships, and ideally address the bounded problems in which the variables are well defined with some degree of certainty (Fellows & Liu 2015). The experimental researcher often uses quantitative research to collect and analyse data to be able to generalise statements applicable to a real-life situation.

The survey approach is ‘the collection of primary data from all or part of a population, to determine the incidence, distribution, and interrelationships of certain variables within the population’ (Tanner 2018, p. 160). It deliberately collects data that explain population (or sample) behaviours, characteristics or attitudes, and uses a variety of data collection tools, including print or online questionnaires, face-to-face or telephone interviews, published statistics, and observation techniques (Williamson & Johanson 2018) in order to be able to conduct quantitative statistical analyses (Gable 1994). Jick (1979) states that the confidence in the generalisability of survey findings is increased because the larger the sample, the more the researcher can generalise the findings (CSU 2020).

However, Galliers (1992) argues that more insights cannot be gained using a survey in regard to the causality behind the phenomenon under research, and this is because of the possibility of bias in response, for example, the nature of self-selection of respondents in questionnaires. Gable (1994, p. 114) also points out that ‘the survey approach provides only a snapshot of the situation at a certain time, thus yielding little information on the underlying meaning of the data’.

3.4.2 Qualitative Research Methods

Creswell (2018) states that the four main qualitative research methods are grounded theory, ethnographic study, action research and case-study research, which are briefly discussed in the following sub-sections.

3.4.2.1 Grounded Theory

The original intent of the founders of the grounded theory approach was to systematically develop new theories of human actions based on empirical data (Glaser, Strauss & Strutzel 1968). The process of the grounded theory approach commonly begins with a general issue conceived in a specific field of research, focused on social concerns (Dey 2012). The process of data collection and analysis is simultaneous as a researcher analyses data and generates coding, categories and concepts during the qualitative data collection process (Glaser & Strauss 2017). Generally, researchers use the two methods of coding, manual coding and computer software, to systematically generate categories and themes (Glaser & Strauss 2017). However, the grounded theory approach has become a matter of debate and controversy in academia, in particular for elucidating, expatiating and even debating the analytical process (Urquhart 2001).

3.4.2.2 Ethnographic Study

The essence of ethnography is the belief that what people think, practise and work upon cannot be separated from their contexts. This approach provides new insights about a social phenomenon in its natural situation. Ethnographers immerse themselves in the social settings they investigate (Lewis 1999), in all types of human interactions, such as a tribe, a hospital or a business organisation (Whitehead 2005). Ethnographers aim to interpret a vivid culture of a certain type of society, entailing the ability to describe what they have seen and heard within the social groups' view of reality (Fetterman 2019).

3.4.2.3 Action Research

The aims of action research are to contribute to 'the practical concerns of people in an immediate problematic situation, and to contribute to a joint collaboration within a mutually acceptable ethical framework' (Rapoport 1970, p 499). In the process, a researcher becomes a partner in the actions of change (Baskerville & Wood-Harper 1996). Ideally, action research addresses a complex real-world problem through collaboration between the researchers and practitioners.

3.4.2.4 Case Studies

Case-study research is 'an empirical method that investigates a contemporary phenomenon in depth within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used' (Yin 2017, p. 23). Yin (2017), as a social scientist, states that the case-study approach has not always been acknowledged as a proper scientific approach. The main argument against it has been that the case-study method provides little basis for scientific generalisation. Weick (1969) states that the case-study method is not appropriate for generalisation because it is too situation specific. However, in a new edition of the book, Weick concludes that that case-study methods 'are better tools than first imagined' because he found that 'findings are unstable over time'. He agreed with Cronbach (1975) and recommended that researchers 'try harder to make interpretations specific to situations' (Weick 1979, p. 37). Thus, the interaction between the phenomenon and its real-life situation is best interpreted through an in-depth case study (Yin 2017).

Digital business strategy and associated organisational change processes as practice with its interpretivist perspective (e.g. Chanias, Myers & Hess 2019; D'Cruz, Timbrell & Watson 2015) is oriented towards a wider social-technological consideration, thus strongly aligning with the interpretive paradigm in organisational contexts. Guided by the interpretive (social) paradigm to research design, the next section discusses the assumptions underlying the adopted research method.

3.5 The Adopted Research Approach and Methods

Guba and Lincoln (1994) state that researchers need to use a disciplined inquiry approach, according to which they believe in the form and nature of that social reality (ontology) and what constitutes valid, acceptable and legitimate knowledge (epistemology). Thus, the ontological and epistemological assumptions held by the researchers determine what method for research is taken, how the research proceeds, and how the research data are collected and analysed. Zuboff (1988, p. 428) clarifies this as follows:

> Behind every method lies a belief. Researchers must have a theory of reality and of how that reality might surrender itself to their knowledge-seeking efforts [...] researchers ought to indicate something about their beliefs, so that readers can have access to the intellectual choices that are embedded in the research effort.

In Chapter 1, the research background briefly describes some organisational challenges for water companies wishing to adopt digital business strategies. This research seeks to both support the process of digital business strategy in water companies, and add to the knowledge about the concomitant digital strategic alignment that enhances sustainable business performance. This is achieved by exploring the relationships and interactions that occur between people and other organisational design factors, and the actions taken and success factors needed for aligning the digital business strategy and organisational design factors involved in this process. The study, therefore, mainly aims to:

Explore the impact of digital business strategy on organisational design and identify the success factors needed for digital strategic alignment that enhances sustainable business performance.

This research takes into consideration that the research strategy should achieve the research aims and must be epistemologically and ontologically commensurate, and thus, the credibility of the research results will be demonstrated. The researcher’s assumption that people construct and reconstruct the social reality by intersubjectively understanding the world in social interactions reflects his/her belief in interpretive social work. From this point of view, the social reality cannot be discovered, but it can be interpreted. Therefore, knowledge of the reality is only a human construction and not an objective truth (Barger et al. 2018; Boon & Baalen 2019). Consequently, this study considers the positivist perspective (epistemology) of the world that is used in natural science inappropriate for investigating complex human behaviour.

Instead, this study considers the interpretivist epistemological perspective that believes that ‘meanings are constructed by human beings as they engage with the world they are interpreting’ (Crotty 2020, p. 43) more appropriate for this research. The underlying premise of the constructivist–interpretative approach to digital strategy research is the need to investigate the process of digital business strategy development in the social-technological contexts. This reflects a genuine need to access participants’ interpretations in water organisations, and close engagement to understand the complex social interactions surrounding the digital business strategy and its alignment process with organisational design.

Qualitative interpretive researchers ‘gather rich data: thick descriptions saturated with contextual and cultural overtones’ (Putnam 1983, p. 44). Focusing on closeness to the phenomena under research, research alongside the participants and rich description means that the researchers aim to use methods that produce qualitative data needed for an inductive or abductive research approach to inquiry, such as participants’ interviews, focus groups and documentation review. Indeed, this research is closer to the inductive approach than the deductive approach, and therefore, it adopted the abductive approach that forms a mixture of inductive and deductive approaches. The abductive approach allows a continuous interplay between theory and empirical data interpretation (Dubois & Gadde 2002, 2017), especially the study aims to analyse the impact of digital business strategy on organisational design and identify the success factors needed for digital alignment that ensures sustainable business performance through the context of water utilities and their stakeholder groups. The water sector, in reality, is shaped by the interpretation of the reality of the social groups under research (Walsham 1995). Two case studies, with data collection tools involving managers’ interviews, company documents and focus groups, are adopted as being the appropriate approach for this study.

Given that the abductive approach enables researchers to collect data and develop a theory simultaneously, many scholars have mentioned that it is very commonly used with a case-study method (Dubois & Gadde 2002, 2017; Järvensivu & Törnroos 2010; Spens & Kovács 2006). A case studies method is a very flexible research method and versatile enough to adapt to different research requirements (Yin 2017). The abductive case study allows a ‘multifaceted treatment of change’ (Pettigrew 1990, p. 270), and recognises that ‘multiple and conflicting representations of reality are generated in organisations’ (Knights 1995, p. 247). In addition, Pettigrew (1990) stresses the importance of analysing multiple and interconnected levels of contexts within the case-study method. In the field of digital strategy, the abductive case-study research method is commonly used (Holgeid et al. 2019; Horlach et al. 2017; Li et al. 2018; Ukko et al. 2019) and fits well in this research context, wherein the study focuses on a contemporary phenomenon (digital business strategy) in water utilities. Therefore, this research adopts the abductive case studies research method.

In recent study, Holgeid et al. (2019) analysed 31 studies related to digital strategy, published from 2016 to 2018, using a thematic synthesis approach to understand the impact of digital strategies on business outcomes. They found that case studies were the dominant type in the digital strategy research, with 26 studies among the selected articles.

In this study, the case-study method was chosen because it allows the researcher to explore the impact of digital business strategy on organisational design and identify the CSFs of digital strategic alignment in its real context. The context in which this study is conducted is digital strategy-enabled water companies in the Saudi water sector. The digital business strategy could not be understood in isolation of the company in which it exists: water services (water supply services across geographically dispersed branches and various infrastructural components that primarily touch the needs of customers), digital partners and their relationships and interactions with one another, and the users of digital services. Thus, two case studies permit the researcher to delve deep into different organisations, various departments and processes to explore more about the phenomenon in order to develop the organisational design theory proposed by Galbraith (2011) as an existing general theory.

By doing this, the research can generate new insights that elaborate the organisational design theory further. Ketokivi and Choi (2014) identify three methodologies to the case-study approach: theory generation, theory elaboration and theory testing. They point out that the theory elaboration approach focuses on the contextualised logic of an existing general theory. Using this approach, researchers seek to elaborate this logic, and not test it. While the researchers can apply an existing general theory, it may be that the research contexts are not known very well to gain sufficiently detailed premises that can be utilised in conjunction with the general theory. This is the case for this research. The theory elaboration approach allows the researcher to consider more concepts than the existing organisational design model accounted for as it highlights the attention to implementation and change issues that are worthy of investigation (Childe 2011).

By using a qualitative theory elaboration approach, the researcher needs to ensure a rigorous check for bias in interpretation of the data (Ramanathan et al. 2017). This has been done through a team (the researcher and his two supervisors) approach to data analysis, ensuring no one-person bias. First-order analysis results (early versions of the research findings are discussed later in this chapter) were assessed from focus group participants whose comments and evaluation were assimilated.

The researcher followed the case-study method, which is particularly useful for a contemporary phenomenon (Yin 2017). Emerging water services-related digital technologies, in particular big data, cloud computing, IoT and digital platforms, are a relatively new area in water companies (Akter et al. 2016; Beal & Flynn 2015; Monks et al. 2019; Montalvo Arango et al. 2014; Mounce 2020; Poch et al. 2020; Sood, Jain & Kaul 2017; Stewart et al. 2018; Stoffels & Ziemer 2017; Svahn, Mathiassen & Lindgren 2017). Under digital strategies, the use of integrated digital technologies was introduced a decade ago and is still an emergent field, but evolving rapidly (Bharadwaj et al. 2013; Holgeid et al. 2019; Wunderlich 2018). Therefore, the concept, the knowledge, the process and the benefits of the use of digital strategies have not been fully assimilated into water utilities practices (Feroz, Zo & Chiravuri 2021; Haddaway 2013; Kamunda et al. 2020; Stoffels & Ziemer 2017).

Given that the qualitative case-study approach has become a commonly used approach of investigation in digital strategy research (Holgeid et al. 2019). Vickers (1999) argues that technology as one of the organisational design factors requires qualitative, reflexive studies that deepen understanding of the difficulties associated with its implementation. Thus, the benefits from a digital strategy go beyond the traditional use of IT, requiring deep understanding of how to develop the proper organisational design factors to sustain business performance.

This research, therefore, used an interpretive in-depth case-study approach to study the process of aligning digital business strategy with organisational design. Since this approach seeks to understand both the organisational context and the digital strategy process, and how they influence each other, the researcher believes that this method is appropriate for the study. Interpretive case study allows for the use of existing theories as a starting point, yet requires 'a considerable degree of openness to the field data, and a willingness to modify initial propositions and theories' (Walsham 1995, p. 76).

However, a case-study method has been subject to a number of criticisms. One of the common concerns about the case-study method is the issue of generalisation. However, Yin (2017) argues that analytic generalisation is the goal of the case-study method, and this is opposed to statistical generalisation. Consequently, case studies 'are generalisable to theoretical propositions and not to populations or universes' (Yin 2017, p. 10). Moreover, Walsham (1993) argues that the case-study method can be used to theoretically develop concepts that inform further theoretical development, to formulate and develop theoretical frameworks, to explain some implications from one particular area that can be useful in interpreting a similar phenomenon in other contexts, and to provide rich insights into a wide range of issues. He also states that the generalisation of a case study provides explanation of a particular phenomenon derived from interpretive studies in specific contexts, and thus, it is not wholly predictive, but it may be valuable in future research in other firms and contexts (Walsham 1995).

3.6 The Research Design

The study aims to explore the impact of digital business strategy on organisational design factors in water companies to identify the success factors needed for digital strategic alignment that improves sustainable business performance. The abductive approach embodies the approach adopted in this study well, and this means a close interaction between theory and empirical data interpretation (Dubois & Gadde 2002, 2017). Eisenhardt (1989) explains this way of research as being the need of the researcher to move back and forth between empirical research data and the theoretical phenomena, effectively combining induction and deduction approaches (Suddaby 2006), to compare the empirical research data with the existing theories, and for eventually generating a new theoretical knowledge related to the phenomenon under research (Eisenhardt 1989).

This entailed combining various insights from literature and practice. A two-stage data collection approach was employed. The first stage was divided into two phases: (1) an initial exploratory study of the literature to gain preliminary understanding of best practices in the process of aligning digital strategy with organisational design, and to identify initial themes to help establish an initial theoretical framework for the research, and (2) a final exploratory study of the literature after analysing the collected data inductively. The second stage was the case-study approach, which focused specifically on an exploration of success factors or conditions that are necessary for achieving digital strategic alignment between digital strategy and organisational design in two unique cases in the Saudi water sector. The findings of the two stages provided a much broader view of the complexity of the process of aligning digital strategy with organisational design. This entailed the inductive use of evidence from the case organisations to develop explanatory information and to draw comparisons between the two companies, and with findings in the existing literature, while elaborating the organisational design theory proposed by Galbraith (2011).

The multidimensional constructs (digital business strategy and organisational design) are necessary for a comprehensive understanding of events and processes in qualitative research because they break the more linear view on the relations and provide a much deeper understanding of empirical data for developing or testing a theory (Dubois & Gadde 2017; Quintens & Matthyssens 2010). This agrees with Dubois and Gadde's (2002, p. 555) argument about the matching of a theory to an abductive approach that highlights the importance of the alignment between a theory and empirical data: 'We have found that the researcher, by constantly going 'back and forth' from one type of research activity to another and between empirical observations and theory, is able to expand his understanding of both theory and empirical phenomena'.

The analysis of the research data was also conducted in a two-stage data analysis, which is discussed in detail in Section 3.6.4. The research design adopted for the study is described in a process diagram of the research design steps (see Figure 3.1).

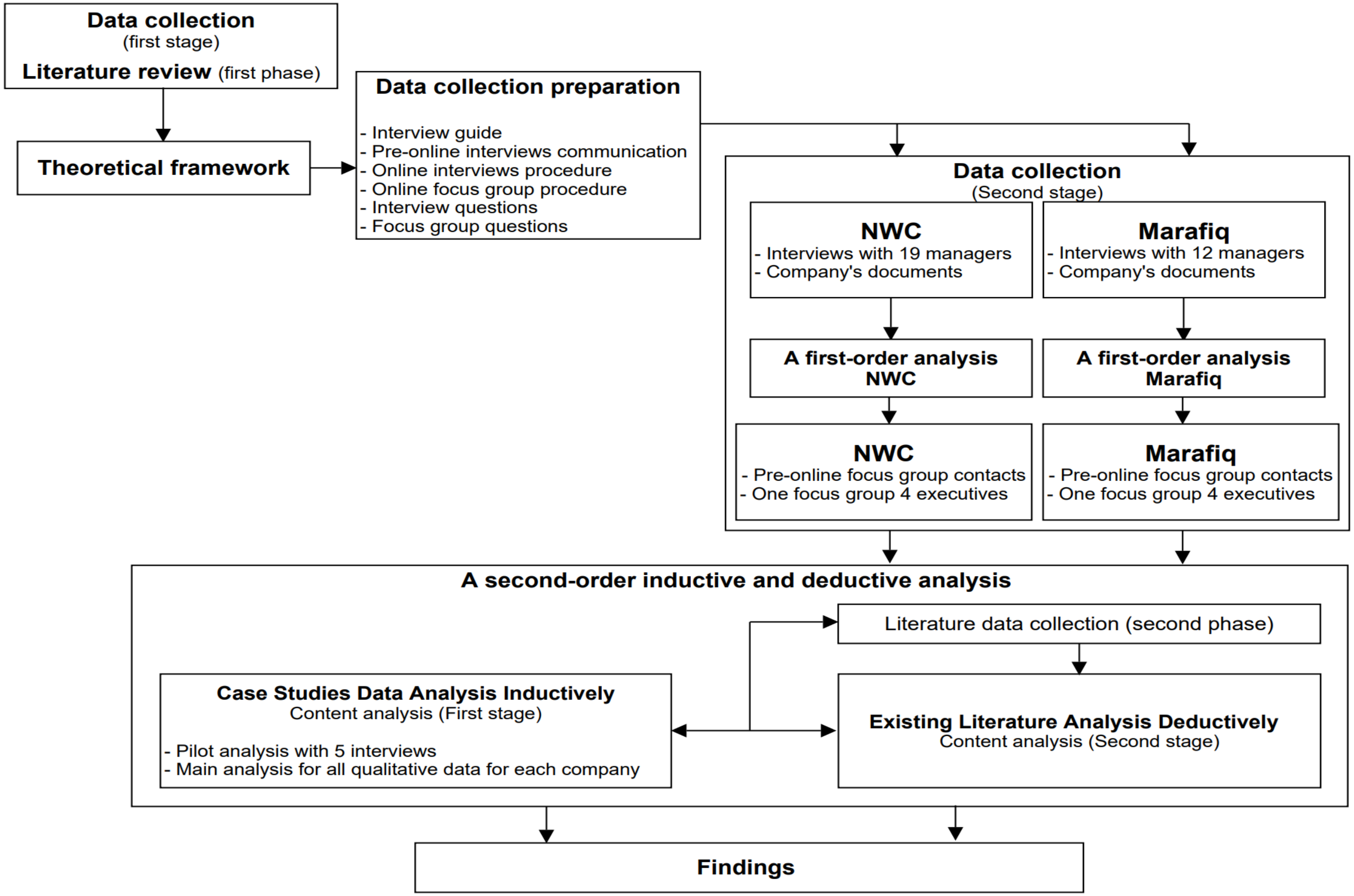


Figure 3.1: Research design stages

3.6.1 Exploratory Studies

The first stage of the data collection process was an initial exploratory study of the literature to gain understanding of best practices in the process of aligning digital business strategy with organisational design in both water companies including Saudi water companies and other companies in various industries around the world. According to Chanias, Myers and Hess (2019) prevailing digital strategy practices are best practices that facilitate the strategy formulation and implementation activities, and which are mostly compiled and harnessed by top management and digital strategy teams. These practices must have a recursive orientation (as they are recurrent, habitual, and routine). Strategy workshops, regular meetings, organisational and digital practices are examples of these practices. In this research, best practices are centred around the issues of digital business strategy and its alignment process with organisational design that can help sustain business performance and meet the future aspirations of the water industry as a whole. For example, developing new organisational design factors or aligning existing ones under digital business strategy. Thus, the first stage was chosen mainly as a preamble prior to the more detailed case-study approach in the second stage (Gable 1994).

With the nature of qualitative investigation, documenting of the phenomenon in its real context to gain evidence from the Saudi water companies is recognised. According to Pettigrew (1990) in the field of strategy research, the context and actions are interwoven, and he therefore emphasises the necessity to consider the past and present when looking to the future. When the organisational change process is driven by human interaction or as a result of lessons learned in the past (Hyder & Eriksson 2005; Johnsen & Ford 2006), the case-study method is often considered part of the dynamic process (Nordin 2006). The past, present and future are interlinked and constitute important elements that may have an impact on the case-study outcomes (Wucherer 2006). Thus, it is important to explore the best practices related to digital business strategies in the literature in an initial attempt to design an appropriate analytical model for digital strategic alignment as an integral part of understanding the current and future issues and challenges of the digital business strategy in Saudi water companies.

3.6.1.1 The Purpose of the Exploratory Study of Literature

The initial review of the literature aims to (1) capture advanced understanding of the process of aligning digital business strategy with organisational design in both the water industry including Saudi water companies and other companies in different industries and (2) produce initial theoretical foundations for the study. The key concepts used in the interviews were grounded in the theoretical insights from the strategic management, organisational design and IT literature (e.g. Bharadwaj et al. 2013; Herden 2020; Kretschmer & Khashabi 2020; Li et al. 2021; Li, Dai & Cui 2020). The findings of the literature review were presented and used in constructing the theoretical framework in Chapter 2.

3.6.1.2 The Purpose of the Exploratory Case Studies

The second exploratory study was the case-study approach. This stage aims to capture the views of participants who are involved in the process of the companies' digital strategies formulation and implementation, and are well aware of the issues they have been facing during the process and with the outcomes of the rollout. Together with two focus group discussions, and through narrative descriptions and documentation analysis, accounts from the two companies' stakeholders and their concerns were captured. Some of the specific purposes developed for the exploratory case studies follow:

1. detailed description of the companies' digital business strategy
2. identification of the CSFs of digital strategic alignment
3. understanding of what issues or problems are experienced by the companies' stakeholders, which are likely to threaten or strengthen the formulation and implementation of their digital strategy
4. understanding of the relations between the digital strategy and other factors of organisational design, in particular the impacts on information processing and knowledge integration
5. development of a digital organisational design model as an analytical model to help analyse the digital strategic alignment process that improves the sustainable business performance in water companies.

The second exploratory study constructs narratives around exemplars and critical states, and the flexibility of the interviews lends itself to exploring the phenomenon within its context as it allows an alternative way for the research to be pursued (McEvoy & Richards 2006). There were 22 interview questions (based on the research framework's constructs and themes) (Appendix E). Wheeldon (2010) states that with abductive research principles, building a theoretical framework or a theory about the phenomenon under study is important to interpret and understand the phenomenon. From this point of view, the findings of the research were used not only to analyse the cases, but also to improve the theoretical framework for the research and to trace back the meaningfulness of the subsequent digital business strategy literature.

3.6.2 Case-Study Design

In-depth, qualitative case studies were undertaken to answer the set research questions. According to Yin (2014) commonly accepted methodological rationales for adoption of the qualitative case study design are often based on considerations such as (a) the nature of the research questions, (b) inherent flexibility of qualitative studies, (c) nascent state of research in the field and (d) the researcher's prior experience with different forms of qualitative designs. Likewise, an inductive, constructivist paradigm and an interpretive methodology (Yin 2014). Moreover, this approach is suitable for studying issues on which limited research has been conducted (Benbasat, Goldstein & Mead 1987), and for exploring both how a company is organised (digitally) and how individuals within the company interact (Engert & Baumgartner 2016). Ebneyamini and Moghadam (2018) find that case-study design is dominant in technology research. Thus, for a detailed understanding of the digital strategic alignment between digital business strategy and organisational design factors, the in-depth case studies approach was undertaken in two Saudi water companies: National Water Company (NWC) and Marafiq. In the following sub-sections, the level and units of analysis and the selection of participating organisations are explained, followed by the data collection and analysis techniques, and validation standard to ensure the quality of the case-study design. Finally, ethical considerations relevant to the case-study approach are discussed.

3.6.2.1 Level and Units of Analysis

In the strategy literature, research often deals with four levels of strategy: network-level strategy at the highest level of the organisational hierarchy, followed by corporate-level strategy, business-level strategy, and functional-level strategy at the base of the aggregation (Andrews 1971; Chaffee 1985; de Wit & Meyer 2020; Hofer & Schendel 1978; Johnson et al. 2014). At each level, the (digital) strategy has specific objectives, stakeholders and scope, which should meet the requirements of internal and external alignment (de Wit & Meyer 2020). In addition, social science research defines four levels of analysis: people, groups, organisations and environments (Valerdi & Davidz 2009). The interest of this study is the analysis of digital strategic alignment process in water companies, which was conducted by the companies' managers. This study, therefore, focuses on the social–technological interaction of individuals in the water companies at all levels of strategy development.

When selecting the constructs on which to focus and designing the research techniques, the primary level of interest in the internal and external interactions is important, especially in the water context, wherein water companies are often focused on relationships between in-house expertise, employees and external stakeholders, in particular digital partners, with reference to each other in their efforts to successfully achieve the company's digital strategy. Therefore, the level of analysis emphasises the interdependence and recognises the roles of organisational networks in the success of the digital business strategy (Knorr-Cetina & Cicourel 2015).

The units of analysis are sources of data that support the levels of analysis (Baxter & Jack 2008; Yin 2017). These sources include people, roles, social and physical artefacts, processes, or relationships (Martin & Davidz 2007; Yin 2017). To facilitate triangulation of data sources and make comparisons across organisations, it is necessary to determine units of analysis (Valerdi & Davidz 2009). The relevant units of analysis for this research include company's documents and managers' experiences (through both interviews and focus groups) of the process of the company's digital business strategy formulation and implementation, the changes to be made and changes already made in the organisational design factors and the alignment process that ensures sustainable business performance. These data were collected from the companies through research individual interviews, focus group discussions and company's documents, which were the units of analysis.

3.6.2.2 Selection of the Participating Organisations for the Exploratory Case Studies

This study adopted a two-case design to ensure the credibility and confidence of research findings (Yin 2017). Evidence from two or more cases is considered more persuasive and robust (Herriott & Firesstone 1983). According to Yin (2017) greater certainty lies with a larger number of cases for a theoretical replication purpose (the selection of cases is based on predicting contrasting findings). However, if the issues do not require detailed research for undue degree of certainty because underlying priori themes supported by existing theories or models, then the selection of two or three cases for literal replication could be warranted (i.e. similar criteria are used to guide the selection of the cases to predict similar results). The rationale for a two-case design is derived from Yin's (2014, p.59) assertion that 'the simplest multiple-case design would be the selection of two or more cases that are believed to be literal replications, such as a set of cases with exemplar outcomes in relation to some evaluation questions (semi-structured interviews), such as how and why a particular intervention has been implemented smoothly, ... hoping for literal replications of these conditions from case to case'. Following the Yin's (2017) replication approach, the research design involves selecting two case studies for literal replication.

The reason for selecting two Saudi water companies is because of the following issues. First, a majority of the Saudi Arabia's revenues has historically been used to subsidise public services (water, energy and gas) (Atalla et al., 2018). Second, the government seeks to upgrade the water infrastructure and encourages foreign investment in this sector (Oxford Business Group, 2021). Third, social transitions towards digitalisation force Saudi water utilities to improve digitally. Fourth, the country rises to its significant water challenges through varied goals established by the Saudi Vision 2030 and National Water Strategy 2030, which are aligned with the United Nations' Sustainable Development Goals (#6,12,13,17). In 2018, MEWA—as the regulator and in a partnership with water companies—adopted several initiatives to reduce water and energy consumption by increasing efficiency, reducing waste, and avoiding unsustainable practices (MEWA, 2020). Finally, Saudi water companies are undergoing major digital transformations by implementing a combination of advanced digital technologies, business-digital infrastructures, and organisational and regulatory changes. These reforms help us understand the organisational design factors required by a water company for the successful adoption of a digital business strategy and its alignment process that ensures sustainable business performance. Thus, Saudi water companies can provide rich insights into the research questions.

In addition, Seawright and Gerring (2008) note that, compared with random selection, strategic case selection ensures higher generalisability of case-study data. Accordingly, the researcher selected two Saudi water companies according to (1) geographical location, (2) the provision of digital water services, and (3) whether the company was in the process of implementing (or had already implemented) a digital strategy. Because of limited resources, the researcher selected two companies whose digital projects had been implemented during the past 5 years to analyse their digital integration, associated organisational changes and sustainability practices.

These criteria enhance the uniqueness of each of the two selected companies (the NWC and Marafiq Company). NWC was chosen for the following reasons. First, NWC has a strong digital business strategy. The company integrated its digital strategy (launched in 2017) into its core business strategy to form a common digital business strategy in 2019. Second, it has set clear shared digital strategic objectives. Third, the company has 17 water branches, which provide the same digital services in Saudi Arabia. For research convenience, the study covered its four largest branches—in Riyadh, Makkah, Jeddah and Taif, which together contribute about 50% of the total water revenues in Saudi Arabia—and its headquarters. Fourth, NWC has positioned itself as a provider of digital water services, which views sustainability as a key pillar of its digital business strategy. Last, it has clear organisational approaches and governance for developing its strategy (NWC 2021a).

Marafiq was selected for the following reasons. First, it has successfully integrated its digital strategy into its core business strategy. Second, it already has clear digital and strategic objectives. Third, the research covered its two largest branches at Jubail and Yanbu, which are known as early adopters of the customer service mobile app and smart operations. Fourth, Marafiq is currently making fresh acquisitions in new industrial cities and planning to implement new digital initiatives in other branches. Last, Marafiq recognises its environmental and social responsibilities, and has received several sustainability awards (Marafiq 2021).

3.6.3 Data Collection

Yin (2017) state that an in-depth case-study approach requires multiple sources of data to achieve the triangulation of data sources. Accordingly, the research used three qualitative methods of data collection: (1) review of literature and company documents, (2) semi-structured interviews, and (3) focus groups. The researcher followed Yin's (2014) recommendations to ensure the quality of the qualitative research. Thus, the necessary instruments and protocols (i.e. interviews guide and questions, and focus group guide and questions) for qualitative data collection were pre-prepared and carried out online from Melbourne, which took about 3 months from November 2020 to January 2021.

Cooper and Glaesser (2012) state that an interpretation based on an existing theory and in-depth within-case data collection process will be needed for the purpose of seeking additional causal issues. Within-case data collection processes for each case company began with collecting data from online company documents such as the company's history, annual reports, digital strategies, organisational structures, HR and reward policies, customer service processes, used digital technologies and recorded videos. Then, interviews and focus groups were conducted respectively as another source of evidence. For example, the researcher watched the digital meter reading process and customer mobile apps as recorded videos and read these processes as written texts on the company's website before interviews, and this supported and clarified the interviewee's responses.

During the interviews, the researcher probed the information provided for potential contributions. Thus, additional questions were asked about the water company context, including strategic intents, organisational influences, constituencies and government policy issues. After the interviews, transcripts were initially analysed, as a first-order analysis (inductive approach using mind maps) to explore and discuss the initial CSFs for digital strategic alignment with focus group participants. Using integrated findings from the document review, interviews and focus groups, a table was provided for each case company, showing digital business strategy signposts on organisational design, stakeholder interests and the government strategies and policies related to the public and private water companies. These processes confirmed the data validity of each case company and provided deeper insights into the research outcomes. In the analysis stage, all qualitative data were integrated and analysed using a computer-aided tool (QCAmap) as a second-order analysis.

3.6.3.1 Review of Literature and Company Documents

First, the inclusion of a company's documentary data allows the researcher to expand the depth of the empirical data and increase the robustness of the research. The integrity of documents or 'written texts' should be given the importance they deserve from researchers (Reed-Scott 1999). The authors' interpretation of texts is used to provide clarification of data selected from interviews and focus groups. In this research, the analysis of documentary data involves the examination of all relevant information (Saunders, Lewis & Thornhill 2019). As mentioned earlier, the researcher collected all relevant documents—structures, customer service process flowcharts, performance assessment criteria, annual reports, digital strategic projects, published statements and recorded videos on company website (e.g. digital meters reading and digital billing processes)—from the past 5 years.

During the interviews, the researcher asked the research participants to email the above documents related to their departments, and again screened company websites and archived data. The main issues emerging from the company documents were transcribed and integrated with the interviews and focus group data. For example, records of the companies' digital strategic projects (e.g. Hayat system project—customer service process flowcharts) were transcribed and analysed to detect the process and organisational issues emerging from these projects. Second, literature reviews in the fields of digital business strategy and organisational design were conducted twice: first, to assess the current state of literature before the interviews and, second, to conduct comparison with the case-study findings. The next sub-section explains the process of selecting participants (in interviews) who had experience in the companies' digital business strategy and organisational changes.

3.6.3.2 Participant Recruitment and Semi-Structured Interviews

This study focused on collecting rich qualitative data to answer the research questions. A semi-structured interview method was chosen as appropriate. Semi-structured interview provides a suitable level of flexibility in producing in-depth qualitative data (Bell, Bryman & Harley 2019). It allows flexibility to explore themes or phenomena where in-depth explanations are required, rather than would otherwise be provided by structured collection methods such as questionnaires. As digital business strategy is an emergent phenomenon, and exists in a complex social context, an open interview method may provide a large amount of data that are irrelevant to interpreting the process of aligning digital business strategy with organisational design. In addition to this, it is not yet clear which 'important concepts' should be examined in the study of digital business strategy, and thus, a structured interview method may not be suitable at this stage.

For undertaking semi-structured interviews, Yin (2017) states that small sample sizes could be adequate with purposeful sampling. Researchers need to select participants who are knowledgeable on the subject under study (Suri 2013). Moreover, to obtain an informative picture of the whole organisation, Engert and Baumgartner (2016) state that interviews should be conducted with the organisation's experts. 'Experts are persons with a high degree of skills in, or knowledge of, a certain subject and the qualitative expert interview is an empirical social research method to build upon this knowledge' (Gläser & Laudel 2006, p. 10). Thus, the researcher recruited the interviewees who (1) are at the level of vice presidents, executives and middle managers, as well as IT managers from the company's business-digital partners, (2) had experience (ranging from 2 to 10 years) in the company's digital strategy and associated organisational changes and (3) had external experience (is a plus) and knowledge of digital business strategy and organisational design.

The researcher sought permission from the CEOs of NWC and Marafiq to interview the companies' executives and middle managers. The companies were given the assurance that the outcomes of the study would be shared with them upon completion of the study, and a confidential protocol would strictly be upheld throughout the research process. Proper authorisation was obtained from the two companies before conducting the research. Then, the researcher sent an email to the companies' HR managers to provide a list of vice presidents, general managers and middle managers and their contact emails. Upon contact of two vice presidents and two general managers by phone and email, they agreed to voluntary participation in the research.

The initial strategy was to use the 'snowballing' approach to find more relevant interviewees to participate (Moser & Korstjens 2018). This is done by asking the interviewees who they can recommend that fall under the highlighted criteria. The vice presidents and general managers recommended 18 managers for further interviews. Invitations were sent to the recommended participants (18) of the two companies, and 15 were willing to participate in the study. Later, 12 additional participants also agreed to participate, bringing the total number to 31. This means the researcher interviewed 19 managers from NWC (including the vice president, executives and digital transformation managers and two of its digital partners—IT project and change management managers) and 12 from Marafiq (and its Marafiq-MaSa partner) online for 60–90 minutes and recorded their audio. (An overview of the participants is provided in Table 4.1.)

To ensure the interviews were conducted on time, the researcher contacted interviewees via email and office phone within the month prior to the start of the interview phase. An interview guide with key focus areas was designed for the interviewees within the case organisations (see Table 3.2). The guide consists of five parts: (1) an introduction and background of the participants and their jobs, (2) the company's digital strategy, (3) the organisational design, (4) the digital strategic alignment factors and challenges, and (5) the recommendations. The key themes, concepts and variables used in the interviews were grounded in the theoretical insights from the literature review. The researcher and his supervisors agreed, however, that this would develop as interviews proceeded.

Table 3.2: Themes for the semi-structured interviews

Key themes	**Examples of concepts/variables**	
Part One		
Introduction	Participant's personal background	
Part Two		
Digital business strategy	Formulation	Policies, procedures or instruments
		Participants
		Vision and objectives
		Sustainable business performance
	Implementation	Policies, procedures or instruments
		Participants
		Measures
		Sustainable business performance
Part Three		
Organisational design	Structures	Sustainable business performance

Key themes	Examples of concepts/variables	
	Processes	Digital flow of information within and across the firm
		Sustainable business performance
	People	Employees, managers, customers and external stakeholders
		Human resource capability and sustainable business performance
	Rewards	Sustainable business performance
	Digital technology	Flexible digital architecture
		Digital integration of resources and services
		Sustainable business performance
Part Four		
Digital strategic alignment	Success factors	
	Challenges	
Part Five	Recommendations	

3.6.3.3 Focus Group Discussions with Water Company Experts

Focus group discussions are a data collection method with a small group of participants to discuss a given topic, usually guided by a moderator using a questions guide (Krueger 2014). According to Moser and Korstjens (2018), the focus group is suitable for the content analysis approach and common in qualitative research to combine more than one data collection method in one study. It is used together with interviews to confirm that data saturation has been reached and determine the group composition. Smaller groups are more suitable for complex topics and give the participants more time to reveal their opinions and provide more detailed information. Participants interact with each other to examine other experiences, perceptions, thoughts and feelings. Thus, the sequence is intended to facilitate the interaction between the participants, and answer questions on a certain topic (Moser & Korstjens 2018). Typically, a focus group discussion consists of 4–15 participants and lasts 60–120 minutes (Gibbs 1997).

The researcher recruited focus group participants from among those who initially participated in the online interviews (in addition to the NWC strategy manager, who did not participate in the interviews). They were selected according to their knowledge on the subject under study (Suri 2013) and their academic background, experience, and active role in formulating and implementing the company's digital strategy. This was done mainly to gain an in-depth understanding of how the sample members achieved digital strategic alignment in their own organisations and to confirm whether they agreed with the initial CSFs identified in a first-order analysis (using mind maps for all interview transcripts). The water company experts were in a better position to validate the trustworthiness of the research findings and the ensuing outcomes. However, because of the COVID-19 lockdown and time constraints, the researcher decided to reduce the number to four participants for each group for each company separately. The focus group discussions—conducted online via Zoom, lasting approximately 90 minutes, and audio recorded in January 2021—contributed to a deeper understanding of the CSFs for the alignment process (see Table 4.5, Section 4.2). The focus group outcomes are discussed in more detail in Section 5.7.4.

3.6.4 Data Analysis Technique

The data analysis requires a systematic approach as well as creativity and discipline (Taylor-Powell & Renne 2003). However, there is no single list of steps for conducting qualitative data analysis (Robson 2011); rather, there are different approaches that can be used (Assarroudi et al. 2018). Thus, two methods were applied to analyse the qualitative data in three stages: a first-order analysis (inductive approach using mind maps), and a second-order analysis, which was divided into a two-stage analysis (i.e. inductive and deductive).

3.6.4.1 The First-Order Analysis

Interviews were initially analysed, as a first-order analysis, by using a mind map for each interview to discuss the initial CSFs for digital strategic alignment with focus group participants. According to Wheeldon and Ahlberg (2019), mind maps can be used as an initial methodological tool for analysing qualitative data and presenting initial findings. Stephens (2015) used an initial mind map analysis to explore students' feelings, and feedback from peers and faculty, and thus, he was able to better understand key concepts, values and attitudes aligned with the profession. Thus, mind maps may establish trust between researchers and participants (Wheeldon & Ahlberg 2019) as they serve as a tool to gain participants' validation of an emerging theoretical framework and establish trust between the research findings and participants (Whiting & Sines 2012).

In this study, the researcher focused on the responses of the interviewees through notes he took during the interviews. In addition to overall interview transcripts, the researcher captured direct quotations from the interviewees. These transcripts, notes and quotations were entered every day into colour-coded Excel spreadsheets to arrange the data, facilitate comparisons among participants, and draw a mind map for each interview. The single, comprehensive mind map for all interviews has been transferred into a table with initial key factors and sub-factors. These initial factors that emerged from this analysis were similar in both companies, but differed in the number of the factors because some factors were combined while others were separate. Then, focus group participants have amended some of these factors and added additional factors that altogether were identified later in the second-order analysis (inductive approach) using a computer-aided tool (QCAmap).

3.6.4.2 The Second-Order Analysis (Using a Computer Program)

Mayring (2014) states that content analysis is an appropriate method for material evaluation and is suitable for material arising from any type of communication. The qualitative content analysis emphasises an integrated view of speech/texts and their specific contexts (Wildemuth 2017). It goes beyond merely counting words or extracting objective content from texts to examine meanings, themes and patterns that may be manifest or latent in a particular text (Wildemuth 2017). Thus, it allows researchers to understand social reality in a subjective but scientific manner (Mayring 2014).

Mayring (2014) proposes a content analysis method as a step-by-step approach. It combines the qualitative content analysis with a quantitatively oriented approach by applying a category system and frequency of content. However, there are different views whether content analysis is a qualitative or quantitative approach (Holsti 1969; Krippendorff 2018). Holsti (1969, p. 121) argues that classifying content analysis as qualitative is 'somewhat misleading because data coded in this manner may be presented quantitatively'. Krippendorff (2018, p. 16) believes that classifying content analysis as quantitative limits this approach to the exercise of numerical counting. He believes that both approaches are complementary and indispensable since 'ultimately, all reading of texts is qualitative, even when certain characteristics of a text are later converted into numbers'. Accordingly, the content analysis approach adopted in this study can be classified as a combination of qualitative and quantitative content analysis. From the qualitative perspective, the research data were analysed iteratively to draw inferences about the meanings of messages conveyed through texts contained in interviews, focus group discussions and documents. From a quantitative perspective, inferences made regarding CSFs were counted and coded within the qualitatively defined themes for each case (see Appendix F).

Among different content analysis approaches in the literature (Elo & Kyngäs 2008; Krippendorff 2018; Taylor-Powell & Renne 2003; Zhang & Wildemuth 2009), this study adopted Mayring's (2014) content analysis approach. Mayring (2014) suggests this approach as a systematic, reliable and transparent methodology that distinctively differentiates between inductive and deductive methods, which can both be used in the same research by involving a series of procedures.

For the most part, all of the qualitative data collected (i.e. interview transcripts, internal company data and focus group reports) were merged and analysed using the latest version of the computer-aided tool (QCAmap) developed by Mayring (from 2010 to 2020). 'QCAmap is an open access web application for systematic text analysis based on the techniques of content analysis' (Mayring 2014). This program can be used to analyse any amount of text coming from documents, group discussions, interviews, observations and other sources. QCAmap is a strictly rule-guided procedure containing qualitative (assignment of categories to text passages and images) and quantitative steps (analysis of category frequencies). 'A category is a group of words with similar meaning or connotations' (Weber 1990, p. 37). The quantitative analysis focused on capturing and coding the CSFs within the qualitatively defined themes numerically for each water company. In this research, CSFs are defined as factors that are necessary for a company to achieve digital strategic alignment between digital business strategy and organisational design factors to bring about highly sustainable business performance. The second-order analysis has two stages, as follows.

3.6.4.2.1 The Second-Order Inductive Analysis

The research used the inductive content analysis model suggested by Mayring (2014). It is a strict step-by-step model for conducting inductive content analysis, as shown in Figure 3.2 below.

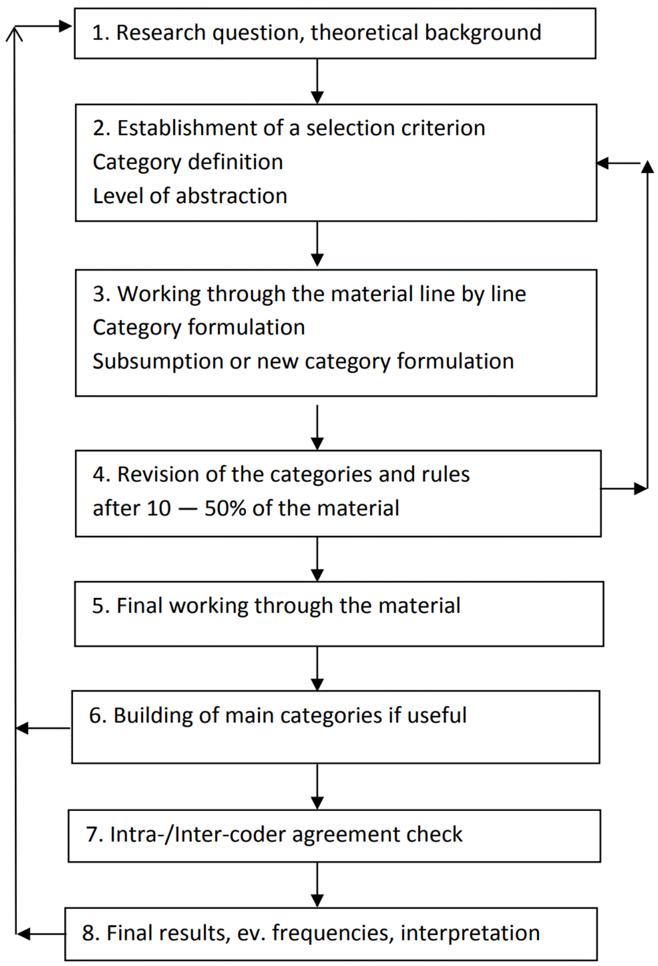


Figure 3.2: Steps of inductive content analysis (Mayring 2014)

According to Mayring (2014), to conduct content analysis, the category system must be defined and established for the specific material in relation to each research question. This requires defining each research question with its associated content analytical units (coding units: smallest component of material that can be coded; context units: interviews, documents and focus group; and recording units: all project documents), definition of selection criterion, and level of abstraction. Then, the researcher can develop inductive categories directly out of the material and may develop categories out of theoretical considerations, indicating the flexibility of the approach to answer the research question. This process constantly requires new decisions and changes regarding individual stages of analysis. During the coding process, the material should be worked through line-by-line reading. When the researcher finds the material that fits the category definition, the researcher must check whether it falls under a previous category, or a new category has to be created.

After working through 10–50% of the material, the researcher should review the quality of the whole category system and correct any mistakes or overlaps between categories (using intra-/inter-coder agreement check in the system). After that, the researcher can complete the final work through the whole material. This analysis will result in a set of categories that can be grouped into main categories linked to specific texts in the material. Then, the researcher can qualitatively analyse the whole system of categories according to the research aims and theories used, and quantitatively analyse the categories and passages by considering those categories occurring most frequently. Recording the number of occurrences of a category may give additional weight to its meaning and importance. Thus, the procedure rules help to clarify inductive content analysis and strengthen its trustworthiness (Mayring 2014).

At the stage of analysing and interpreting the categories, the researcher has to conduct three text analysis techniques:

- Summary (text reduction): To reduce unnecessary information and texts.
- Explication: To add more material about questionable text components (e.g. verbs, terms, sentences) to increase the understanding and interpreting of texts.
- Structuring: To filter out or assess certain aspects of the material (Mayring 2014).

The analysis and interpretation of the in-depth case studies has followed the inductive content analysis technique described above. As advised by Mayring (2014), five of the first interviews were subjected to an initial round of analysis to verify the suitability of the analysis; this formed a pilot study to gain methodological strength by testing and modifying the category systems as needed. The researcher established a proper coding scheme that corresponds to the research questions to ensure that relevant information (answer that questions) is captured. The coding scheme for the case analysis was created inductively. In the qualitative analysis, the whole material was analysed iteratively to understand the CSFs (i.e. the changes to be made and changes already made in the organisational design factors as a result of the digital business strategy) described by the water companies for achieving digital strategic alignment.

The iterative interpretation allowed the researcher to create themes through the automated themes coding offered by QCAmap. The role of categories overcomes the issue of synonyms. This allowed the researcher to calculate the frequencies of the most common words or their meanings in the texts (Mayring 2014). For example, not all interviewees are digital experts who know the difference between interoperability and compatibility, which is why some of the interviewees used compatibility and interoperability interchangeably. Thus, the companies' data were analysed and compared independently of the current literature.

3.6.4.2.2 The Second-Order Deductive Content Analysis

The second-order deductive content analysis was carried out using the model of deductive category assignment proposed by Mayring (2014), as shown in Figure 3.3 below.

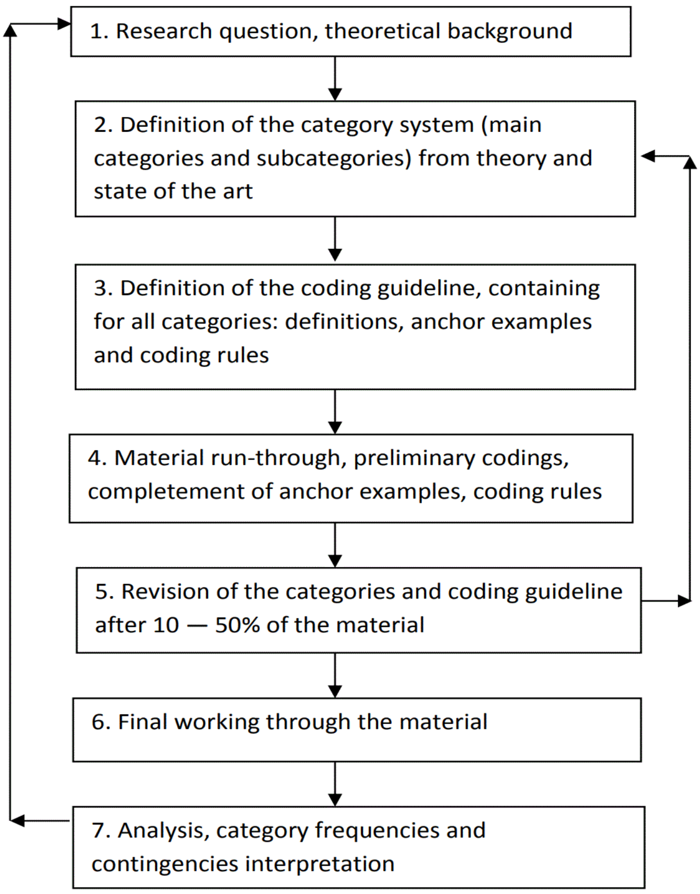


Figure 3.3: Steps of qualitative deductive content analysis (Mayring 2014)

Following Mayring's (2014) model, a table was prepared that contained four columns: categories, category definition, anchor examples, and coding rules. The categories (CSFs) derived from the existing theories were defined. Each data sample (literature anchor example) was given one of three features (less important, important, and very important) as so-called coding rules. Anchor examples for each feature were taken from the data. Finally, using QCAmap, the data analysis was carried out by deductive coding of all CSFs by the researcher and later reviewed by his supervisors.

As the research is theoretically based on the digital strategic alignment between digital business strategy proposed by Bharadwaj et al. (2013) and other factors of organisational design proposed by Galbraith (2011), it was meaningful to conceptualise these factors—or more precisely, the corresponding new factors and sub-factors—as the fundamental concepts for structuring the analysis. Thus, the detailed differentiation of these concepts into particular categories for coding was derived from the literature. Thus, the theoretical basis of every category was essential.

However, when the 'preliminary coding' was used, Mayring (2014) did not clearly explain whether the codes are inductively or deductively produced (Assarroudi et al. 2018). He also did not mention the possibility of developing new categories from the literature data (Assarroudi et al. 2018): 'theoretical considerations can lead to a further category or rephrasing of categories from previous studies, but the categories are not developed out of the data as the case in inductive category formation' (Mayring 2014, p. 97). Therefore, as advised by Assarroudi et al. (2018), this research attempted to combat such analytical methodological criticisms by integrating the process of inductive content analysis proposed by Elo and Kyngäs (2008), and the process of linking the preliminary codes extracted from raw data, with predefined categories in the literature proposed by Zhang and Wildemuth (2009).

After initial identification of the CSFs of the digital strategic alignment within the case companies, the existing literature was deductively analysed to identify the potential success factors emerging from the literature. This served as a cross-check regarding the results in the case companies' data and existing literature. As Gioia, Corley and Hamilton (2013, p. 21) state, this process occurs when the research transited from being inductive research to being abductive research, in which 'data and existing theory are now considered in tandem’. The approach is an argument for a stronger reliance on theory than that proposed by pure induction (Dubois & Gadde 2002, 2017).

Thus, the case-study research was first undertaken independent of the success factors that explicitly exist in the literature; then, the existing literature was analysed deductively to draw comparisons with findings from the case studies research. Hence, this study represents an initial attempt to explore the CSFs of digital strategic alignment in the organisational design model proposed by Galbraith (2011), which is fundamentally underpinned by the IPV theory proposed by Galbraith (1974), as well as the use of the KBV theory proposed by Grant (1996b). The findings of the abductive analysis are presented in Chapter 4, and interpreted and discussed in Chapter 5.

3.6.5 Quality Criteria and Validation Issues

The use of a case-study method is well established in many scientific disciplines (Yin 2017). However, it has been subject to a number of criticisms. For instance, Yin (2017) shows concerns for absence of a systematic methodological procedure. Verschuren (2003) also views the question of researcher subjectivity as problematic. Another concern is the reliability, validity and generalisability of case studies (Engert & Baumgartner 2016). However, the study combated such methodological criticisms by making the case-study research procedure as transparent as possible. In addition, the researcher used the content analysis proposed by Mayring (2014), which involves a set of systematic and transparent procedures for analysing data. Mayring’s QCAmap involves specific quality criteria, such as inter- and intra-coder agreement, within the process of content analysis.

However, many scholars advocate the need for criteria to judge the quality of research designs in both quantitative and qualitative research (Ebneyamini & Moghadam 2018). The reliability and validity criteria are widely used to evaluate the quality of research in positivist research paradigms, which often use questionnaires and quantitative analysis of empirical data (Yazan 2015). In contrast, trustworthiness in qualitative research includes four criteria: credibility, transferability, dependability and confirmability (Denzin & Lincoln 2005; Dubois & Gadde 2014; Lincoln & Guba 1985, 2016). The following sections undertake discussion on the four criteria proposed by Lincoln and Guba (1985, 2016) to ensure the trustworthiness of the qualitative research process and results.

3.6.5.1 Credibility

Credibility refers to the believability and value of the findings (Lincoln & Guba 1985, 2016), which therefore requires two processes: conducting the research study in a believable way and the ability to demonstrate credibility (Houghton et al. 2013). Some scholars argue that credibility is the most important criteria for judging qualitative research. Credibility is related to the concept of construct validity in quantitative research and is revealed by evidence that the construct being investigated is dependent on interpretations of relevant theoretical paradigms. In other words, predicted patterns match the actual patterns; thus, multiple sources of evidence enhance the credibility within naturalistic research (Lincoln & Guba 2016). In this research, therefore, credibility is enhanced with data triangulation, comprising data collected from multiple sources, including interviews, focus groups and document analysis, to investigate the extent to which results can be verified (Casey & Murphy 2009).

3.6.5.2 Confirmability

Confirmability means the accuracy and neutrality of the data (Tobin & Begley 2004) and is strongly related to dependability (Houghton et al. 2013). Further, Bradley (1993, p. 437) defines confirmability as 'the extent to which the characteristics of the data, as posited by the researcher, can be confirmed by others who read or review the research results'. It therefore aims to control researcher bias and maintain the objectivity of research (neutrality). Thus, it can be increased by peer review agreement on the results, interpretation and recommendations of the study (Houghton et al. 2013).

3.6.5.3 Dependability

Dependability is akin to the reliability in quantitative studies, meaning how stable the data are (Shah & Corley 2006). This means that qualitative researchers gather evidence to support the claim that similar results would be gained if the research were repeated. However, qualitative researchers often argue that given the ever-changing social world and perceptual changes, findings of research, even if repeated with the same participants in the same context, would provide new findings (Dubois & Gadde 2014). The researcher, nevertheless, is responsible for yielding a set of data and descriptions that allows others to judge it regarding the results' transferability to different contexts. Therefore, dependability is enhanced by checking the coherency and consistency of the research process (Creswell & Creswell 2018). Schwandt, Lincoln and Guba (2007) also suggest that indexing a coding scheme that links to the relevant data sources allows external auditors to follow the research processes to demonstrate the dependability of the study.

3.6.5.4 Transferability

Transferability refers to the extent to which particular results can be transferred to another context or similar situation, while still maintaining the inferences and meanings from the completed research (Leininger 1994). Therefore, it requires evidence supporting the generalisation of results to other situations or contexts with different participants (Slevin & Sines 1999). Transferability is strengthened by thick descriptions in qualitative research (Creswell & Creswell 2018; Houghton et al. 2013), which enable other researchers to make judgements regarding its 'fit' within other contexts or situations (Lincoln & Guba 1985).

Comparison across different cases that provide similar results also enhances transferability. At the level of theoretical thinking, transferability can be obtained by evidence of theoretical transference, which is where the same concepts are applied more widely and are applicable in different contexts. The results of qualitative research are embedded in the context in which the qualitative data were collected and analysed. As a result, the trustworthiness of qualitative interpretations deals with generating arguments for the most probable interpretations. Therefore, it is impossible to conclusively determine the degree to which the findings will be replicated in different contexts with the same findings expected. However, this research provides thick descriptions of the case organisations to give other researchers sufficient knowledge to judge the degree of transfer that is possible in different contexts.

3.6.6 Ethical Considerations and Access

The Australian National Statement on Ethical Conduct in Human Research (2018) requires researchers to keep study participants free from risks by seeking the Victoria University Human Research Ethics Committee's (VUHREC) approval before conducting research involving human participants. As this study involves online interviews with 31 managers of two organisations, in addition to online focus groups, the Ethics Committee approval was obtained before the start of data collection. In addition, proper authorisation was obtained from the two companies before conducting online interviews and focus groups. De-identification of participants was ensured, and their responses were kept safe under password-protected digital devices such as laptop and voice recorders.

Potential ethical issues for this research, using Patton's ethical issues checklist (2002) as a guide, are explaining purpose, informed consent, confidentiality, and advice.

3.6.6.1 Explaining Purpose

Before the start of the case studies, the companies were given an information sheet (see Appendix B) for the research study. The respondents were also given the information sheet that includes the research aims; the nature of their participation; and what procedures would be taken to keep their privacy safe and protect their rights and identity as participants, including the option to withdraw at any stage.

3.6.6.2 Informed Consent

A consent form was developed on the basis of the guideline of the VUHREC. Respondents were given an information sheet (see Appendix B) to read one week before the interview. All respondents were informed of their rights and asked to sign an informed consent form in accordance with the requirements of the VUHREC. In doing so, participants acknowledged that they were aware of what was entailed by their involvement and agreed to have various activities recorded for research purposes.

3.6.6.3 Confidentiality

The researcher is obligated to uphold the participants' dignity and to ensure their confidentiality and that no quotations are attributable to participants without prior consent. Undertakings of confidentiality were given to the participants before the start of the interviews, and consent was sought for recording of the interviews. None of the participants declined to record the interview.

3.6.6.4 Advice

The two supervisors for this study were considered the researcher's confidants and advisors on ethics issues during the research.

3.7 Conclusion

This chapter has presented the research method and design for the study. It first highlighted the philosophical position of the research and the options made about the research strategy and methods of enquiry. Then, the stages of research, data collection techniques and analysis strategy were introduced in the research design section. This research adopts a constructivist–interpretative paradigm with a qualitative approach by using primary and secondary data from managers' interviews, focus groups and documents, in addition to reviewing the existing literature. The research adopts an abductive approach, and the empirical data collection phase consists of a two-stage process. The first stage is divided into two phases.

The first phase is an initial exploratory study of the literature to gain initial understanding of best practices in the process of aligning the digital business strategy with organisational design factors. This phase helped the researcher to produce the key concepts used in the interviews, which were grounded in the theoretical insights from the literature. The second phase is a final review of the literature after analysis of the collected data inductively.

The second stage of data collection is a case studies approach that entailed an exploration of best practices in two unique cases, NWC and Marafiq, in the Saudi water sector, focusing specifically on collecting qualitative data regarding their processes for formulating and implementing the digital business strategy and achieving the required digital strategic alignment between digital business strategy and organisational design. This method extends the understanding of both theory and the phenomenon under study by calling for a successive and parallel analytical review of the emerging data and theoretical insights. This resulted in multidimensional constructs, which are crucial in the abductive research approach to break down the more linear view on relations between theory elaboration and empirical data. In the following chapter, the findings of the exploratory case studies and the later developments of the digital strategic alignment model are presented.

Chapter 4: Data Analysis and Results

4.1 Introduction

The previous chapter made it clear that the underlying premise of the research has an interpretivist worldview, reflecting the desire for the empirical data to be underpinned by participants' interpretations and thick descriptions, and saturated with contextual and practice-based overtones. A case was also made for a qualitative enquiry comprising an exploratory investigation of digital business strategy-enabled water companies, which feeds into a subsequent and more detailed case-study research design.

Following presentation of the data collection and analysis aspects of the research in the previous chapter, this chapter presents the findings of the exploratory studies, and will help analyse the CSFs of digital strategic alignment in the case-study companies. This chapter thus addresses the research objectives, which were to explore the impact of digital business strategy on organisational design factors (i.e. structures, processes, people and rewards) and identify the success factors needed for digital strategic alignment that enhances sustainable business performance, in addition to proposing a digital strategic alignment model (a novel digital organisational design) that can support water organisations with their digital business strategy uptake to improve their sustainable business performance.

This chapter is structured into six sections. The results of the exploratory study, which include the case descriptions for within-case data and the cross-case analysis and findings, are presented in Section 4.2. The comparative (quantitative) analysis of the identified CSFs for digital strategic alignment in the two companies is presented in Section 4.3. The criteria used for selecting CSFs of digital strategic alignment and supporting literature are presented in Section 4.4. The selected CSFs and the revised theoretical framework are discussed in Section 4.5. This is followed by Section 4.6, which concludes by summarising the key findings of the exploratory studies.

4.2 Results of the Exploratory Study

The exploratory study presents digital business strategies and organisational design factors as practised in two Saudi water companies. The goal is to identify the impact of digital business strategy on organisational design factors, and to explore the CSFs of the digital strategic alignment process between digital business strategy and organisational design, exploring successes experiences, best practices and barriers during the process. Barriers, when they are adequately addressed and managed, can act as success factors for the digital strategic alignment. Thirty-two different water managers, representing two digital business strategy-enabled water companies, participated in the exploratory study. Table 4.1 below presents details of the participants.

Table 4.1: Demographic overview of the participants (interviews and focus groups)

	Participant (pseudonym)	Position	Experience in the company + previous experience	Company name
1	1NI	Vice President of Customer Care	3 + 10 years	NWC
2	2NI/1NF	Digital Transformation and IT General Manager	7 + 10 years	NWC
3	3NI	Digital Transformation Office Manager	2 + 7 years	NWC
4	4NI/2NF	Smart Operations General Manager	11 years	NWC
5	5NI	Customer Digital Applications Director	2 + 8 years	NWC
6	6NI	Collection and Customer Operation Executive Manager	12 years	NWC
7	7NI	Bills Collection Manager	5 years	NWC
8	8NI	Executive Director of Customer Service	10 + 4 years	NWC
9	9NI	Digital Infrastructure and Data Centre Manager	2 + 9 years	NWC
10	10NI	External Consultant (Digital Partner)	11 + 4 years	NWC
11	11NI/4NF	Executive Director of Customer Service	10 + 2 years	NWC
12	12NI	IT Manager	10 + 2 years	NWC

	Participant (pseudonym)	Position	Experience in the company + previous experience	Company name
13	13NI	Customer Service Channels Manager	5 + 2 years	NWC
14	14NI	Board Secretary & Director General of Executive Affairs	11 + 4 years	NWC
15	15NI	Solution Design Manager and Customer Application Manager	2 + 2 years	NWC
16	16NI	Digital Meters Director and Metering Data Management Specialist	2 + 4 years	NWC
17	17NI	Senior Manager of Smart Meters Projects(Digital Partner)	2 + 10 years	NWC
18	18NI	General Director of Human Capital	2 + 7 years	NWC
19	19NI	Service Channels Director	2 + 16 years	NWC
20	3NF	General Manager Strategy, Business Planning and Corp Performance	2 + 8 years	NWC
21	1MI	Customer Service Manager	17 years	Marafiq
22	2MI/3MF	HR Manager (Marafiq-MaSa partner)	20 years	Marafiq
23	3MI	Stations Manager	5 years	Marafiq
24	4MI	Technical Asset Management General Manager	17 years	Marafiq
25	5MI/2MF	Corporate Performance Operation CPO, OT, ERP Manager (Marafiq-MaSa partner)	8 years	Marafiq
26	6MI/4MF	O&M, Water Networks General Manager (Marafiq-MaSa partner)	8 years	Marafiq
27	7MI/1MF	General Manager, Procurement and Performance & Reliability (Marafiq-MaSa partner)	5 years	Marafiq
28	8MI	Assets Strategy Planning Manager	9 years	Marafiq
29	9MI	Reclaimed Water Network Manager	6 + 6 years	Marafiq
30	10MI	Potable Water Manager	2 + 8 years	Marafiq
31	11MI	IT General Manager	10 years	Marafiq
32	12MI	Strategic Planning & Performance Manager	17 years	Marafiq

The water companies were targeted using demonstrable evidence that they have formulated and implemented digital business strategies in their respective organisations and aligned these strategies with organisational design. By screening companies' websites and archived data, Marafiq in 2020 has shown its digital strategy, which was launched in 2018. It focuses on five pillars; improve energy usage and outcomes, automated and smart operations, seamless customer experience, improve asset performance and reliability and enhance digital capabilities and culture (Marafiq 2020). NWC also presented its digital business strategy (launched in 2017), which focuses on four strategic pillars, namely, customer-centricity, financial sustainability, environmental protection and fully integrated branches (NWC 2021b). The NWC's digital business strategy has also three strategic enablers, include process and operation excellence, analytics and digitalisation, and high-performing agile organisation. The strategic pillars and enablers helped the companies change and align their organisational designs. In addition, the two companies are classified as large organisations, with an average of 17,000 employees and 50 years of water supply experience on average. Thus, the interviews, the focus groups and the documents collected are all related to their digital strategy approaches, including their digital strategic alignment processes and outcomes.

For both companies, data collection relied on semi-structured interviews and focus group discussions. In addition, documents such as archived reports, published digital strategic projects and internally produced magazines were collected from the participating companies to corroborate and augment the evidence collected through the interviews and focus groups. These documents revealed their digital business strategy development process. Records of the companies' digital projects (e.g. digital meters or Hayat system) were analysed to detect the manifestation of the strategy process and organisational issues emerging from the process. The analysis included interview transcripts, focus group transcripts and documents, and indexing them all by identifying the most important issues. The analysis is guided by the interrelated organisational design factors (i.e. strategy, structures, processes, people and rewards). The outcomes highlight the CSFs of the digital strategic alignment process requiring particular attention in the case companies.

All data were analysed using both within-case and cross-case analyses. Cross-case analysis allowed us to identify the themes emerging from the interviews, focus groups and documents through corroboration and contradiction. This approach was checked against best-practice recommendations of the linear model of case-study research as explained in the literature (Piekkari, Plakoyiannaki & Welch 2010; Yin 2017). The data analysis for each case was conducted independently of the existing literature. After identification of the CSFs within each case company, the literature was analysed deductively to identify the potential CSFs arising from the literature. This process was iterative and served as a cross-check regarding the findings of the case data and existing literature, and as a means to develop new knowledge, propositions and interpretations (Dubois & Gadde 2017).

The section is divided into two sub-sections. First, the case descriptions for within-case data are presented in Section 4.2.1. Second, the cross-case analysis and findings are presented in Section 4.2.2.

4.2.1 Case Descriptions for Within-Case Data

The water companies diverge when the practicalities of formulating and implementing the digital business strategy and the digital and organisational changes are considered. In 2019, NWC hired a global strategy consultant and set up an in-house strategy team to develop the digital business strategy and speed up the implementation process across its regional branches in cooperation with many global and local digital partners such as Oracle Corporation and Elm Company (NWC 2021b). Marafiq, in 2018, contracted the company SAP to develop a digital strategy (Utilities 2018). Table 4.2 shows a detailed summary of the descriptive statistics of the case-study organisations, based on company documents and opinions of the participants.

Table 4.2: Description of the case organisations

Element	NWC	Marafiq
Company size	Large water company	Large water company
Ownership type	Government	Private
Founded	In 2008 Previously, made up of water directorates in 13 regions under the government sector since the 1960s	In the 1970s, as a government utility In 2003, started as a private company
Number of employees	<15 000	(Marafiq and Marafiq Saur [MaSa]) <4000
Number of branches	17 (residential cities)	4 (industrial cities)
Products and services	Water and wastewater	Water, wastewater and electricity
Primary digital actors	In-house digital IT professionals and external consultants Contracted a digital partner, Oracle, and supported by many digital partners globally and locally	In-house digital IT professionals Contracted a digital partner (SAP services provider) and supported by carefully selected and trusted digital partners and consultants
Integrated digital technologies	Hayat integrated system (Oracle): includes a customer care and billing system SADAD Saudi payment system, eBranch, enterprise content management, digital metering, geographic information system (GIS), Internet of Things (IoT) through supervisory control and data acquisition (SCADA), customer service mobile apps, interactive voice response, enterprise asset management system, metering data management (MDM), business intelligence, robotic process automation, SMS, mobility app, HR APP, enterprise resource planning (ERP), iSupplier platform, NWC digital forum, Hayat Academy (digital-enabled knowledge sharing platforms), and lean quality management system	SAP cloud computing solutions, unified data centre (SAP data bank), SAP HANA platform, customer relationship management (CRM), SAP ERP, digital metering, IoT with SCADA, district metering zone (DMZ) system, a customer service mobile app, HR app, GIS, digital platform with its external partners, and supplier relationship management (SRM) system

4.2.1.1 National Water Company

NWC is a public water and environmental services provider located in the Kingdom of Saudi Arabia. The company provides services nationwide, and is responsible for the supply of potable water and collection and treatment of wastewater for more than 33 million people (NWC 2021b). NWC has invested nearly US$6.7 billion in more than 300 water projects over the last 10 years in Riyadh, Jeddah, Makkah and Taif, and recently announced huge investments worth billions over the next few years (U.S.-Saudi Business Council 2021). The company has received several global awards (e.g. Global Water Intelligence 2020, Arab Government Excellence Award 2020, Special Achievement in GIS [SAG] Award 2020 and Continuous Improvement Award [KAIZEN] in 2019) and was accredited by the International Organisation for Standardization (ISO) for information security (i.e. conforming to ISO/IEC 27001 information security standards) in 2019 (see Appendix C). In 2020, the company's remits were expanded from four major cities to cover the six regions (comprising 13 provinces) of Saudi Arabia, making it the world's largest water utility (GWI 2020).

The company integrated its digital strategy (launched in 2017) into its core business strategy to form a common digital business strategy in 2019. It focuses on four strategic pillars, namely, customer-centricity, financial sustainability, environmental protection and fully integrated branches. All the company's strategic objectives depend on the pillars: improving water production, treatment and consumption and customer satisfaction, as well as working on a commercial basis.

The company's strategic objectives, also linked to strategic enablers, include process and operation excellence, analytics and digitalisation, and high-performing agile organisation. All organisational processes and procedures must meet standards of excellence as a strategic enabler for achieving the company's strategic objectives. The second key enabler is analytics and digitalisation, which aims to improve the digital environment within the company, as well as the digital experience in relation to internal and external stakeholder experience, such as customers, suppliers, government agencies and other stakeholders. In addition, the use of data and analysis to accelerate and improve the decision-making process falls under this enabler. The third key enabler is agile organisation, which allows the company to change its structure and organisation when needed by using cross-functional teams. The company also seeks to create an attractive working environment and enforce robust and transparent governance, as well as alignment between digital business strategy and implementation plans. All the four strategic pillars and three enablers have KPIs and are linked to sustainable business performance (NWC 2021b). Thus, NWC has a clear digital business strategy that has been developed during the past 5 years.

4.2.1.2 Marafiq Company

Marafiq is a private power and water utility company headquartered in Jubail Industrial City on the east coast of Saudi Arabia. The regional office is located in Yanbu Industrial City on the west coast. In Jubail, Marafiq produces, distributes and supplies water (potable seawater for cooling and reclaimed water). It also provides wastewater treatment services (sanitary and industrial) to customers in the industrial quarter of Jubail, and part purchases, processes and supplies potable water to meet additional demand in the city. Marafiq trades water and power and account for fuel supply to Jubail Water and Power Company (JWAP)—an independent water and power plant (IWPP) by Tawreed (an off-taker, fully owned subsidiary of Marafiq)—in Jubail. Marafiq IWPP is the world's largest power and desalination plant (ACWAPOWER 2021). In Yanbu, all the utility services are centralised in a single integrated complex. Services include power generation, transmission and distribution, water production, seawater cooling systems, and sanitary and industrial wastewater treatment. Thus, Marafiq is considered Saudi Arabia's first private integrated power and water utility company, which provides a full package of services in the industrial cities (Marafiq 2021).

In 2011, the company Saur and Marafiq formed the company MaSa to operate and maintain the water supply, wastewater treatment and industrial cooling services for Jubail. The operation and maintenance contract awarded to MaSa, of which 51% is owned by Marafiq and 49% by Saur. The challenges of the new contract focus on cost optimisation, improved operational performance, facilities upgrading, the rollout of action plans that includes training, skills transfer and services digitalisation (Saur 2020).

Marafiq has received several sustainability awards (e.g. King Khalid Responsible Competitiveness Award, Dubai Award for Sustainability, and Five-Star Occupational Health and Safety Audit—Appendix C). It provides a healthy working environment that attracts and retains professional talent and demonstrates good corporate citizenship (Marafiq 2021).

Marafiq has teamed up with SAP to further its digital strategy, in line with the goals of the Saudi Vision 2030 economic diversification mandate. The agreement makes Marafiq one of the first water utilities in Saudi Arabia to enter a digital transformation agreement with the German technology company SAP (Utilities 2018). The company focuses on digitisation to improve its digital services, that is, on digitalising power generation, water production and wastewater recycling to realise the kingdom’s ambitious economic plans, especially for the energy-intensive industrial cities. The company’s digital strategy with SAP aims at preparing the company for change to become the provider-of-choice for the industrial sector and to lead sustainable, reliable and cost-effective power and utility services (Utilities 2018). Therefore, Marafiq has pursued the digital strategy by developing integrated digital solutions and processes driven by the Towards Excellence program, and defined its digital ambition by providing smart and sustainable energy and water solutions to its stakeholders (Marafiq 2021).

4.2.2 Cross-Case Analysis and Findings

Cross-case analysis is the comparison of the patterns, similarities and differences based on the analysis of the data collected from the case-study organisations (Lima, Marcelino-Sadaba & Verbano 2021). This study used the cross-case analysis method proposed by Barratt, Choi and Li (2011). The researcher selected constructs from the existing literature and sought the evidence while addressing these constructs. The researcher chose this method because the study preliminary constructs were informed by the organisational design model.

A flexible approach in the interviews provided the researcher in-depth knowledge of the data and new insights beyond the tenets of the organisational design framework proposed by Galbraith (2011), and this further extended the theory. This research belongs to the theory elaboration method, not theory generation or theory testing. According to Ketokivi and Choi (2014), theory elaboration focuses on the contextual logic of a general theory (organisational design in this case). Although the organisational design model has been successfully applied in many digital technologies (Galbraith 2014; Raj & Seamans 2019), the researcher believes that its applicability in the context of digital business strategy is not sufficiently developed to obtain detailed propositions, as digital business strategy in itself is the elaboration of traditional business strategy in the organisational design model. Thus, the researcher focused more on the theoretical framework compared with the method of theory generation and less compared with theory testing. On the contrary, the researcher collected and analysed empirical data to support theory elaboration to a greater extent compared with theory testing.

The next sub-sections present, first, the themes that support the existing organisational design factors (i.e. people and rewards), followed by additional themes that extend the organisational design model. They provide detailed analysis on themes generation and proposition development.

4.2.2.1 Themes that Support the Existing (People and Rewards) Factors of Organisational Design

The analysis shows that the integration of some of the existing organisational factors (i.e. people and rewards) into the new digital organisational design is imperative to achieve digital strategic alignment. The research did not find evidence of the impact of digital business strategy on HR policies and reward systems proposed by Galbraith (2011). However, the study found three themes that support the existing factors of organisational design as follows:

4.2.2.1.1 Theme 1: Digital business strategy requires renewed digital skills and knowledge

This study revealed that the process of working in a digital business strategy-enabled company requires water leaders and professionals to reskill in some digital areas to develop their own digital skills base (3MI) (for participants' codes, refer Table 4.1 above). As digital business strategy and associated digital technologies affect most, if not all, parts of a firm, several studies (mostly in organisational design literature) find that firms need to overcome digital skill shortages to improve performance (Balakrishnan & Das 2020; Boniface 2022; Carcary et al. 2017; Hess et al. 2016; Kane et al. 2017; Kane et al. 2016; Kretschmer & Khashabi 2020; Sutherland 2020).

Interestingly, all interviews have found links between digital skills and knowledge, organisational design factors, and sustainable business performance. 7NI, 17NI, 3MI, 9MI and 12MI recognised the benefits they obtained from digital skills and knowledge, mainly through improved efficiencies or technical (IT) issues reduction, in response to their digital strategy. Digital skills can make employees more competent in dealing with complex issues of digitalisation (17NI, 12NI). In Marafiq, for example, 9MI stated that with the digital strategy, the level of digital skills is higher than before, which reduces operation costs and increases productivity.

Both companies especially faced a big challenge in aligning their existing digital skills and knowledge with ever-changing digital technologies, highlighting the important role of continuous training under digital business strategy for retaining the core business competencies within the water sector (1MI, 3MI, 4MI, 9MI, 11NI, 12NI, 14NI, 15NI, 16NI, 2NF). For example, one of the Marafiq interviewees stated that:

> Another challenge is the lack of real in-depth digital knowledge. When we introduce a new digital system, we think that our people are able to operate the new digital system. In fact, our people with their existing digital skills are unable to operate and develop all new digital systems (3MI).

A participant from NWC also stated that:

> With the continuous development of our digital business strategy, there is a need to undertake ongoing training to bridge the existing digital skills gap and avoid mistakes, speeding up the adoption of new digital technologies (12NI).

One of the interviewees was from NWC's digital partners. He experienced some difficulties due to the lack of some employees' digital skills and knowledge. He stated that:

> NWC needs more digital professions, and high levels of digital skills such as coding, programming, data analysis, and practical digital knowledge in field works in order to be able to align the company's digital strategy with its digital projects and to reduce operating costs (17NI).

On the basis of this analysis, digital skills and knowledge can be described as the competence and experience of employees in designing, implementing, managing and operating digital systems, and can make employees more competent in dealing with complex issues of digital integration. The researcher also believes that digital skills and knowledge are a success factor for two reasons. First, ever-evolving digital business strategy requires renewed digital skills and continuous training to align employees' competency with the digital systems they use. Second, digital business strategy creates high-digital-skill tasks (in structures) to achieve desired outputs. Therefore, there is evidence to link both the digital skills and knowledge to sustainable business performance directly, and to the changes in organisational design factors. In other words, once a firm develops its employees' digital skills and knowledge, those employees can solve technical issues and develop the organisational design in response to its digital strategy, which in turn influences sustainable business performance. Thus, the researcher posits two propositions:

Proposition 1: Digital skills and knowledge have a direct influence on sustainable business performance.

Proposition 2: Digital skills and knowledge influence all organisational design factors.

4.2.2.1.2 Theme 2: A dynamic digital business strategy creates within-organisation resistance to change

Interestingly, all the research interviewees recognised the importance of change management and its link with digital strategy implementation. They highlighted that the benefits they obtained from change management, in response to resistance to change, helped them indirectly in improving their social sustainability, mainly by improved people's digital skills or their participation in the formulation and implementation of the firm's digital strategy. 1NI, 2NI, 3NI, 4NI, 5NI and 4MI stated that change management is a CSF for overcoming resistance to change, improving end-user digital skills, and thus aligning the firm's employees with its digital business strategy.

This result is consistent with the literature on the link between change management and strategic alignment. Foster, Hawking and Stein (2004, p. 7) define 'the change management as the process of assisting an organisation in the smooth transition from one defined state to another, by managing and coordinating changes to business processes and systems'. It involves the effective communication with stakeholders regarding the scope and impact of the expected changes to assist them to cope with and adapt to the transition. Gray (2006) suggests that there is a need for change management when implementing new technological solutions that affect people. During digital strategy implementation, people are often incorporated through change management programs, and these people form the direct link between digital strategy implementation and sustainable business performance. The responses by 1MI support the role of change management in that they confirm that:

> Change management identifies the required digital and organisational changes within the company, helping to manage the effect on employees by identifying what type of training is appropriate for each group of employees, … and ensuring that all employees are prepared to use the new digital systems (1MI).
>
> Employees used to work in a usual way, any change is unknown to them, so some may resist the change … if a new digital system can help them improve their performance and gain some benefits, this would speed up their acceptance over time (1MI).

One respondent pointed out that:

> The role of the change management depends on the size of the change and the number of employees affected by the change … some large change programs require awareness campaigns, videos and brochures regarding the change and their benefits to employees and customers (11MI).

According to Shivakumar (2018), change management processes are needed to efficiently handle the digital change. Absence of change management leads to cost and schedule overruns. Under digital business strategy, change management should be a continuous and iterative process, because digital technologies are constantly evolving, and this influences a firm's people and their attitudes. Therefore, change management is highly effective in alignment processes (Luftman & Kempaiah 2007). The evidence is clear from the following quotation: 'Change management must be established as a continuous process due to the company's ever-changing digital technologies' (2MF).

From a different perspective, one of the interviewees of the NWC's digital partners stated that 'technical issues may cause resistance to change because employees cannot work properly unless these issues are solved. The change management role is to report and resolve these issues with IT departments before the launch of new digital systems' (10NI).

Within-company resistance to change can slow down the implementation of its digital business strategy and reduce its benefits (Carcary et al. 2017; Kretschmer & Khashabi 2020; Li et al. 2016; Matt, Hess & Benlian 2015; Stoffels & Ziemer 2017). Change management is a CSF for digital strategic alignment because it allows organisations to quickly overcome resistance to change and to deliver digital services faster to customers, and eventually achieves the best value-generating structure and practices ahead of its rivals. Thus, this finding is consistent with the above literature. However, change management should be treated as a strategic factor that considers strategic digital organisational change at all organisational levels, and thus directly influences all organisational design factors that, in turn, affect sustainable business performance. Therefore, the researcher posits:

Proposition 3: Change management influences organisational design factors.

4.2.2.1.3 Theme 3: Digital business strategy requires quality management with KPIs to drive the digital strategic alignment process

The majority of interviewees mentioned that their companies used quality management systems with KPIs as a framework for establishing, documenting and measuring strategic objectives, projects and initiatives, and improving sustainable business performance. NWC received the KAIZEN Awards for continuous improvement in 2019 (1NI) and was accredited by the International Organization for Standardization (ISO) for information security in 2019 (5NI). Marafiq also earned ISO certification for its management system and environmental management system in 2018 (Marafiq 2021) (see Appendix D).

The main driver of quality management with KPIs is to define a systematic and transparent approach to ensure the achievement of quality requirements and customer satisfaction. According to Shivakumar (2018), quality management outlines the main quality processes for digital projects implementation. These processes define the quality goals and associated KPIs that can be used to measure overall digital project quality. The KPIs are derived from the firm's strategic objectives, and therefore could be considered a subset of strategic alignment as they are mapped to these strategic objectives and are used to evaluate the performance of the digital technologies, and effectiveness of the whole organisational process. The researcher found this finding in the company's documents, as shown in Figure 4.1 below.

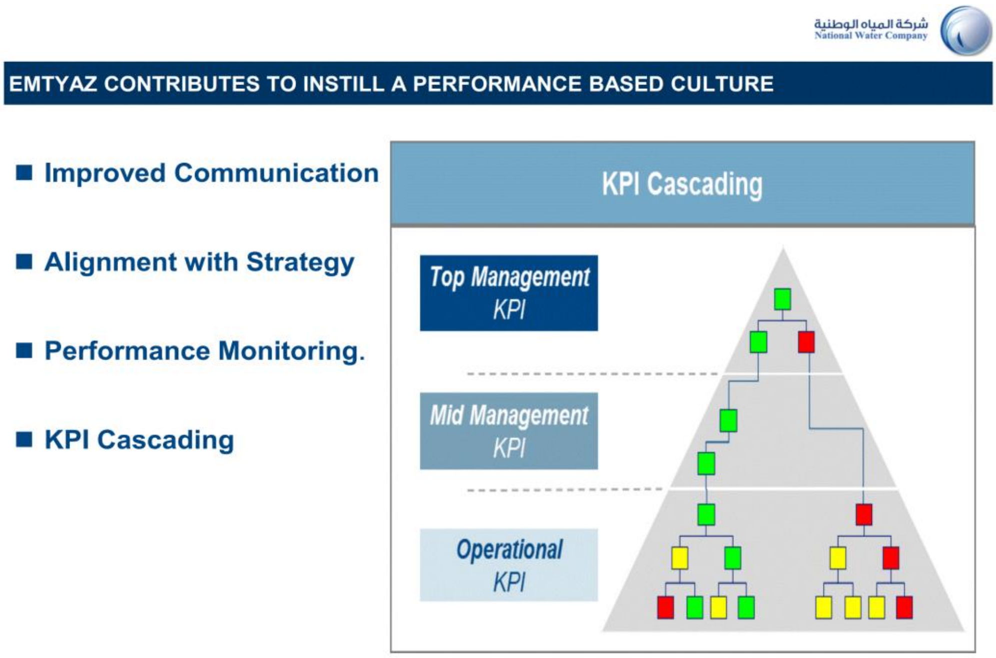


Figure 4.1: NWC performance-based organisation (Source: NWC's CEO 2012)

Quality management with KPIs helps NWC to move continually in a clear path for alignment, support and development while implementing digital projects (1NI, 2NI, 3NI, 4NI, 5NI). Participant 4NI stated, 'NWC is a performance-based organisation, which measures financial sustainability, social responsibility, and environmental protection objectives for digital technology itself and for the end-users and customers'.

Similarly, Marafiq has established over 90 KPIs related to management and operations (Marafiq 2021). Thus, it can be concluded that the digital strategic alignment process is driven by quality management with KPIs, which is expected to (1) reduce costs and increase benefits indirectly through faster detection of strengths, weaknesses, threats and opportunities; (2) lead to a sharper focus on the effective use of resources; and (3) dynamically create digital strategic alignment that improves sustainable business performance. This is consistent with the findings of McAdam, Miller and McSorley (2019), who find that ever-changing digital technologies require dynamic strategic alignment orchestrated by quality management practices. Quality management using KPIs should be viewed as a strategic factor that documents, measures and develops the performance of the entire organisation, including that of the top management and cross-functional teams, and, most importantly, digital capabilities. Thus, the researcher posits:

Proposition 4: Quality management with KPIs influences organisational design factors.

4.2.2.2 Elaboration of Organisational Design Theory

While the research findings have supported factors already in the literature, the researcher has found evidence of additional factors that indicate how water organisations can maximise the benefits derived from the adoption of a digital business strategy. As participant 1NI stated, ‘With our digital business strategy, we have to make new digital processes, structures, digital training, mindsets, digital solutions, and new ways to manage, communicate, and collaborate … everything is changing’.

This section presents the additional themes that could extend the organisational design theory in response to digital business strategy achieving digital strategic alignment that ensures sustainable business performance. In each theme, the researcher presents the factors found in the literature and gives a detailed summary of the findings within the case organisations.

4.2.2.2.1 Theme 4: The integration of IT and business strategies into one digital business strategy in organisational design is the essence of digital strategic alignment

While most studies in the literature argue that the organisational design factors are affected by the adoption of digital business strategy (Chanias, Myers & Hess 2019; Hess et al. 2016; Kretschmer & Khashabi 2020; Li et al. 2021; Matt, Hess & Benlian 2015), this study has found evidence that there are links between the adoption of digital business strategy, organisational design factors and sustainable business performance. The analysis shows that the integration of IT and business strategies into one digital business strategy aims to unify and align strategic, digital and organisational changes. This research specifically identified the key issues associated with the integration of two factors, namely, a shared digital strategic vision and shared digital strategic objectives. The integration between IT/digital vision and strategic vision results in a shared digital strategic vision, which can lead the company’s digital business strategy. A vice president at NWC stated:

> Our business strategy and digital strategy were integrated into one digital business strategy to create a shared digital strategic vision through which business and digital units work together to unify and align the strategic, organisational, and digital changes ensuring that sustainable business performance is in the interest of everyone (1NI).

In addition, 17 interviewees (2NI, 5NI, 7NI, 14NI, 16NI, 1NF, 2NF, 4NF, 1MI, 5MI, 7MI, 8MI, 11MI, 12MI, 2MF, 3MF, 4MF) saw the importance of—and strived towards—a shared digital strategic vision, which is also affected by external stakeholders. In Marafiq, for example, participant 2MF said, ‘I agree that a digital strategic vision is necessary for unifying the digital and strategic direction of the company’. Participant 2NF stated, ‘If we do not have a shared digital vision, then each business unit would set a different direction’, and participant 7MI stated, ‘The company should have a digital vision that defines what the company wants to be in the future. The digital vision must be shared with business vision’.

Thus, a (shared digital) strategic vision should be divided into strategic objectives (Chakravarthy & Lorange 1991). Interestingly, most interviewees recognised the importance of shared digital strategic objectives under digital business strategy. In Marafiq, digital technologies-related investments push the firm to achieve shared digital and business objectives (6MI). Using a digital platform based on an external cloud service, Marafiq aims to reduce its operating costs and improve internal and external services simultaneously (11MI).

Research in the 1980s considered IT strategic alignment an event that developed strategic plans to achieve multiple strategic objectives based on combining IT and business visions (Reich & Benbasat 1996). Marques, da Cruz and Pires (2015) state that a water company’s sustainability is usually assessed by economic, social and environmental objectives. Scholars argue that all three objectives are equally important for a firm to sustain its business performance (Jones, Grant & Kramar 2010). In NWC, the shared digital strategic objectives helped to indirectly improve environmental sustainability, mainly through leveraging digital resources to reduce water leaks and carbon rates, which are linked to KPIs (1NI and 5NI). The combination of strategic, digital, organisational and sustainability objectives is important to support each other according to a ‘shared digital strategic vision’. The response by 1NF confirms that:

> The shared digital strategic vision is a CSF because it would be divided into strategic objectives that include digital, financial, and non-financial objectives, which are indispensable when attempting to promote a firm sustainability … shared objectives are a tool for co-organising and leading the company digitally and sustainably.

In Marafiq, 6MI supports shared digital strategic objectives in that he confirms that:

> Digital alignment is a strategic objective in itself in Marafiq. It allows the firm to leverage the full potential of its digital resources and align its internal and external organisation to achieve strategic objectives. Marafiq invests to get a return on that investment … so, it must define what it needs (i.e. digital and organisational capabilities) to run its business in the most effective and efficient manner.

According to participant 12MI:

> Our digital strategy seeks to digitalise the entire company … the integration between the operation technology (OT) and information technology (IT), as a digital, strategic and organisational objective, enables the company to conduct advanced data analysis, provides more information in real time for decision-makers, and reduces operating costs and water leaks, and speed up information processing.

The researcher found shared digital strategic objectives in NWC's documents, as shown in Figure 4.2 below:

Figure 4.2: Shared digital strategic objectives in NWC

Thus, digital, strategic and sustainability objectives could provide a positive influence on the relationships among organisational design factors that, in turn, influence sustainable business performance. This finding is important and provides a novel contribution to the organisational design theory because digital business strategies that involve shared digital strategic objectives may push firms to innovate integrated digital solutions that achieve these objectives simultaneously. This, in turn, enhances sustainable business performance, as long as these objectives are measured by KPIs.

Based on the analysis, there is evidence confirming that the presence of a shared digital strategic vision and shared digital strategic objectives ensures an adequate level of integration of digital strategy with business strategy and indirectly helps in achieving sustainable business performance. A clear shared digital strategic vision can be divided into shared digital strategic objectives. This could reduce the equivocality and uncertainty in decision-making processes among different actors. Thus, the stronger the integration in firms, the better they perceive indirect positive impacts on their sustainable business performance.

However, studies on the impact of the integration in organisational design literature are limited. Ramanathan et al. (2017) find that the level of integration between IT and business strategies can have an indirect impact on sustainable business performance. Li et al. (2021, p. 702), whose study is underpinned by the IPV theory, state that IT business strategic vision facilitates mutual understanding between IT and business managers. Korachi and Bounabat (2020) refer to the importance of the digital strategic vision and digital strategic objectives in digital strategies. The current study provides new evidence on the direct impact of the integration of a shared digital strategic vision and objectives on the factors of organisational design, which, in turn, influence sustainable business performance. Thus, the researcher posits two propositions:

Proposition 5: A shared digital strategic vision influences all organisational design factors.

Proposition 6: Shared digital strategic objectives influence all organisational design factors.

4.2.2.2.2 Theme 5: Digital business strategy balances between deliberate and emergent approaches, requiring simultaneous incremental–comprehensive development of organisational design factors

The integration of IT and business strategies into one digital business strategy requires a new approach of planning and implementation. The analysis refers to the fact that the formulation and implementation of digital business strategy cannot be separated into two phases in practice. This is because digital business strategy is usually developed and implemented incrementally as companies continue to act in small iterative steps (e.g. introducing mobile apps or new digital services), which ultimately requires continuous changes in structures, processes and governance mechanisms (3NI, 5NI, 14NI, 5MI, 10MI, 11MI). Interestingly, many of the research interviewees recognised the importance of the simultaneous incremental–comprehensive development approach in different aspects of organisational design factors with different examples (3NI, 7NI, 9NI, 10NI, 11NI, 13NI, 14NI, 15NI, 16NI, 17NI, 18NI, 19NI, 1NF, 3NF, 1MI, 2MI, 3MI, 5MI, 7MI, 8MI, 9MI, 10MI, 11MI, 12MI, 1MF, 3MF). This approach ensures clarity in the scope of work, business needs, schedules and resource allocation, as well as the strategic, organisational and digital changes required for multiple complex implementation phases. The evidence is clear from the following quotation:

> NWC adopted a simultaneous incremental–comprehensive development approach, which consists of three paths: two-quarters planning, four-quarters planning and five-years planning. Each path should result in an implementation plan involving approved digital and business projects, and associated organisational change processes, which together are linked to other upcoming developments (5NI).

Marafiq has a similar approach, but it focuses more on quality assurance and is relatively slower in terms of the speed of development. It sets annual incremental−comprehensive development plans in line with its strategic objectives, implementation priorities, and investments for each year (12MI). The development process of its digital strategy aims to integrate and align all digital systems across functions to unify the company’s databases, processes and information flow and speed up decision-making (5MI1 and 1MI).

Evidence clearly shows that the simultaneous incremental−comprehensive development approach is a critical factor for digital strategic alignment because it balances deliberate and emergent approaches to digital business strategy, and improves the firm’s ability to see new opportunities while maintaining a focus on existing advantages, as two respondents point out that:

> NWC is continuously developing its digital business strategy, requiring simultaneous organisational changes to align each other during the implementation stage and maintain sustainable business performance (4NI).

> Our digital business strategy is updated and implemented incrementally (1NI).

This approach also allows decision-makers to simultaneously develop organisational factors and digital resources in line with the company’s objectives and market conditions. This evidence is clear from the following quotations:

> Digital business strategy and organisational design should not drive one another. It is a mistake to formulate a digital business strategy and then reorganise organisational design based on it or vice versa. Digital business strategy and organisational design should be developed simultaneously based on the company’s strategic objectives (4NI).

> The formulation and implementation of digital business strategy are influenced by the ever-changing market conditions, which require continued changes (2NI, 5NI).

One of the Marafiq interviewees stated that:

> Digital business strategy requires a new approach of planning and implementation. As digital strategy aims to improve processes and services that ultimately improves financial performance, it needs incremental planning and implementation that prioritises organisational processes by their importance, and potential for digitisation. This also requires holistic planning that considers continuous organisational changes in structures or employee’s skills before implementation (2MF).

This evidence supports Alam et al. (2018), who find that comprehensive and adaptive planning can help manage the effects of internal and external factors that shape organisational responses to digital strategy. The study also agrees with Yeow, Soh and Hansen (2018) that digital strategy should be treated as a planned and emergent strategy, but the study adds that digital business strategy needs a strategic approach. This result elaborates the organisational design theory further, as the IPV of organisational design relies on a deliberate business strategy—rational planning—while digital business strategy balances between deliberate and emergent approaches using a simultaneous incremental−comprehensive development approach of all organisational design factors, which in turn influences sustainable business performance. Therefore, the researcher posits:

Proposition 7: Simultaneous incremental–comprehensive development influences all organisational design factors.

4.2.2.2.3 Theme 6: The level of top management support is an indication of the level of digital strategic alignment between digital business strategy and organisational design

Evidence clearly demonstrates that the top management support is crucial for the digital strategic alignment process. While some research has already examined the relationship between top management support and IT implementation (Dong, Neufeld & Higgins 2009; Lederer & Mendelow 1988), only limited attention has been paid to the significance of top management support in digital alignment. Matt, Hess and Benlian (2015) state that top management support is recognised as being fundamental to the implementation of digital business strategy because it affects the entire company, and its implementation may result in resistance from different areas of the firm. Li et al. (2016) find that the strategic alignment literature suggests that top management support is one of the most critical success factors. Shee et al. (2018) find that top management support can influence the decision to adopt cloud-based technology to maximise supply chain performance, which, in turn, can influence the firm sustainability. In addition, the involvement of top management teams in digital strategy formulation influences the process of strategic change (Singh, Klarner & Hess 2020). Thus, the findings of this study are consistent with the existing literature and show that the top management support regarding issues of digital strategic alignment (i.e. digital integration, organisational changes, resistance to change or resources allocation) is of central importance. The acceptance and support of top management teams is a prerequisite for successful implementation of digital business strategies, and productivity improvement. This has been highlighted by 1NI, 2NI, 3NI, 5NI, 7NI, 10NI, 12NI, 15NI, 19NI, 1NF, 2NF, 3NF, 4NF, 1MI, 2MI, 5MI, 7MI, 8MI, 11MI, 12MI, 1MF, 2MF, 3MI and 4MF, for example, ‘The digital vision should be supported by the top management team’ (2MF) and ‘Otherwise, there will be no investments, and nothing will change the firm’ (7MI).

A higher level of top management support in implementing digital business strategy generally resulted in both lower levels of resistance to change and higher levels of digital integration and cooperation between business and digital units. This observation is clear from the following quotation: ‘Top management team supports us in developing customer service departments, allows us to restructure these departments in line with the digital strategy and integrated digital technologies, and creates a spirit of cooperation between employees and increases productivity’ (19NI).

On the basis of the analysis, the researcher believes that the level of top management support in developing digital business strategy and making organisational changes could provide a moderating influence on the relationship between organisational design factors and sustainable business performance, which is a new contribution to the organisational design literature. Therefore, the researcher posits:

Proposition 8: Top management support moderates the relationship between organisational design factors and sustainable business performance.

4.2.2.2.4 Theme 7: The level of knowledge exchange is an indication of the level of digital strategic alignment between digital business strategy and organisational design

The analysis has found new evidence for the indirect effect of knowledge integration on the organisational design factors that, in turn, affect sustainable business performance. The researcher has specifically combined the key emerging issues associated with the knowledge exchange, such as knowledge sharing, transfer and integration between internal and external experts, digital-enabled knowledge-sharing platforms, and internal and external co-innovation, in one factor, ‘knowledge integration’, for the following knowledge considerations.

The exchange of knowledge between experts does not necessarily result in its application. The importance here lies in integrating that knowledge through applying it in organisations (Grant 1996a). Competitive advantage depends on the efficiency of knowledge integration. The efficiency relies on the level of common and specialised knowledge exchange (e.g. employees’, managers’, specialists’ or experts’ knowledge). Thus, the outcome of knowledge integration depends on the knowledge all individuals of a firm and its external (digital) partners share (Grant 1996a; Spender 1996).

This leads us to the reason for integrating external expertise and knowledge transfer. Firms use external expertise to exploit global and local market available specialised expertise, and gain access to innovative digital solutions, or even create a space for co-innovation between internal and external digital experts (Herden 2020). Moreover, firms create large-scale digital knowledge platforms for internal and external stakeholders as a collaboration tool to solve business problems (Shivakumar 2018). These issues ultimately lead to knowledge integration in firms, and therefore, the researcher combined them in one construct called 'knowledge integration'.

Evidence clearly shows knowledge integration as a CSF for digital strategic alignment, whether initially in strategy formulation or for adopting digital innovations in the utilities. 1NI, 2NI, 4NI, 5NI, 14NI, 19NI, 4MI, 6MI, 7MI, 9MI, 10MI, 11MI and 12MI acknowledged the knowledge sharing between internal and external digital experts in digital strategy formulation and its alignment process. They highlighted that the benefits they obtained from such knowledge sharing helped them indirectly in improving business performance, mainly through improved efficiencies. For example, 2NI stated:

> Our digital partners are essential in formulating and implementing our digital strategy and gaining new knowledge. They provide field digital experts to implement and integrate digital technologies … they are allowed to exchange knowledge with our employees … they build new knowledge due to their participation with our employees and other digital partners in the field … knowledge sharing with external digital experts contributed to co-innovations and resulted in 96% of processes being digital.

At formulation stages, participant 8MI stated:

> Marafiq forms a team consisting of business managers, field experts and external consultants to assess its digital and business infrastructures, and digital readiness. This process involves a broad sharing of knowledge from the company's employees to identify proper digital technologies that it intends to introduce within the next stages.

Participant 2NF refers to social-technology imperative in knowledge integration process:

> Preferred digital technologies must be adaptable to business and end-user needs. Global standard digital systems, like Oracle, are designed to align with business needs, but it is difficult to make new configurations on these systems in line with end-user needs in

specific business contexts. This leads to digital immaturity and misalignment in some parts of the firm, requiring knowledge sharing with digital partners to solve this issue.

All interviewees from both companies agreed on the importance of knowledge integration. The majority of interviewees recognised the firm’s investments in establishing digital-enabled knowledge-sharing platforms. The platforms enable all employees, digital partners and field experts to share knowledge with each other, as well as solve business problems anytime and anywhere, which speeds up decision-making processes. This enables the companies to find all levels of knowledge needed in business, starting from how to introduce a new digital technology to how to integrate and operate this technology. Thus, the researcher believes that the greater the level of knowledge integration, the greater the level of digital strategic alignment between digital business strategy and organisational design, which in turn enhances sustainable performance.

Although knowledge integration is a widely researched issue in strategic alignment literature, mainly in the context of business strategy (Baker et al. 2011; Chan, Sabherwal & Thatcher 2006; Charoensuk, Wongsurawat & Khang 2014; Kearns & Sabherwal 2006; Luftman 2004; Preston & Karahanna 2009; Reich & Benbasat 2000; Trienekens, Kusters & Cuenca 2014; Yayla & Hu 2009, 2012), this issue has not been conceptualised in the context of organisational design for digital business strategy. The findings of the literature reveal that a high level of knowledge integration, through lateral relationships between internal business units and external partners, reduces information uncertainty, speeds up decision-making, and increases the efficiency of the decisions made (Gregory et al. 2018; Herden 2020; Li et al. 2021). This study agrees with the literature and adds new evidence on the direct effect of knowledge integration on organisational design factors in the context of digital business strategy. Thus, the researcher posits:

Proposition 9: Knowledge integration influence all organisational design factors.

4.2.2.2.5 Theme 8: Digital business strategy requires longer-term digital partnerships management to facilitate inter-organisational collaborations

A large number of the participants mentioned the importance of digital partnerships management in digital business strategies for managing complex digital projects (different digital partners), especially when it comes to implementing integrated digital solutions. In IT literature, IT relationships management is a widely researched term, mainly in the context of supply chains in extended inter-firm networks (Klein & Rai 2009; Rai et al. 2012; Saraf, Langdon & Gosain 2007). However, digital partnerships management has been conceptualised in limited ways in the context of digital business strategy in the organisational design theory. For example, Li et al. (2021) have found that digitally transformed organisations are more likely to establish digital-enabled external relationships management, which, in turn, enhances their ability to respond to technological turbulence in the markets promptly. Feeny and Willcocks (1998) found that entrepreneurial IT collaborations with IT partners ensure the development of proper IT and infrastructure among all the participating organisations. The researcher believes that the concept of digital partnerships management has more depth than IT relationships management as it aims to leverage external digital resources through multiple (digital and business) partners in the ecosystems in which the company operates, thereby encouraging longer-term digital partnerships that create higher value returns, as one of the interviewees of NWC's digital partners confirmed:

> Our company works with NWC as a digital partnership that relies on long-term agreements to provide digital solutions that add value to both companies. The partnership aims to co-innovating new digital solutions through knowledge sharing and interrelationships between our employees … this partnership not only supports the NWC's digital strategy, but also helps us to be more competitive and to innovate new digital solutions that serve the environment and society, as well as supports our projects with other companies in other countries (17NI).

In Marafiq, participant 8MI stated:

> A single digital partner is beneficial for digital systems integration … but its options would be limited … may control the company's systems and increase prices, which is a high risk. The best practice to implement a flexible digital infrastructure is to rely on multiple digital partners. This is to share knowledge with different parties, leverage their digital resources, and develop new digital services. Multiple digital partners pose challenges such as, digital integration, or interoperability, data security and information sharing among different parties requiring effective specialised management.

Hence, it is important to effectively manage such digital partnerships and enhance inter-organisational collaborations to create a unique competitive advantage by which the firm can achieve a sustainable business performance. As inter-organisational collaborations become stronger, firms develop tighter bonds with their external partners. According to the IPV, this allows the formation of lateral relationships and improves the feedback from different parties, bringing different views together (Galbraith 1974).

In addition, digital partnerships management can create highly connected digital networks, which facilitate interactions with partners and enhance sharing of knowledge. Two participants recognised the importance of digital partnerships management in terms of aligning systems with each other and developing employees' skills and knowledge:

> NWC contracts with digital partners to implement and innovate digital solutions and integrate them within the company's digital systems. Such partnerships allow employees to develop new digital skills and transfer the knowledge (14NI).

> Digital partnerships management facilitate sophisticated interactions with external partners, ensure the successful implementation of different digital projects, coordinates between a group of external partners and internal users to ensure successful digital alignment between digital systems and user needs (2NI).

In short, organisations that have the ability to manage these multiple digital partnerships obtain timely and comprehensive information and knowledge. This has been suggested as a critical factor for fast and efficient decision-making, which allows organisations to respond to the dynamic environment rapidly (Mani, Barua & Whinston 2010). Zomer, Neely and Martinez (2020) also find that digitally transformed organisations invest heavily in increasing their digital partnerships and acquisitions. Therefore, it is crucial for water organisations to establish digital partnerships management to (1) deal with external partners and end-users, (2) seek new digital resources and align them with current ones, and (3) allow co-innovation of integrated digital solutions. These activities not only encourage longer-term digital partnerships but also create more opportunities for inter-organisational collaboration. Thus, this research has evidence for a direct impact of digital partnerships management on the organisational design factors in the context of digital business strategy, providing new contributions to the organisational design theory, and proposes:

Proposition 10: Digital partnerships management influences all organisational design factors.

4.2.2.2.6 Theme 9: Digital business strategy requires agile-based structures

Evidence clearly shows that agile structures are a CSF for digital strategic alignment. Five interviewees (1NI, 2NI, 3NI, 4NI, 5NI) stated that NWC adopts agile structures through a network of cross-functional teams and agile approaches in planning and implementing projects. The cross-functional teams have greater autonomy and decision-making authority to create alignment between digital processes, people, functions and systems, as well as resource and information sharing internally and externally (2NI). They allow NWC to overcome the bureaucracy in hierarchies (2NI, 1NF). Marafiq also relies on cross-functional teams in collaboration with digital partners to formulate and implement its digital strategy and associated projects (7MI, 11MI). This allows its employees to develop their digital skills and share their knowledge with digital partners (12MI). Thus, agile structures enhance the idea of collaboration across organisations and internal units, and break functional silos by creating cross-functional teams. This is consistent with the literature that relying on cross-functional teams is a common practice under digital business strategies (Sia, Soh & Weill 2016).

A participant from Marafiq also said, ‘The company created a cross-functional team to develop operation technologies (OT) and integrate them with the company’s IT. This enables the company to collect and analyse data coming from different data sources in the same integrated system’ (4MI). This is in agreement with Dremel et al. (2017), who find that cross-functional teams help organisations to use data analytics as a digital-driven initiative for the benefit of business units.

Van de Wetering, Mikalef and Pateli (2018) assert that IT flexibility enables organisations to adapt rapidly to market conditions and improve performance. The dynamic adaptation provides a relatively stable environment for value creation, such as through the sharing of digital resources (Holotiuk & Beimborn 2017; Horlach, Drews & Schirmer 2016). Therefore, digital business strategies encourage organisations to share digital resources using agile structures through agile, networked cross-location teams across the geographical structures of the companies. Cross-functional teams, therefore, require empowerment and decentralisation (Nadkarni & Prügl 2021). This leads to agile, virtual working and devolving decision-making down the structures (Bharadwaj et al. 2013).

However, studies on the relationship between digital business strategy and agile structures in organisational design theory are limited. Liang et al. (2017), in their survey on the relationship between strategic alignment and organisational agility, have supported the emergent and interdependent nature of strategy formulation and implementation in the strategic alignment process. Literature also shows that the strategic alignment models that support sustainability focus more on organisational agility (Tallon & Pinsonneault 2011). More recently, Jones, Gareth and George (2022) recommend organisations operating in uncertain environments to develop agile structures. Based on the analysis, the researcher finds that agile (flatter) structures, which include cross-functional teams and agile project approaches, can reduce information uncertainty and speed up decision-making processes. Therefore, agile structures have a direct effect on the other factors of organisational design that, in turn, affect sustainable business performance. This finding provides a new contribution to the organisational design theory in the context of digital business strategy, and thus, the researcher posits:

Proposition 11: Agile-based structures influence all organisational design factors.

4.2.2.2.7 Theme 10: Digital business strategy requires shared digital units in organisational structure

An element frequently discussed by the research interviewees was shared digital units in organisational structures. Yeow, Soh and Hansen (2018) state that organisations need to introduce new digital units through which they align the new and existing business together. In the context of big data analytics, Galbraith (2014) also recommends organisations to create digital units that bring together digitally skilled experts and talent to improve and speed up decision-making. According to MIT and Capgemini Consulting research (2012), organisations need shared digital units to implement a digital strategy.

Interestingly, NWC's interviewees (2NI, 3NI, 4NI, 5NI, 7NI, 15NI, 16NI, 17NI, 19NI, 2NF) pointed out that the digital business strategy pushed the company to create new shared digital units (such as smart solutions, enterprise architecture, smart operations, digital projects, business analysts, digital quality and governance, digital applications, digital innovation, digital transformation office, digital channels, and digital infrastructure and data units) in the headquarters and branches in order to work together in a sequential and parallel process to develop, implement and innovate new digital solutions for the entire company. The interviewees also stated that these shared digital units are a CSF for digital alignment between different branch needs and integrated digital solutions. Thus, shared digital units help obtain high-quality digital projects implementation, which improves work environment and customer experience (1NI, 2NI, 3NI, 5NI).

One of the interviewees stated that:

> Companies that embrace digital business strategies need digital units in major organisational divisions. The digital units should work together under a central digital department, but they are located in branches to facilitate digital services, create digital work environment in the branches, and help employees and customers to use these digital services. Digital units support companies to achieve three objectives: 1) to effectively leverage digital resources, 2) to enable employees to use new digital technologies, and 3) to achieve customer satisfaction (2NI).

In Marafiq, the focus on shared digital units seems to be much less than in NWC. However, some interviewees recognised the importance of shared digital units and linked it with digital alignment. For example, two interviewees stated:

> The IT department consists of a set of units, such as digital IT infrastructure, IT networks and digital systems, and operation technology units. These units participate in driving and implementing our digital strategy (8MI).

> The SCADA system has emerged as a new digital unit in the company (5MI).

According to IPV, it is logical to bring people together under shared, collaborative digital units. These units serve the entire company as they can make decisions and learn together, rather than several isolated units trying to do this independently. Specialising in this way also enables the organisation to develop the digital skills it needs faster, in turn enabling faster adaptation to digitisation. Knowledge can also be shared within such a group, and innovation encouraged as well. There may sometimes be challenges with shared digital units in terms of how to organise the structures to obtain new value.

While few studies have found that shared digital units are a critical factor for implementing a digital strategy (Yeow, Soh & Hansen 2018) or big data analytics (Galbraith 2014) or digital governance (Tannou & Westerman 2012), this study has found evidence that there are links between shared digital units, and organisational design factors and sustainable business performance. The researcher thus believes that this finding is a novel contribution to the organisation design model in the context of digital business strategy, and posits:

Proposition 12: Shared digital units influence all organisational design factors.

4.2.2.2.8 Theme 11: Digital business strategy requires redetermining tasks and redistributing employees in organisational structures

The majority of the research respondents from both companies stated that under digital business strategy, integrated digital systems entail eliminating many traditional tasks and determining new tasks. The high potential of integrated digital solutions makes it easier to detect unnecessary or costly tasks related to the output in real time (Kretschmer & Khashabi 2020). This observation is clear from the following quotations from two of our respondents:

> Integrated digital solutions eliminate unnecessary tasks and enable employees to easily implement tasks and speed up internal processes (16NI).

> Daily water operations have been reduced because the use of the district metering zone (DMZ) system which is integrated with water pressure management and SCADA system (5MI).

The SCADA system can predict an upcoming failure in the smart water network and can request technical support (physical service) as a required task for the delivery of service (Nast 2018). Therefore, integrated digital solutions can generate information related to how to divide required tasks into groups and determine required changes (Kretschmer & Khashabi 2020). In this case, it is crucial to match suitable employees for new tasks resulting in a more efficient alignment process. This was further corroborated by the fact that interviewees (1MF, 11MI, 3MF) saw the importance of redetermining tasks and redistributing employees:

> The development of digital technology requires replacing old tasks and matching employees to the new tasks to obtain the required outcomes (1MF).

> New digital systems perform our tasks faster and in a more efficient way (11MI).

> The digital business strategy requires redistributing tasks and employees to align with new digital systems (3MF).

Following the logic of IPV, integrated digital technologies can affect task groupings by changing the information interdependencies between some or all tasks (Galbraith 1974). If more information about certain tasks is created by integrated digital technologies, new interdependencies between tasks can be revealed, which can affect the way they can be (digitally) grouped (Kang & Santhanam 2003). Integrated digital platforms, such as the Hayat system in NWC and the SAP CRM system in Marafiq, are examples of grouped tasks and activities. One interviewee stated, 'Our employees perform tasks on the billing system and the CRM system at the same time, because they are integrated. The employees' tasks became fewer in number and more efficient than ever' (1MI). Thus, digital technologies make it easier to group activities together and decentralise some functional areas, which open new potential for increasing organisation efficiency (Kretschmer & Khashabi 2020). This was further corroborated by the following: 'The consulting company was able to reduce more than 50% of the tasks using the integrated digital systems. Some tasks were decentralised and others became centralised because of the integrated digital system' (2MI).

According Kretschmer and Khashabi (2020), to formulate an appropriate digital strategy and to implement new digital technologies, organisations need to determine the required tasks for the expected outputs. However, one of the respondents had a different opinion:

> Redetermining tasks and redistributing people based on new digital systems and processes are a challenge. Tasks, roles and responsibilities are not re-divided and reassigned at the same pace as the rapid development of digital technologies in the company. The digital transformation is faster than our work on changing job descriptions and responsibilities because the digital strategy is a continuous process and never stops, which is especially difficult for large organisations with thousands of jobs … the right balance is required, whether to increase implementation time, or to increase the number of HR employees, or to reduce the number of digital projects (18NI).

From these observations, the researcher believes that digital business strategy requires continuously redetermining tasks and redistributing employees at the same pace as the rapid development of integrated digital solutions in the company. This influences the other factors of organisational design that, in turn, influence sustainable business performance. Using the new tasks and grouped activities based on integrated digital solutions (e.g. Hayat system or mobile apps), organisations can (1) increase their capability to process information and (2) reduce information to be processed. This makes it easier to decentralise some functional areas, which are often centred in different geographical locations. By using integrated digital solutions, new interdependencies between tasks can increase the company's efficiency and access new assets outside its boundaries. Thus, tasks redetermination and people redistribution will have an indirect impact on sustainable business performance. This finding is a new contribution in rebuilding the organisational design model in the context of digital business strategy. Thus, the researcher posits:

Proposition 13: Task redetermination and people redistribution influence all organisational design factors.

4.2.2.2.9 Theme 12: Digital business strategy requires unified, optimised digital processes

Most interviewees highlighted the importance of unified, optimised digital processes in their organisations. The respondents (1NI, 2NI, 3NI, 4NI, 5NI) stated that unified digital processes enable NWC to process information quickly with high-quality outcomes within and across the company. The literature suggests that digitisation, improvement, integration and standardisation of processes are inevitable to allow information to be processed quickly and to reduce IPR (Catlin, Patiath & Segev 2014; Hess et al. 2016; Kamble, Gunasekaran & Gawankar 2018; Ross et al. 2016; Stoffels & Ziemer 2017; Teoh et al. 2022). The following response confirms this: 'NWC re-engineers processes continually to align with its digital technologies. The reduction of tasks and approvals is essential to develop digital processes' (18NI).

The greater the number of digital processes, the smaller the amount of information that must be processed. This observation is clear from the following quotation from an NWC customer service manager: 'Before 2018, the manual transactions entered into the billing system were approximately 500,000 per year, while in 2019, with the use of integrated digital channels, there were about 170,000 transactions' (19NI).

According to Park, Oh and Yu (2017), with sufficient information, managers can quickly recognise the importance of this information and take prompt and appropriate actions, especially when it comes to unified digital processes that provide transparent information in a timely manner. One of the Marafiq interviewees stated, ‘Our processes have become transparent, and managers monitor the performance of operational and physical processes, where they end up as digital processes in digital systems; digital processes reduce operating costs, speed up problem-solving, and improve productivity’ (10MI).

In addition, the digital water meter reading process reduces the number of employees and tasks. Digital meters record water consumption and transform it digitally to NWC’s billing systems, which store and process information in near real time (8NI, 11NI, 12NI, 13NI, 1MI, 8MI). This reduces the distance NWC employees must travel (by vehicles) to take manual readings (12MI, 1NI), reducing greenhouse gas emissions (particularly CO_2) and decreasing meter reading costs by 75% (GWI 2020).

On the basis of this finding, the researcher defines unified (primary and support) digital processes as a series of connected activities that contain a combination of tasks that uniformly move and process information within and across a firm—benefiting from integrated digital solutions. According to the logic of IPV, firms that collect and process internal and external information and provide timely information to managers possess a high level of IPC. Unified, optimised digital processes have the potential to increase a firm’s ability to unify information sources and flows, all of which strengthens the firm’s capability to quickly process information. This in turn reduces the uncertainty and equivocality in the information by reducing the amount of irrelevant information included (Li et al. 2021). Thus, the researcher believes that unified, optimised digital processes increase IPC and reduce IPR, benefiting from integrated digital solutions and enabling the unified digital flow of information within–in out–out in a company.

Therefore, firms need to expand the scope of digital business strategy by increasing their digital technology portfolios to develop unified digital processes, thereby reaching the desired alignment between IPC and IPR. However, there is a paucity of research that explains how unified, optimised digital processes influence organisational design and achieve digital strategic alignment that enhances sustainable business performance. Therefore, the research presents new evidence on these relationships, and posits two propositions:

Proposition 14: Unified, optimised digital processes have a direct influence on sustainable business performance.

Proposition 15: Unified, optimised digital processes influence organisational design factors.

4.2.2.2.10 Theme 13: Digital business strategy requires unified digital flows of information (within–in out–out in a firm) using unified digital processes

Interestingly, the majority of the interviews from both companies saw the importance of unified digital flows of information within–in out–out in the companies. Under digital business strategy, Weinrich (2017) highlights three flows of information in digital processes: (1) the internal information flow of an organisation, (2) the information flow from the inside of an organisation out, and (3) the information flow from outside into an organisation. The two companies use shared digital platforms, which ultimately unify information flows to cut costs, increase service quality, and speed up service delivery.

A large number of the participants stated that digital business strategy focuses on building trust with their stakeholders by providing unified digital service experiences. In both the companies, employees in all branches use the same system and the same internal information flow so they undergo the same experience (1NI, 2NI, 4NI, 5NI, 18NI, 8NI, 5MI, 7MI, 9MI, 11MI). For customers, the companies target a seamless, digital omni-channel experience so that customers can order, inquire, pay, and receive support in a consistent way from any channel at anytime and anywhere. Because the goal is customer trust, the case companies seek to unify customer digital channels for the same experience in all branches (3NI, 18NI, 8NI, 6NI, 7MI, 9MI). These companies also provide unified digital platforms for digital partners so they can contact, inquire, and receive support in the same way in any branch (1NI, 2NI, 4NI, 5NI, 11MI). In this sense, digital business strategy is transforming the experience of the companies' stakeholders by providing unified digital flows of information using digital platforms and mobile apps. Thus, users have a seamless unified experience across various touch points regardless of what digital channel they are using (Mushore & Kyobe 2019). The responses by 4NI and 7MI lend support to this finding:

> Marafiq's digital strategy aims to unify the digital flow of information (7MI).

> NWC's digital strategy relies on unified digital flows of information, benefiting from integrated digital solutions that link inside and outside the company and allow digital processes to be tightly interconnected (4NI).

The information exchange within and outside the organisations on digital platforms allows digital processes to be shared. This observation is also clear from the following quotations from two of the respondents:

> The company uses a unified digital platform (eBranch for customers) to easily communicate with customers and provide all digital services and information that customers need. The eBranch is integrated with the customer mobile app and Hayat system. Customers have a unified and seamless experience across various touch points, which means that internal digital processes are unified and have a unified digital flow of information related to customers (1NI).

> In the past, each branch had different information processing and different service prices, which made customers have different experiences in each branch. Today, with integrated digital systems, the flow and processing of information are unified, and this facilitates service delivery and improves user and customer experience as they have the same experience in each branch (3NI).

The unified digital flows of information enable companies to exploit the linkages between value-creating activities more efficiently and effectively. This is particularly true, as one of the interviewees said:

> When a customer is late in paying a water bill, the billing system digitally issues a water disconnection order via the Mobility (operation) app to field staff, who use the mobility app and implement the orders physically. The Mobility app is integrated with the billing system. This app distributes operating tasks among employees based on equal workload and enables the employees to deliver service and confirm the implementation. The internal digital flow of information reduces costs and speeds up the process (18NI).

Digital platforms have made it easier for suppliers to make timely connections and exchange services (Bharadwaj et al. 2013). This was further corroborated by the fact that interviewees (9NI, 4MI, 1NF) saw the importance of having a unified digital platform for each group of external stakeholders (i.e. customers, government agencies, digital partners), which, in turn, unifies the flow of information and facilitates its processing within the company. This evidence is also clear from the following quotations from two of the interviewees:

> NWC uses a unified digital platform (iSupplier) to easily communicate with external digital partners and contractors, unify the flow of information, and speed up the processing of information in the company (9NI).

> Marafiq has a joint digital portal to communicate externally with industrial companies in the city. It is connected digitally to our billing system and the systems of our customers (industrial companies) … when the company issues a water bill to an industrial company, the water bill goes directly to the company via the joint digital portal (1MI).

While some studies have found that digital business strategy requires unified digital flows of information (Weinrich 2017), this study has found evidence to link the unified digital flows of information to both sustainable business performance and organisational design factors, which is a new contribution to the organisational design literature. Unified digital flows of information speed up the decision-making process, improve the stakeholders' experience, and reduce coordination costs across geographical and divisional units of the firm and external with others. This in turn creates digital strategic alignment between the digital business strategy, processes, people practices and stakeholder interests (Mushore & Kyobe 2019). Thus, the researcher posits two propositions:

Proposition 16: Unified digital flows of information have a direct influence on sustainable business performance.

Proposition 17: Unified digital flows of information influence all organisational design factors.

4.2.2.2.11 Theme 14: Digital business strategy requires integrated digital solutions to link the entire organisational design

The majority of the interviewees highlighted that their digital business strategy relies on holistic, integrated digital solutions in reconfiguring business infrastructure, processes and functions, and improving performance. Integrated digital technologies, therefore, result in faster realignment processes (Rahrovani 2020) as they make alignment more tightly associated with daily business activities and value creation (Henfridsson & Lind

2014; Karpovsky & Galliers 2015). Creating the value of digital alignment requires using a fully integrated and aligned set of digital technologies (Li, Dai & Cui 2020). This was further corroborated by the fact that interviewees (1NI, 2NI, 3NI, 4NI, 5NI, 1MI, 2MI, 6MI, 10MI) saw the importance of integrated digital solutions in achieving shared digital strategic objectives. By using an integrated customer platform and mobile apps, customers may not need to physically travel to customer service centres to have their complaints resolved, which also reduces greenhouse gas emissions, saves time and travel costs, reduces traffic in major cities, and increases customer satisfaction and public acceptance of such digital services (1MI, 2MI, 3MI, 12MI, 6NI, 10NI, 12NI, 15NI, 16NI). There are additional influences, as follows: 'Human errors are reduced where information moves step-by-step between actors in the same integrated digital systems' (1NI), and 'With integrated digital solutions, time in processing information is greatly reduced' (3NI).

NWC deploys its policies and information in social media, digital platforms and apps, and provides instructions to customers on how to save water (1NI, 2NI, 5NI, 19NI, 6NI). 'Our platform and mobile app allow customers to see their consumption data anytime and anywhere, detect any issues related to water consumption, for example, high water consumption in near real time, which helps customers reduce water consumption' (4MI).

According to Kretschmer and Khashabi (2020), integrated digital solutions offer an enhanced competitive advantage for a firm through its ability to collect, analyse and act upon digitised information more efficiently than its competitors. This observation is clear from the following quotation from one of the Marafiq interviewees: 'The integrated digital systems enable the company to have a clear visibility of all water operations across the city and enhance its ability to analyse data, forecast and take proactive action in real time, which is a competitive advantage' (9MI).

In Marafiq, the integration of cloud services, ERP and dashboards provide real-time data. This enables the firm to analyse employee and project performance and verify work progress and exact billable hours. The digital integration of SCADA, MDM and digital metering systems also enabled NWC to analyse its data and reduce non-revenue water levels by 3.4% in 2019 alone (GWI 2020). Thus, this study reveals that integrated digital solutions develop rapidly in the digital business strategy-enabled water companies as they directly influence sustainable business performance.

However, previous research has reached inconsistent conclusions regarding the impact of digital technologies on sustainable business performance. Shee et al. (2018) find that cloud computing is a cost-effective solution over the spending on IT legacy systems. While Dalenogare et al. (2018) find that Industry 4.0 technologies have the potential to facilitate operational performance, others argue that technologies such as big data analytics, cloud computing and IoT can improve economic and environmental performance (Dubey et al. 2019; Schniederjans & Hales 2016; YU et al. 2015).

On the basis of this analysis, the researcher believes that integrated digital solutions are a novel contribution to the organisation design model in the context of digital business strategy and sustainable business performance. Integrated digital solutions enable companies to create a competitive advantage by unifying and aligning digital infrastructure, systems, processes, information flows and people around them. They also enable companies to collect and store hourly readings of water usage to provide an opportunity to establish customers' access to their consumption information in near real time, and thus help customers to reduce water consumption. The availability of real-time data and the analysis of performance contribute to verification of work progress and exact billable hours. Thus, they can help improve performance, productivity and profitability, as well as creating a new value proposition. For example, integrated digital solutions contribute to the reduction in the distances the water company's employees must travel (by vehicles) to make manual readings, verifications, or other supervising and control routines, which reduces greenhouse gas emissions (particularly CO_2) and decreases the capital expenditures and operating expenses necessary to develop and operate such activities. Therefore, integrated digital solutions affect not only the companies' organisational design, but also their sustainable business performance. Thus, the researcher posits two propositions:

Proposition 18: Integrated digital solutions have a direct influence on sustainable business performance.

Proposition 19: Integrated digital solutions influence organisational design factors.

4.2.2.2.12 Theme 15: Integrated digital solutions require interoperability and compatibility to create value of digital business strategy

The majority of the interviewees stated that interoperability and compatibility play a crucial role in integrating digital solutions, enabling a company to capture the full potential of its digital resources and align digital solutions with each other. This is consistent with the literature for the success of integrated digital solutions in water utilities (Howell, Beach & Rezgui 2021; Howell, Rezgui & Beach 2017; Kamunda et al. 2020). Some of these issues were related to the presence of legacy systems or not owning their own data, and thus, the lack of interoperability and compatibility affected the level of digital integration, and hence reduced the benefit the companies would otherwise derive from new digital resources (16NI, 8MI, 9MI, 11MI).

NWC uses a single open wireless network using the OMS for many types of digital meters made by different manufacturers (2NI). The interoperability offers several gains, such as lower transaction costs, lower maintenance costs, lower upgrade costs and lower installation costs, as well as reduced risk of vendor lock-in and reduced negative effects of vendor bankruptcy (Lewis 2013). This was further corroborated by the fact that interviewees (16NI, 4NI, 6MI) saw the importance of interoperability in wireless networks of digital water meters:

> Before 2018, NWC had at least two wireless networks in every city, and each network was connected to one type of smart meter (one manufacturer), which was costly. Then, the company decided to use OMS, which enables the company to use one open wireless network for different types of digital meters in all cities. If a digital meter does not have interoperability with the OMS, the company rejects it (4NI, 16NI).
>
> The company provides digital meters from multiple companies … we have a single wireless network for smart meters (6MI).

An interviewee was able to identify the benefits they obtained from interoperability:

> Interoperability helps the company to reduce capital expenditure (CAPEX) and operating expense (OPEX) because the company needs to install a single wireless network that works on OMS for different types of meters in the whole city. This also enables branches to provide available digital meters to other branches if needed urgently (7NI).

According to Bharadwaj et al. (2013), digital business strategy involves the planning and design of products, services, processes and systems that have interoperability with other complementary digital platforms, and their deployment within the firm and externally with digital partners as products and services by leveraging digital resources. This was further corroborated:

> The open wireless network and metering system are integrated with the Hayat platform, Mobility app and GIS. This integration enables the system to send work orders to the field staff to locate water meters and take action like fix or change broken digital meters (13NI).

To the best of our knowledge, there is no study that addresses interoperability and compatibility (as a very technical matter) in the context of digital business strategy in the organisational design model. However, this study finds that interoperability and compatibility enable companies to (1) integrate digital technologies, (2) reduce the number of employees, (3) reduce the number of wireless networks that harm the environment, (4) reduce costs, (5) improve operating performance and productivity, (6) improve information flow and quality, and (7) provide more data and information. Thus, interoperability and compatibility influence both organisational design factors and sustainable business performance. Therefore, the researcher posits two propositions:

Proposition 20: Interoperability and compatibility have a direct influence on sustainable business performance.

Proposition 21: Interoperability and compatibility influence organisational design factors.

4.2.2.2.13 Theme 16: Digital business strategy relies on a centralised orchestration of digital resources and services

Many of the interviewees recognised the importance of digital centralisation of resources and services to unify and align the services provided to customers and end-users across different branches, especially with the presence of integrated digital solutions such as cloud services, digital platforms and mobile applications. The purpose of having centralised digital resources and services is to manage, preserve and articulate stakeholders and to facilitate the employees' tasks (Tuamsuk & Subramaniam 2017;

Walker & Keenan 2018). Centralised digital resources and services not only enhance the reputation of firms, but also make it possible for employees and customers to access information anywhere and anytime (Rahman et al. 2017). They also improve firms' ability to use data and create and transfer knowledge effectively (Dremel et al. 2017; Rahman et al. 2017; Saeed et al. 2016). This was further corroborated by the fact that the Marafiq interviewees (1MI, 11MI) saw the benefits of centralised digital resources and services, and how it increases IPC and reduces IPR:

> Marafiq uses SAP cloud services to manage and store data and information—instead of information moving between employees through emails, or hard copies, and everyone having more than a copy in different places. With cloud services, all information and large-sized files move, upload, sign, and store digitally. The cloud service provides a unified central storage place for all information, which can be accessed by authorised employees anywhere and anytime. These services allow employees to share information and keep them connected with each other, which facilitates the digital flow of information and reduces daily tasks (11MI).

> The unified data centre (data bank) reduces data redundancy that occurs when the same piece of data is stored in two or more separate places. When you need a billing report, you can download it from the finance department system or the customer service system. It is exactly the same because they use the same source, which increases the information quality and accuracy (1MI).

An interviewee mentioned that NWC has not used public cloud services yet because of government restrictions to cloud uses regarding security precautions and policies issued by the Saudi cybersecurity authority that the company considers. He hopes to see private cloud use in the company because of the following issues:

> NWC has 10 data centres across Saudi Arabia. This is a huge responsibility because it takes a lot of effort and time to ensure that the capacity of all data centres covers all business needs in branches when the company implements new digital projects (9NI).

However, NWC addressed this issue by creating a unified data storage, as 2NI stated:

> The digital business strategy pushed NWC to build a unified data storage as a pool of data for all data centres, benefiting from integrated digital solutions. All digital data comes daily to the data storage where digital aggregation and summarisation take place.

9NI noted the benefits and risks of the centralisation of digital resources and services:

> The centralisation of digital infrastructure reduces electricity consumption and protects the environment … NWC had seven billing systems in branches, each consume electricity and other operating costs. Today, NWC has one unified billing system (Hayat system), which makes customer service central for all 17 branches in Saudi Arabia. But the risk now is higher than before; if the HQ’s Hayat system goes down, all branches would stop working … so NWC is developing a disaster recovery centre, which ensures the business continuity in the event of a disaster or system’ problems.

Another participant asserted that:

> The Hayat system reduces annual licenses costs (one unified billing system rather than seven systems), improves revenue collection, allows the company to easily manage one system and make changes in one place (headquarters) and improves productivity and customer experiences (2NI).

On the basis of the analysis, the researcher believes that centralised digital resources and services enable companies to achieve seven benefits:

1. They allow customers to have the same experience in all branches, and to review their accounts and bills for all properties in all cities through a centralised digital platform or mobile app, which increases the accuracy and quality of information.
2. The company’s head office can access customer information that has previously been handled exclusively at local branches, supporting development efforts.
3. The company can address growing customer demands in relation to data quality, cybersecurity and data-related skills (Sklyar et al. 2019).
4. The company can produce unified data and maximise the use of data analytics in driving and accelerating the decision-making process, which, in turn, increase the company’s efficiency and effectiveness.
5. The company can manage and control all digital processes in all regions.
6. The company can achieve digital agility by making rapid digital changes in infrastructure, as changes in one system are easier than in multiple systems in different places, which reduces capital and operating costs.
7. The company can prevent organisational misalignment and complexities among branches.

Thus, the digital centralisation of resources and services increases IPC and reduces IPR, and has an impact on both organisational design factors and sustainable business performance. This result is supported by the findings of Sklyar et al. (2019), who suggest that within-firm digital centralisation plays a key role in the capacity to organise and align digital services and improve performance. This finding is a novel contribution in the organisational design theory in the context of digital business strategy and sustainable business performance. Thus, the researcher posits two propositions:

Proposition 22: The digital centralisation of resources and services has a direct influence on sustainable business performance.

Proposition 23: The digital centralisation of resources and services influence organisational design factors.

4.2.2.2.14 Theme 17: Digital business strategy requires digital governance of all factors of organisational design

Importantly, most NWC interviewees recognised the benefits they obtained from digital governance, benefiting from integrated digital solutions. 1NI, 2NI, 3NI and 5NI stated that digital governance helped them indirectly improve their sustainable business performance, mainly through improved efficiency. For example, 'NWC relies on "digital processes governance", where the company's policies, and regulations are applied in its integrated digital systems to govern and organise information flows' (2NI). However, Arkhipova et al. (2016) state that traditional IT governance is characterised by centralised governance structures, vertical communication and hierarchical culture continuously aligning between IT and business. In contrast, NWC's digital governance is employed in all digital systems (vertically and horizontally), ensuring the digital structural governance of policies, roles, responsibilities, procedures, and control of digital processes for improving data quality (by data governance) and speeding up decision-making processes (1NI, 2NI).

One interviewee linked the importance of structural governance with agile structures, saying, 'Structural governance addresses the overlap between roles and responsibilities in core/non-core activities caused by digital business strategy … this allows cross-functional teams to work well' (3NI). Further evidence that highlights the importance of data governance is contained in the following quotation: 'The unified digital flow of information is an important factor, but it needs data governance that ensures data reliability, integrity, transparency and quality … data flow internally and externally needs data governance' (1NF).

From a different perspective, two interviewees from Marafiq highlighted the importance of governance in business competition, saying, 'The company has a governance system for bidders. Open competitions require a strict, digitally governed system, ensuring fairness between competitors' (4MI, 5MI). Two interviewees could link the company's digital strategy, digital governance and digital culture, and the impact of their relationship on sustainable business performance:

> The company relies on digital governance in implementing its digital business strategy … all our digital systems and projects are subject to specific roles and responsibilities for each employee … our governed digital systems lead to reliable data coming from known sources … reliable data improves productivity and enhances stakeholder satisfaction (16NI).
>
> Digital governance should frame our digital business strategy (3NF).

To our knowledge, there is no study that considers digital governance as a part of the organisational design theory. Only a few studies provide insights into the role of digital governance in organisations and link it with alignment and agile organisation in the stage of digital transformation (Indriasari, Supangkat & Kosala 2020). Thus, the researcher believes that digital governance enables a company to (1) increase the quality of data and information and reduce uncertainty, (2) counteract any resistance to change and power relations to seek realignment of the constituent parts of organisational design through purposive actions, and (3) implement its digital business strategy and achieve its vision and objectives. Thus, the researcher posits:

Proposition 24: Digital governance influences all organisational design factors.

Finally, the findings lend support and credence to the involvement of new CSFs in the organisational design theory in ensuring how companies could maximise sustainable business performance derived from digital strategic alignment. As CSFs are useful in explaining and designing the complex organisation and the theoretical framework, when revised, they could similarly be useful in analysing the process of digital strategic alignment associated with the introduction of digital business strategy in water utilities contexts. Therefore, the remainder of this chapter will present and compare the CSFs identified for digital strategic alignment as a result of the quantitative content analysis phase, and then identify the criteria used for selecting the CSFs and evaluating digital business strategy-enabled case organisations. The identified CSFs will allow the theoretical framework to be revised to inform the next phase of the research involving the key findings of the exploratory studies and the implications for the elaboration of the organisational design theory.

4.3 A Comparative Analysis of Two Companies on Identified Critical Success Factors for Digital Strategic Alignment

The objective of this study is to explore the impact of digital business strategy on organisational design elements (i.e. strategy, structures, processes, people and rewards) and identify the success factors needed for digital strategic alignment that enhances sustainable business performance. A review of the literature (see Chapter 2, above) reveals that there is a lack of knowledge concerning the CSFs of digital strategic alignment between digital business strategy and the factors of organisational design (Holgeid et al. 2019; Kahre, Hoffmann & Ahlemann 2017; Karlsson & Wåhlin 2017; Kretschmer & Khashabi 2020; Llamzon, Tan & Carter 2022). This research involved a multi-phase exploratory study utilising a content analysis approach. Based on this approach, the CSFs identified in each case company were recorded and the frequency of each CSF for the two case companies was calculated. Accordingly, a broad range of CSFs were identified (see Table 4.3). A number of these CSFs were already identified in the literature, in addition to extra factors that were not previously identified and documented. This section, therefore, presents and compares the CSFs identified in the case companies, and then gives a summary of the findings.

Table 4.3: CSFs identified from content analysis

	CSFs**	NWC Co.				MARAFIQ Co.				Average
		Number of occurrences in persons & documents	% of all codings	Number of persons & documents*	% of persons & documents	Number of occurrences in persons & documents	% of all codings	Number of persons & documents*	% of persons & documents	% of persons & documents
1	Knowledge integration	114	8%	24	100%	57	6%	17	100%	100%
2	Renewed digital skills & knowledge	64	5%	23	96%	57	6%	17	100%	98%
3	Unified, optimised digital processes	214	16%	24	100%	82	9%	16	94%	97%
4	Integrated digital solutions	73	5%	22	92%	82	9%	17	100%	96%
5	Interoperability & compatibility	75	6%	23	96%	49	5%	16	94%	95%
6	Unified digital flows of information	51	4%	24	100%	54	6%	15	88%	94%
7	Change management	97	7%	21	88%	78	8%	15	88%	88%
8	Simultaneous incremental–comprehensive development	68	5%	20	83%	53	6%	16	94%	88%
9	Digital partnerships management	60	4%	18	75%	58	6%	16	94%	84%
10	Shared digital strategic objectives	101	7%	21	88%	97	10%	13	76%	82%

	CSFs**	NWC Co.				MARAFIQ Co.				Average
		Number of occurrences in persons & documents	**% of all codings**	**Number of persons & documents***	**% of persons & documents**	**Number of occurrences in persons & documents**	**% of all codings**	**Number of persons & documents***	**% of persons & documents**	**% of persons & documents**
11	Task determination	53	4%	18	75%	57	6%	15	88%	81%
12	Quality management with KPIs	95	7%	20	83%	55	6%	12	71%	77%
13	Shared digital units	69	5%	19	79%	31	3%	12	71%	75%
14	Agile structures	63	5%	19	79%	24	3%	12	71%	75%
15	Digital centralisation (resources& services)	68	5%	18	75%	49	5%	13	76%	75%
16	Top management support	19	1%	14	58%	22	2%	12	71%	64%
17	A shared digital strategic vision	14	1%	11	46%	22	2%	11	65%	55%
18	Digital governance	53	4%	18	75%	13	1%	5	29%	52%
Total			100%	24			100%	17		

**Note: Column CSFs ordered by frequencies on average for two companies (last column 'Average % of persons & documents').

*According to Mayring (2014), documents usually contain texts from one communication source, and thus:

NWC documents = 1 source (as you can find the same extract—statement—in different NWC documents), interviews = 19 persons, focus group = 4 persons (total 24 sources).

Marafiq documents = 1 source, interviews = 12 persons, focus group = 4 persons (total 17 sources).

The CSF that appeared most frequently in the content analysis was *knowledge integration* (100%). The interviews covered a broad range of topics about different aspects of knowledge integration. The level of detail and focus varied between interviewees. Most of the interviewees discussed the knowledge integration issues that were most critical to the digital strategic alignment. They pointed out that their companies do not have adequate digital experts internally and have to rely on implementation partners and/or digital consultants. In addition, the knowledge level and selection of these external partners can affect the digital strategic alignment process. NWC was more focused on sharing knowledge with external digital experts and consultants, while Marafiq was more focused internally with IT and business units. This does not mean that it does not share knowledge with external digital partners or hire them to align and integrate new digital technologies with its existing digital systems, but it is a greater internal focus and therefore did not seem to be an issue. However, interviewees from both companies agreed on the importance of knowledge transfer from external digital partners to company employees, and recognised the importance of the company's investment in establishing digital-enabled knowledge-sharing platforms for internal and external stakeholders.

A significant number of both companies' interviewees (98%) identified *digital skills and knowledge* as a CSF for digital strategic alignment. While some interviewees recognised the importance of digital skills, others believed that digital skills and digital knowledge were applicable to both digital business strategy and digital strategic alignment. In other words, they could be used as a CSF for both. It may be assumed that digital skills are the same as the digital knowledge for digital business strategy. However, it cannot be assumed that these issues have the same implications for digital strategic alignment. For example, digital skills would encompass different skill sets for operating and maintaining digital systems, digital problem-solving and communication.

There would be also specific digital knowledge for each digital system implementation. For example, digital knowledge specific to digital strategic alignment is the knowledge of sources of value creation through shared digital resources and the locations of value capture in a digital business ecosystem, which enables firms to break traditional industry boundaries and operate in connective tissue with the aid of inter-firm digital capabilities (Rai et al. 2012), requiring alignment and integration between internal and external digital resources. In this case, other digital knowledge issues—such as digital co-innovation, interoperability and compatibility—arise to achieve this alignment. Hence, digital skills and digital knowledge complement each other and rely on the individual capability, but how this capability is utilised varies between people. Therefore, the researcher combined them into a single CSF for digital strategic alignment.

Common themes were appeared in the content analysis that identified *unified, optimised digital processes* (97%) as a CSF, which was also associated with ensuring *unified digital flows of information (within–in out–out in)* (94%) and benefited from *integrated digital solutions*, which represented 96% of all interviewees' opinions as a CSF. It seems that both companies focus on developing and unifying digital processes, benefiting from integrated digital solutions, to facilitate and ensure unified digital flows of information within–in out–out in their companies. Since *unified digital processes* depend on *integrated digital solutions,* and both affect reporting structures and information flow, and are also digitally governed and implemented by people, they should be treated as key factors of organisational design.

However, because of their high level of integration, *integrated digital solutions* are extremely complex in both companies, and thus, the majority of interviewees from both companies identified *interoperability or compatibility* as a CSF for integrating and aligning digital technologies, facilitating information flow and processing and reducing CAPEX and OPEX, which make sense for digital business strategy and achieve sustainable business performance.

Not all interviewees are digital experts who know the difference between interoperability and compatibility, which is why some of the interviewees mentioned the importance of interoperability, and others stated compatibility and interoperability interchangeably. The two components are related to each other as they are used in the same digital integration environment, wherein two or more systems or applications can talk to each other and exchange information. If one of these components does not work with one or more of the systems, there would be misalignment in the whole operating system, stopping the flow of information between the affected components. For example, a future version of a system is incompatible with other systems that work and interact within the same operating system, or a new digital technology contains standards that are not interoperable with other systems, preventing smooth information flow within the systems. Therefore, the researcher combined the two components *interoperability* and *compatibility* into one CSF, which collectively accounted for 95% of all interviewees' opinions.

One CSF that was identified in the content analysis as being related to both *integrated digital solutions* and *interoperability and compatibility* was *digital centralisation of resources and services*. Digital resources refer to any digital platforms, apps or infrastructure (hardware and software), including cloud resources such as storage, data centre and security, as well as personnel. Digital services refer to the digital delivery of information across multiple platforms and devices, such as platforms or mobile apps, in water companies, for example, digital bills, payments, opening a new account or closing accounts. A large number of interviewees recognised the importance of digital centralisation of both resources and services as they are interconnected and interdependent on each other.

Some of the NWC interviewees identified digital centralisation of resources in terms of personnel. They stated that the company retains digital talent and attracts new employees with high digital skills to work in the company's headquarters to provide, develop and align new digital solutions for all branches. Likewise, the Marafiq interviewees stated that the company leverages its IT people to develop digital projects for the entire company and its branches. Both companies use a single digital platform and a mobile app for customer services for all branches. Marafiq also uses SAP cloud services to manage data and information and to provide a unified central storage place for all information, which can be accessed by authorised employees anywhere and anytime. Accordingly, the researcher combined the two components 'centralisation of digital resources' and 'centralisation of digital services' into *digital centralisation of resources and services* as a CSF of digital strategic alignment, which collectively accounted for 75% of all interviewees' opinions.

In both companies, *integrated digital solutions* and *unified digital processes* are complex because of their high level of integration. The impact on these companies was significant as their implementation resulted in the removal of many old tasks and the digitisation of many new tasks enterprise wide. Organisational design scholars argue that task interdependency matters for grouping tasks, and thus, managers should group the more interdependent tasks together (Thompson 1967). Thus, digital business strategies change the match between tasks and people, and the way firms determine, divide and group the tasks required to reach expected outputs. This effect is evident from the responses of interviewees from both companies. Collectively, 81% of the interviewees identified *task redetermination and people redistribution* as a CSF of digital strategic alignment.

Another CSF that was identified from the content analysis was *change management* (88%). Many researchers would argue that *change management* is one key CSF in any implementation (e.g. Davenport, Harris & Cantrell 2004; Foster, Hawking & Stein 2004). However, the majority of the interviewees from both companies identified *change management* as a CSF for digital strategic alignment. This can be interpreted by the fact that both companies have already implemented a digital business strategy and recognised the importance of change management. There would have been no reason for them to think that change management was any less critical to their digital strategy implementation, this factor being implicit in their digital projects approach. Hence, these companies do not underestimate the impact of minor changes to stakeholders.

Both companies focus on managing digital and organisational changes. Change management on large (digital) projects can have a different meaning than preparing employees for change (IBM 1980). From a digital perspective, change management refers to managing the change in technical objects between the development and production environments (IBM 1980). Employees could eventually be affected by these changes, depending on the type of change that occurs. All the interviewees, except two from both companies, referred to the non-digital perspective of change management, which is related to training, development and user involvement. As mentioned previously, digital strategic alignment considers digital skills development as a CSF and, in this case, it is an essential component of successful change management. Accordingly, both were identified as CSFs of digital strategic alignment.

The content analysis identified *simultaneous incremental–comprehensive development* as a CSF for digital strategic alignment (88%). However, the literature did not identify this factor as being critical to alignment success. Although this factor is important to both companies, the digital strategy development approaches of each company are different because of the nature and capabilities of each company. Digital business strategy requires quick, small, iterative and overlapped processes of formulation and implementation because of the continuous development of digital technologies. The impact on the companies is significant as their implementation results in the removal of many legacy systems and the digitisation of many processes enterprise wide, which ultimately requires the continuous development of other organisational design factors. Thus, *simultaneous incremental–comprehensive development* is the best approach and a CSF to address such issues, as supported by many interviewees from both companies.

Another critical success factor that was identified from the content analysis was *digital partnerships management* (84%). This factor refers to a firm's ability to manage inter-organisational partnerships between the firm and its external digital partners to share digital resources, and align implementation processes for integrated digital solutions, and ultimately create new shared value. It seems that both companies saw the importance of, and strove towards, successful digital partnerships management. This is evident in various aspects. These companies depend on multiple digital partners rather than a single digital partner to avoid strategic lock-in so as to be able to use another partner without substantial switching costs (Johnson et al. 2014). For example, both companies use different digital meters, systems and apps from different manufacturers and partners. Furthermore, both companies create new value through increasing the level of knowledge integration and competitiveness among different partner firms. These practices ensure that their digital business strategy will be sustainable over time. However, such digital partnerships need the firms' ability to manage these multiple digital partnerships, obtain its benefits and avoid its risks. To our knowledge, there are limited studies that consider *digital partnerships management* part of any of the organisational design elements, although it was supported by the majority of interviewees from both companies.

One CSF that was identified from the content analysis was *shared digital strategic objectives* (82%). The majority opinion among the study's interviewees was that shared digital strategic objectives—as being related to digital, business and sustainability objectives—may have indirect impacts on sustainable business performance. Although a company's vision should be divided into strategic objectives (Chakravarthy & Lorange 1991), only 55% of the content analysis sample identified a *shared digital strategic vision* as a CSF of digital strategic alignment. However, it is necessary to foster the integration between digital strategy and business strategy, achieving digital strategic alignment. One reason why this factor has a low incidence in the interviews is that digital strategic visions are not formally declared in both companies. However, as the companies' digital business strategies evolve, shared digital strategic objectives may be taken for granted as long as the strategies are successful. Arguably, only when digital business strategies are less than satisfactory can other CSFs, such as a shared digital strategic vision, be developed. Thus, a *shared digital strategic vision* must be developed first to formulate *shared digital strategic objectives* of digital business strategy accordingly. Therefore, a *shared digital strategic vision* and *shared digital strategic objectives* are identified as CSFs.

The content analysis identified *top management support* (64%) as a CSF of digital strategic alignment, which means that it was given a relatively medium importance compared with other factors. This can be explained by the fact that most of the respondents are from the top management team or executives, who play an essential role in providing this support to implement the company's (digital) strategy (Drucker 1967). The success of digital business strategy is dependent on a combination of having integrated digital solutions and processes, and the right people in the right place, which are tools necessary to enhance sustainable business performance. Thus, the success of the implementation requires *top management support*. This support takes the form of providing a shared digital strategic vision, commitment, leadership, and the necessary authority to allocate resources and ensure the success of digital strategic alignment. Thus, *top management support* was identified as a CSF in this study.

Quality management with KPIs was identified in the content analysis (77%) as a CSF for digital strategic alignment, although a few studies gave insights into the role played by quality management in achieving strategic alignment and linked it with performance. However, both companies can be considered performance-based organisations in which the quality of digital technology and the satisfaction of stakeholders, as well as people's performance, are measured by KPIs to ensure continuous improvement. Nevertheless, some interviewees stated that their companies adopt *agile structures* (75%), which depend on a people-centred organisation. The researcher believes that the two factors are key for digital alignment, but caution should be exercised when identifying KPIs and how to achieve *agile structure*.

People have specific targets measured by KPIs, and *agile structures* require cross-functional teams to improve the firm's ability to rapidly develop its digital processes, and align between functions, people, and internal and external digital resources, which are often outside the scope of routine tasks and targets. As they are supported by many interviewees, *quality management with KPIs* and *agile structures* are CSFs to drive digital strategic alignment by discovering strengths and weaknesses, addressing any deviations in organisational design, and finding and implementing potential solutions for improvement through cross-functional teams. A*gile structures* eliminate the need for traditional structures and should be treated as a key factor of organisational design.

Overall, 52% of the sample identified *digital governance* as a CSF of digital strategic alignment. The relatively low percentage may reflect the level of digital maturity in the sample. However, as companies become more mature, this CSF becomes more crucial. Interestingly, many of NWC's interviewees in the content analysis sample (75%) identified *digital governance* as a CSF, although it was not identified in the organisational design theory or digital business strategy, despite its importance. This may be explained by the fact that at NWC, the *digital governance* is officially declared on its website and used as a strategic enabler to ensure sustainable business performance and facilitate agility, which indicates a more mature digital practice. In contrast, only 29% of Marafiq's interviewees identified *digital governance* as a CSF. This low incidence could be related to its relative importance in Marafiq, and the reduction in the number of heterogeneous systems due to the use of the SAP system, which is governed digitally and from which the data are extracted.

The identification of *digital governance* as a CSF of digital strategic alignment in both companies, with different relative importance rates, implies that as companies' digital business strategy usage becomes more established, this factor becomes more relevant and ensures best practices in subsequent digital business strategies. As *digital governance* is related to structures, processes, data and digital systems, it should be treated as a key factor of organisational design.

Associated with *digital governance* is *shared digital units*, which were identified from the literature as being a component of *digital governance* (Tannou & Westerman 2012). The content analysis identified that 75% of the sample identified *shared digital units* as a CSF for digital strategic alignment. NWC clearly sought to establish new digital units in order to work together, based on their subspeciality in professional knowledge/skills within the digital field, and to integrate digital solutions and achieve business needs supporting the company's digital business strategy. In Marafiq, the focus on *shared digital units* seems to be much less than in NWC. This can be explained by the fact that establishing new digital units is costly and may be unprofitable when it comes to return on investment (ROI), the company's size and its limited resources compared with NWC. Therefore, Marafiq hires digital companies and consultants when needed. However, a large number of interviewees from both companies recognised the importance of *shared digital units* and linked them with digital strategic alignment.

4.4 The Criteria Used for Selecting Critical Success Factors of Digital Strategic Alignment

To answer the research sub-question 3

How do the critical success factors of digital strategic alignment enhance sustainable business performance?

having selection criteria to guide decision-making is important. All the interviewees indicated certain criteria that guided in the choices they made with regard to the CSFs of digital strategic alignment and their impact on sustainable business performance. These criteria are broad, but the researcher used the content analysis approach to categorise the CSFs and their associated set of criteria for sustainable business performance. Hence, the criteria and metrics were selected from the content analysis approach and as supported in other studies in the literature.

To link between the CSFs and the criteria of sustainable business performance, the research first adopted the TBL of sustainability, proposed by Elkington (1998, 1999), and then collectively adopted a set of sustainable business performance criteria (such as increased profits and efficiency, stakeholders' satisfaction, public acceptance and awareness, pollution prevention and conservation of natural resources) related to the water industry proposed by Brattebø et al. (2013), Cantele, Tsalis and Nikolaou (2018), Epstein and Roy (2001), Epstein and Buhovac (2014), Fleming (2008), Marques, da Cruz and Pires (2015), and Li, Dai and Cui (2020). Based on the data analysis, sustainable business performance is directly influenced by six factors: renewed digital skills and knowledge, unified digital processes, unified digital flows of information, integrated digital solutions, digital centralisation, and interoperability and compatibility. Tables 4.4 and 4.5 summarise the evidence from the data to link the six CSFs to sustainable business performance and the supporting literature. They are further discussed in Chapter 5.

Table 4.4: Dimensions, criteria and metrics explored in this study and supporting literature

Dimension	Criteria	Metrics	Supporting literature
Economic performance	Increased profits	Revenue and collection Increased productivity	Brattebø et al. (2013); Cantele, Tsalis and Nikolaou (2018); Epstein and Buhovac (2014); Epstein and Roy (2001); Fleming (2008); Li, Dai and Cui (2020)
	Improved efficiency	Cost, time and effort reduction	
Social performance	Stakeholders' satisfaction	Quality of service Information transparency Meeting stakeholders' needs	
	Public acceptance and awareness	Complaining	
Environmental performance	Pollution prevention	Control of water and air pollution	
	Conservation of natural resources	Efficient use of water and energy	

Table 4.5: CSFs and impact criteria on sustainable business performance

CSF	Impact criteria	Direct link to
Renewed digital skills and knowledge	Increases employee confidence to handle complex digital issues. (17NI, 12NI)	A new metric is linked to social performance
	Reduces operation costs and technical (IT) issues, and increases productivity. (7NI, 17NI, 3MI, 9MI, 12MI)	Economic performance
Unified digital processes	Reduces operating costs, speeds up revenue collection, and increases productivity. (6NI, 15NI, 16NI, 17NI, 1MI, 10MI, 12MI)	
	Reduces the number of employees and tasks. (2NI, 4NI, 7MI, 8MI, 10MI, 12MI)	
	Makes quick decisions and reduces communication costs. (12NI)	
	Robotic process automation (RPA) through artificial intelligence, which digitally implements daily processes and reduce time and efforts. (2NI, 9NI)	
	Speed up information processing and satisfy stakeholders’ needs. (1NI, 2NI, 3NI, 4NI, 5NI, 8MI)	Economic and social performance
	Improve the information quality. (8NI, 11NI, 12NI, 13NI, 1MI, 8MI)	
	Improve the ease of handling consumer complaints. (6NI, 17NI, 15NI, 16NI, 12MI, 1MI)	
	Reduce customer transactions. (19NI)	
	Enable field’s employees to make a quick response to emergency environmental issues (e.g. data analytics send alerts and detect main water pipe breaks in distribution networks or digitally stop air pollution in treatment stations). (3MI, 2NI, 1MI)	Environmental performance
	Digital meter reading process reduces the number of the company’s vehicles that must travel every day in the city (this reduces air pollution). (12MI, 1NI)	
	Digital bill production process without human intervention (paperless billing). (13NI, 15NI)	

CSF	Impact criteria	Direct link to
Unified digital flows of information	Speed up the processing of information (9NI)	Economic performance
	Improve the ease of handling digital partners’ inquiries. (1NI, 2NI, 4NI, 5NI, 11MI)	
	Increase employees’ trust. (1NI, 2NI, 4NI, 5NI, 18NI, 8NI, 5MI, 7MI, 9MI, 11MI)	Social performance
	Increase customer trust. (3NI, 18NI, 8NI, 6NI, 7MI, 9MI)	
	Facilitates service delivery and improve user and customer experience. (3NI)	
Integrated digital solutions	Reduce employees (operation costs). (8NI, 11NI, 12NI, 13NI, 1MI, 8MI)	Economic performance
	Reduce human error. (1NI)	
	Reduce time in processing information. (3NI)	
	Enhance our ability to analyse data, forecast and take proactive actions. (9MI)	
	Allow customers to easily communicate with the company and access their consumption data in near real time. (4MI)	Social performance
	Provide transparent information to stakeholders. (10MI)	
	Increase public acceptance and awareness. (12NI)	
	Reduce air pollution and carbon dioxide emissions. (1MI, 2MI, 3MI, 12MI, 6NI, 10NI, 12NI, 15NI, 16NI)	Environmental performance
	Reduce water and electricity consumption. (9NI, 15NI, 17NI, 3MI)	

CSF	Impact criteria	Direct link to
Digital centralisation of resources and services	Centralised digital platforms and apps increase customer satisfaction. (1MI, 6MI)	Social performance
	One unified billing system and customer care (Hayat platform is digitally centralised for 17 branches) reduces annual licenses costs and operating costs and reduces electricity consumption. (2NI, 9NI)	Economic and environmental performance
	Centralised services (e.g. cloud services or HR apps) allow employees to access and share information anytime and anywhere (achieve employee satisfaction), speed up information processing and reduce daily tasks. (1MI, 2MI, 4MI, 5MI, 8MI, 9MI, 11MI, 12MI, 2NI, 11NI, 14NI)	Economic and social performance
	Unified data centre reduces data redundancy and increases the information quality and accuracy. (1MI, 2NI) Cloud services reduce effort and time. (9NI)	Economic performance
Interoperability and compatibility	Reduces the threat of partner lock-in (reduce costs). (2NI, 4NI, 13NI, 16NI, 17NI, 1MI, 6MI, 8MI) Reduce CAPEX and OPEX and increase productivity. (7NI, 11NI, 12NI, 15NI) Facilitate communication and exchange of information between digital systems. (4MI, 5MI)	
	Interoperable digital meters with OMS enabled the company to install a single wireless network for the whole city instead of installing many networks for many types of digital meters, and this protects environment from communication towers. (4NI, 15NI, 16NI, 17NI)	Environmental performance

An iterative analytical technique was used to develop the categorisation of CSFs of digital strategic alignment that enhance sustainable business performance. It was important to conduct an iterative abductive process of dialogue between the data collected and a mixture of existing theories and propositions to develop knowledge and provide new interpretations (Dubois & Araujo 2004; Dubois & Gadde 2002, 2017; Saunders, Lewis & Thornhill 2019; Van Maanen, Sørensen & Mitchell 2007). This served as a cross-check regarding the results in the case companies' data and existing literature.

All transcripts were analysed sequentially using a three-stage category system (themes, CSFs, and sustainable business performance criteria) for each company. The system was established inductively using the case-study data to answer the research questions for each company; 31 themes, coded into categories and sub-categories, emerged from the first analysis stage. According to Mayring (2014), the most important findings for interpretation would be those categories with many occurrences and many persons or different text sources. In the second stage, the researcher removed six factors—digital mindsets, pilot projects, digital IT modernisation, digital-based reward systems, customisation, and digital professions—because they obtained low rates of occurrences and less than 50% of supporting persons in each company. In this stage also, the researcher combined seven factors—co-innovation, standardisation, compatibility, digital culture, effective monitoring, digital-based tasks, and holistic planning—with other factors because they are closely related in meaning and practice, as explained in the previous sections (4.2 and 4.3). Thus, the 31 themes were reduced to 18 on identifying and articulating the CSFs of digital strategic alignment.

Because of the similarities and overlapping of factors, scholars suggest re-classifying and grouping them according to the research requirements (De Haes & Van Grembergen 2009; Gutierrez, Orozco & Serrano 2009; Trienekens, Kusters & Cuenca 2014). Accordingly, in the third stage, the 18 CSFs were grouped into three main categories—strategic factors, organisational factors and digital factors. The main category of strategic factors includes a shared digital strategic vision, shared digital strategic objectives, quality management with KPIs, simultaneous incremental–comprehensive development, knowledge integration, top management support, digital partnerships management, and change management. The main category of organisational factors includes agile structures, shared digital units, task determination, unified digital processes, unified digital flows of information, renewed digital skills and knowledge and digital governance. The main category of digital factors includes integrated digital solutions, interoperability and compatibility, and digital centralisation of resources and services.

Then, the 18 factors were re-coded and linked to the sustainable business performance criteria and metrics chosen collectively by the interviewees (only six factors have a direct impact on sustainable business performance, as shown earlier in this section). The grouping of the factors into main categories, categories, and sub-categories demonstrates the relationships between the 18 factors and assists in understanding the broad areas these factors affect. The more detail that is provided with each factor, the better understanding of how the factor affects sustainable business performance based on economic, social and environmental dimensions. This also can help in understanding how a company can focus their efforts and resources to create and align the different factors to enhance sustainable business performance.

The 18 CSFs were then compared and revised in light of deductive analysis of existing literature (Bharadwaj et al. 2013; Fernando, Jabbour & Wah 2019; Galbraith 1974; Grant 1996b, 2016; Herden 2020; Indriasari, Supangkat & Kosala 2020; Karpovsky & Galliers 2015; Kates & Galbraith 2007; Kretschmer & Khashabi 2020; Li et al. 2021; Li, Dai & Cui 2020; Luftman, Lyytinen & Zvi 2017; McAdam, Miller & McSorley 2019; Teoh et al. 2022; Yeow, Soh & Hansen 2018). This methodology generally follows the logic of Mayring’s (2014) inductive and deductive content analysis approach, by which the researcher identified additional CSFs that extend the organisational design theory. The key contributions of this study with further links to the literature are discussed in Chapters 5 and 6. Table 4.6 below encapsulates the more detailed summary of the exploratory (inductive and deductive) study results and illustrates the categories and the associated CSFs that follow.

Table 4.6: Summary of CSFs, and their effects on sustainable business performance

CSFs		Supporting literature	Sample quotations on impact criteria	Theme/Propositions	Sustainable business performance (SBP)		
					Econ.	**Soci.**	**Envi.**
Strategic factors	A shared digital strategic vision (SDSV)	Korachi and Bounabat (2020); Li et al. (2021); Ramanathan et al. (2017)	NWC's business strategy and digital strategy were integrated into one digital business strategy. This integration aims to create a shared digital strategic vision through which business and digital units work together to unify and align the strategic, organisational, and digital changes ensuring that sustainable business performance is in the interest of everyone. (1NI)	**Theme 4:** The integration of IT and business strategies into one digital business strategy in organisational design is the essence of digital strategic alignment. **Proposition 5:** A shared digital strategic vision influences all organisational design factors.	SDSV has an indirect effect on SBP SDSV has a direct effect on ODFs SDSV → all ODFs		
	Shared digital strategic objectives (SDSO)	Korachi and Bounabat (2020)	A shared digital vision is a CSF because it would be divided into shared strategic objectives that include digital, financial, and non-financial objectives, which are indispensable when attempting to promote a firm sustainability. Shared objectives are a tool for co-organising and leading the firm digitally and sustainably. (1NF)	**Proposition 6:** Shared digital strategic objectives influence all organisational design factors.	SDSO has an indirect effect on SBP SDSO has a direct effect on ODFs SDSO → all ODFs		

CSFs		Supporting literature	Sample quotations on impact criteria	Theme/Propositions	Sustainable business performance (SBP)		
					Econ.	**Soci.**	**Envi.**
	Top management support	Li et al. (2016); Matt, Hess and Benlian (2015); Singh, Klarner and Hess (2020)	The top management team supports us to develop and improve the customer service departments, … allows us to restructure these departments in line with the digital strategy and its integrated digital technologies … to create a spirit of cooperation among these departments. (19NI)	**Theme 6:** The level of top management support is an indication of the level of digital strategic alignment between digital business strategy and organisational design. **Proposition 8:** Top management support moderates the relationship between organisational design factors and sustainable business performance.	Moderator Top management ↓ ODFs → SBP		
	Knowledge integration (KI)	Herden (2020); Li et al. (2021)	Marafiq forms a cross-functional team consists of different departments, external consultants and field experts to assess its IT and business infrastructure, and digital readiness. This process involves a broad sharing of knowledge from the company's employees to identify proper digital technologies that it intends to introduce to achieve its objectives. (8MI)	**Theme 7:** The level of knowledge exchange is an indication of the level of digital strategic alignment between digital business strategy and organisational design. **Proposition 9:** Knowledge integration influence all organisational design factors.	KI has a direct effect on ODFs KI → ODFs		

CSFs		Supporting literature	Sample quotations on impact criteria	Theme/Propositions	Sustainable business performance (SBP)		
					Econ.	Soci.	Envi.
	Simultaneous incremental–comprehensive development (SICD)	Alam et al. (2018); Kretschmer and Khashabi (2020); Rahrovani (2020); Yeow, Soh and Hansen (2018)	The company is continuously developing its digital business strategy, requiring simultaneous organisational changes to align each other during the implementation stage and maintain sustainable business performance. (4NI) Digital business strategy requires a new approach of planning and implementation, which considers continues organisational changes in structures or employee's skills before implementation. (2MF)	**Theme 5:** Digital business strategy balances between deliberate and emergent approaches, requiring simultaneous, incremental–comprehensive development of organisational design factors. **Proposition 7:** Simultaneous, incremental–comprehensive development influences all organisational design factors.	SICD has a direct effect on ODFs SICD → ODFs		
	Digital partnerships management (DPM)	Li et al. (2021); Zomer, Neely and Martinez (2020)	Digital partnerships management is a critical success factor for aligning digital projects with each other, providing employees with high digital skills, and transferring the knowledge to the company's employees. (14NI)	**Theme 8:** Digital business strategy requires longer-term digital partnerships management to facilitate inter-organisational collaborations. **Proposition 10:** Digital partnerships management influences all organisational design factors.	DPM has a direct effect on ODFs DPM → ODFs		

CSFs		Supporting literature	Sample quotations on impact criteria	Theme/Propositions	Sustainable business performance (SBP)		
					Econ.	Soci.	Envi.
	Quality management with KPIs (QMK)	McAdam, Miller and McSorley (2019)	The company is a performance-based organisation, which means that the company uses KPIs for the digital technology itself and for the end-users and customers. So, the KPIs are often reflected in more than two objectives of sustainable business performance. (4NI)	**Theme 3:** Digital business strategy requires quality management with KPIs to drive the digital strategic alignment process. **Proposition 4:** Quality management with KPIs influences all organisational design factors.	QMK has a direct effect on ODFs QMK → ODFs		
	Change management (CM)	Carcary et al. (2017); Kates and Galbraith (2007); Kretschmer and Khashabi (2020); Li et al. (2016); Luftman and Kempaiah (2007); Stoffels and Ziemer (2017)	Change management must be supported by the top management team to overcome resistance to change and be established as a continuous process to align people skills with the company's ever-changing digital strategy. (2MF)	**Theme 2:** A dynamic digital business strategy creates within-organisation resistance to change. **Proposition 3:** Change management influences all organisational design factors.	CM has a direct effect on ODFs CM → ODFs		

CSFs			Supporting literature	Sample quotations on impact criteria	Theme/Propositions	Sustainable business performance (SBP)		
						Econ.	Soci.	Envi.
Organisational factors	Structure	Agile structures (AS)	Dremel et al. (2017); Liang et al. (2017); Nadkarni and Prügl (2021); Sia, Soh and Weill (2016); Svahn, Mathiassen and Lindgren (2017); van de Wetering, Mikalef and Pateli (2018); Zhao et al. (2018)	The company adopts agile organisation that includes cross-functional teams and agile approach in planning and implementing digital projects … to overcome the bureaucracy in hierarchy structures and in implementing digital projects with digital partners, and to speed up product launch. (1NF)	**Theme 9:** Digital business strategy requires agile structures. **Proposition 11:** Agile structures influence all organisational design factors.	AS has a direct effect on ODFs AS → ODFs		
		Shared digital units (SDU)	Galbraith (2014); Tannou and Westerman (2012); Yeow, Soh and Hansen (2018)	Companies need to digital units to work together to 1) effectively leverage digital resources, 2) enable employees to efficiently use new digital technologies, and 3) achieve customer satisfaction. (2NI)	**Theme 10:** Digital business strategy requires shared digital units in organisational structure. **Proposition 12:** Shared digital units influence all organisational design factors.	SDU has a direct effect on ODFs SDU → ODFs		
		Task Determination & people distribution (TRPD)	Kretschmer and Khashabi (2020)	The firm started re-combining tasks based on its new integrated digital systems and processes. Digital strategy creates new tasks … eliminates some unnecessary tasks as new systems perform tasks faster and more efficiently. (11MI)	**Theme 11:** Digital business strategy requires redetermining tasks and redistributing employees in organisational structures. **Proposition 13:** Task redetermination and people redistribution influence all organisational design factors.	TRPD has a direct effect on ODFs TRPD → ODFs		

CSFs			Supporting literature	Sample quotations on impact criteria	Theme/Propositions	Sustainable business performance (SBP)		
						Econ.	**Soci.**	**Envi.**
	Processes	Unified, optimised digital processes (UODP)	Catlin, Patiath and Segev (2014); Hess et al. (2016); Kamble, Gunasekaran and Gawankar (2018); Ross et al. (2016); Stoffels and Ziemer (2017); Teoh et al. (2022)	The firm re-engineers its organisational processes to align with its digital strategy…but it is important to optimise and integrate the entire organisational processes. (18NI) The firm's digital processes have become transparent … managers can monitor the performance of processes and employees … they reduce operating costs, speed up problem-solving and improve productivity. (10MI)	**Theme 12:** Digital business strategy requires unified, optimised digital processes. **Proposition 14:** Unified, optimised digital processes have a direct influence on sustainable business performance. **Proposition 15:** Unified, optimised digital processes influence organisational design factors.	UODP has a direct effect on SBP UODP → SBP ------------------------ UODP has a direct effect on ODFs UODP → ODFs		
		Unified digital flows of information within–in out–out in. (UDFI)	Weinrich (2017)	The firm's digital business strategy relies on unified digital flows of information through unified digital platforms, e.g. eBranch for customers, and iSupplier for external partners, which link inside and outside the company … facilitates and unify information flow and processing for all branches … reduce coordination costs. (4NI)	**Theme 13:** Digital business strategy requires unified digital flows of information using unified digital processes. **Proposition 16:** Unified digital flows of information have a direct influence on sustainable business performance. **Proposition 17:** Unified digital flows of information influence all organisational design factors.	UDFI has a direct effect on SBP UDFI → SBP ------------------------ UDFI has a direct effect on ODFs UDFI → ODFs		

<table>
<tr><th colspan="3" rowspan="2">CSFs</th><th rowspan="2">Supporting literature</th><th rowspan="2">Sample quotations on impact criteria</th><th rowspan="2">Theme/Propositions</th><th colspan="3">Sustainable business performance (SBP)</th></tr>
<tr><th>Econ.</th><th>Soci.</th><th>Envi.</th></tr>
<tr><td rowspan="3"></td><td>People</td><td>Renewed digital skills & knowledge
(RDSK)</td><td>Balakrishnan and Das (2020); Boniface (2022); Carcary et al. (2017); Kretschmer and Khashabi (2020); Sutherland (2020)</td><td>Some interviewees highlighted the benefits they obtained from digital skills and knowledge, 1) to immediately solve technical problems, 2) to improve efficiency, 3) to reduce operation costs (i.e. external digital experts), and 4) to increase staff productivity. (7NI, 17NI, 3MI, 9MI, 12MI)</td><td>Theme 1: Digital business strategy requires renewed digital skills and knowledge.
Proposition 1: Digital skills and knowledge have a direct influence on sustainable business performance.
Proposition 2: Digital skills and knowledge influence all organisational design factors.</td><td colspan="3">RDSK has a direct effect on SBP

RDSK → SBP

RDSK has a direct effect on ODFs

RDSK → ODFs</td></tr>
<tr><td>Rewards</td><td>No important findings</td><td>Kates and Galbraith (2007)</td><td>No important findings</td><td>Based on the organisational design model proposed by Kates and Galbraith (2007), rewards affect other factors of organisational design.</td><td colspan="3">Rewards have a direct effect on ODFs

Rewards → ODFs</td></tr>
<tr><td colspan="2">Digital governance
(DG)</td><td>Indriasari, Supangkat and Kosala (2020)</td><td>The company relies on digital governance in implementing its digital business strategy … all digital systems are subject to specific roles and responsibilities for each employee … these governed digital systems lead to reliable data coming from known sources, and this enhances digital culture of reliable data. (16NI)</td><td>Theme 17: Digital business strategy requires digital governance of all factors of organisational design.

Proposition 24: Digital governance influences all organisational design factors.</td><td colspan="3">DG has a direct effect on ODFs

DG → ODFs</td></tr>
</table>

CSFs		Supporting literature	Sample quotations on impact criteria	Theme/Propositions	Sustainable business performance (SBP)		
					Econ.	**Soci.**	**Envi.**
Digital factors	Integrated digital solutions (IDS)	Gambardella, Khashabi and Panico (2020); Ivanov, Dolgui and Sokolov (2019); Junior et al. (2018); Kayaga, Kingdom and Jalakam (2018); Kretschmer and Khashabi (2020); Li, Dai and Cui (2020); Rahrovani (2020)	The integrated digital technologies make it easy for customer to communicate with the company … help employees to efficiently solve customers' problems … allow customers to see their consumption data anytime and anywhere, detect any issues related to water consumption, e.g. water leaks or high water consumption … making customers aware of their consumption … help customers reduce water consumption. (4MI) … enable the company to unify digital processes and the flow of information … easily process the increased information, reduce human errors, where information moves step-by-step between employees in the same integrated systems. (1NI)	**Theme 14:** Digital business strategy requires integrated digital solutions to link the entire organisational design. **Proposition 18:** Integrated digital solutions have a direct influence on sustainable business performance. **Proposition 19:** Integrated digital solutions influence organisational design factors.	IDS has a direct effect on SBP IDS →SBP ------------------------ IDS has a direct effect on ODFs IDS → ODFs		

CSFs		Supporting literature	Sample quotations on impact criteria	Theme/Propositions	Sustainable business performance (SBP)		
					Econ.	Soci.	Envi.
	Interoperability & compatibility (I&C)	Hauser et al. (2016); Hauser, Hild and Roedler (2013); Hauser and Roedler (2015); Howell, Beach and Rezgui (2021); Howell, Rezgui and Beach (2017); Kamunda et al. (2020)	Interoperability helps the company to reduce CAPEX and OPEX because the company needs to install a single wireless network that works on OMS for different types of meters in the whole city. This reduces environmental damage and number of employees. (7NI)	**Theme 15:** Integrated digital solutions require interoperability and compatibility to create value of digital business strategy. **Proposition 20:** Interoperability and compatibility have a direct influence on sustainable business performance. **Proposition 21:** Interoperability and compatibility influence organisational design factors.	I&C have a direct effect on SBP I&C → SBP ------------------------ I&C have a direct effect on ODFs I&C → ODFs		
	Digital centralisation (resources & services) (DC)	Rahman et al. (2017); Sklyar et al. (2019)	The firm uses SAP cloud services to manage and store data… all data and information move, upload, sign, and store digitally. The cloud provides a unified central storage place … can be accessed by authorised employees anywhere and anytime … allow employees to share information … facilitate and reduce the digital flow of information.' (11MI) 'The centralisation of digital infrastructure helps the firm reduce electricity consumption and protect the environment. (9NI)	**Theme 16:** Digital business strategy relies on a centralised orchestration of digital resources and services. **Proposition 22:** The digital centralisation of resources and services has a direct influence on sustainable business performance. **Proposition 23:** The digital centralisation of resources and services influence organisational design factors.	DC has a direct effect on SBP DC → SBP ------------------------ DC has a direct effect on ODFs DC → ODFs		

4.5 The Selected Critical Success Factors and the Revised Theoretical Framework

Table 4.7 below shows the main categories and the associated 18 CSFs of digital strategic alignment that directly and indirectly influence sustainable business performance.

Table 4.7: Main categories, related CSFs, and average % of persons and documents

CSFs category		Related CSFs	Average % of P & D
Strategic factors		A shared digital strategic vision	55%
		Shared digital strategic objectives	82%
		Top management support	64%
		Knowledge integration	100%
		Simultaneous incremental–comprehensive development	88%
		Digital partnerships management	84%
		Quality management with KPIs	77%
		Change management	88%
Organisational factors	**Structure**	Agile structures	75%
		Shared digital units	75%
		Task determination & people distribution	81%
	Processes	Unified digital processes	97%
		Unified digital flows of information within–in out–out in	94%
	People	Renewed digital skills & knowledge	98%
		Digital governance	52%
Digital factors		Integrated digital solutions	96%
		Interoperability & compatibility	95%
		Digital centralisation (resources & services)	75%

Note: Average % of P & D (average for two companies—all supporting persons & documents).

It cannot be assumed that CSFs with higher frequencies have a greater (direct or indirect) impact on sustainable business performance than those with lower frequencies. A high frequency demonstrates that an increased number of interviewees considered a particular CSF important enough in achieving digital strategic alignment that enhances sustainable business performance. A low percentage may reflect the digital maturity level in the sample as companies become more mature, some CSFs become more crucial. Therefore, all the newly emerged CSFs, excluding people and rewards, were added to the revised theoretical framework for this research (as a digital strategic alignment model—DSAM) (see Figure 4.3 below).

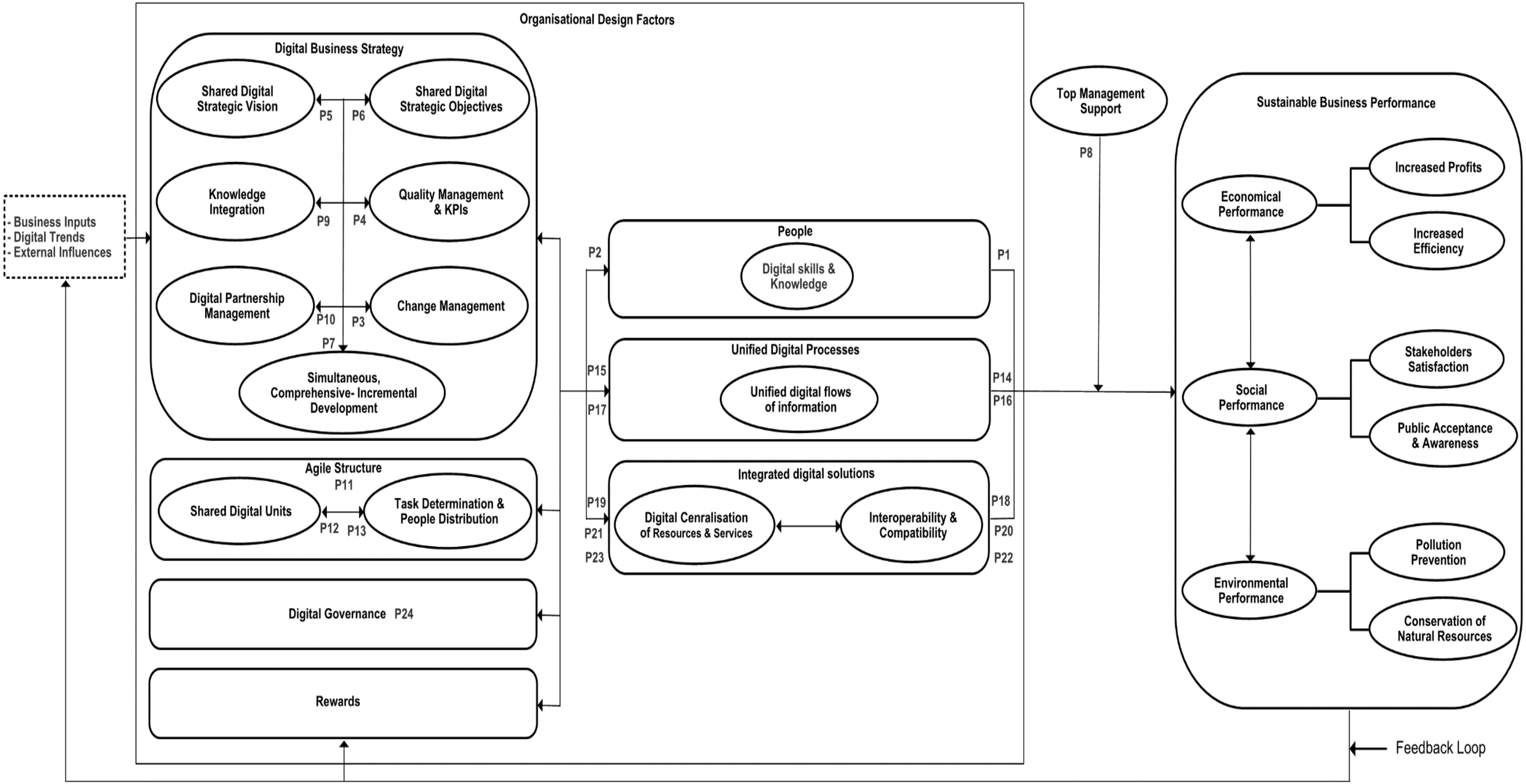


Figure 4.3: The revised theoretical framework for the study (Digital Strategic Alignment Model—DSAM)

The DSAM (Figure 4.3) shows 20 CSFs for the digital strategic alignment process that ensures sustainable business performance. The model includes 18 CSFs in addition to the existing organisational design factors (i.e. people and rewards) for the process. Three factors, namely, digital skills and knowledge, change management, and quality management with KPIs, support people and rewards in the existing organisational design literature as they influence organisational design factors to improve performance. The other (additional) 15 factors could potentially extend the organisational design model as they have direct links to the factors of organisational design, and direct/indirect links to sustainable business performance.

More specifically, the DSAM illustrates that the digital business strategy is not the same as the traditional business strategy in organisational design. Digital business strategy is a deliberately emergent strategy, which is articulated by two strategic factors, namely, a shared digital strategic vision and shared digital strategic objectives, in addition to a simultaneous incremental–comprehensive development approach as a strategic factor that considers organisational changes, and social and technological requirements. Digital business strategy also requires another five strategic factors, namely, knowledge integration, quality management with KPIs, digital partnership management, and change management, which all affect each other, in addition to top management support, as a strategic factor that moderates the relationship between organisational design factors and sustainable business performance. In total, eight strategic factors are identified.

In addition to the existing organisational design factors (i.e. people and rewards), the DSAM reveals new organisational and digital factors in organisational design. The organisational factors include agile structures, shared digital units, task determination and people distribution and digital governance, which influence each other and influence other factors of organisational design. The organisational factors, namely, unified digital processes, unified digital flows of information, and renewed digital skills and knowledge, and the digital factors, namely, integrated digital solutions, interoperability and compatibility, and digital centralisation of resources and services, have direct links to both the factors of organisational design and sustainable business performance.

Last, the feedback loop links sustainable business performance with business inputs, digital trends and external influences via two specific CSFs, namely, quality management with KPIs and agile structures. Quality management with KPIs can help a firm move continually on a clear path for alignment, correction, support and development while implementing its digital business strategy. The KPIs measure financial, digital, social and environmental objectives for all projects and practices, providing the opportunity to track their strengths and weaknesses accurately. Agile structures, through cross-functional teams, can help organisations share resources and make quick, frequent changes to digital business strategy and organisational design to rapidly adapt to changing environmental conditions. Thus, the digital strategic alignment process can enhance a firm's capability in leveraging internal and external digital resources and enhancing sustainable business performance.

Hence, the 20 CSFs must be created, aligned and interacted harmoniously with one another to enhance sustainable business performance. Arguably, the number of factors (20 CSFs) in itself is not a barrier to the digital strategic alignment process because water companies may not have an immediate impact on their performance, but rather a gradual influence over time, especially when these factors are gradually developed (internally and externally) and are mutually constitutive—their ongoing relationships influence each other and create value over time.

On the basis of the findings, the researcher conceptualises digital strategic alignment as a continuous dynamic process that aims to (1) support a deliberately emergent digital business strategy, (2) adapt integrated digital solutions in response to social and technological requirements, (3) shape digital architecture-based organisational design, (4) dynamically address organisational deficiencies, and (5) sustain business performance over time. This enables organisations to achieve their stakeholders' interests, exploit new opportunities and cope with ever-changing market conditions. Finally, the study finds that sustainable business performance grows out of the digital strategic alignment process wherein all the factors are created, aligned and interacting harmoniously with one another. Thus, this finding extends the organisational design model proposed by Kates and Galbraith (2007).

4.6 Conclusion

In the pursuit of the wider research aim of exploring the impact of digital business strategy on organisational design factors (i.e. structures, processes, people and rewards), this exploratory study was undertaken with the objectives of understanding digital business strategies for and practical experiences of digital strategic alignment in water companies. It also provided the opportunity to learn the best practices from the managers' (experts) perspectives regarding concentration, selection and use of the various CSFs for digital strategic alignment that enhances sustainable business performance in water organisation contexts.

The analysis of the case studies has showed that there are discernible differences between privately owned and publicly owned water companies in Saudi Arabia. NWC, as a public water company, has more slack resources, a large number of branches (17 cities) and the rapid spread and affordability of integrated digital technologies, as enjoys strong direct/indirect financial support from the government. In contrast, Marafiq, being a private company, is restricted to its limited resources and small number of branches, and the provision of digital water services is mainly aimed at profitability. Thus, what may work for a public water company, may not work for a private water company in Saudi Arabia.

The findings of the exploratory inquiry have further emphasised that the digital strategic alignment challenges in organisational design are social in nature, pointing for the digital strategic alignment process to acknowledge the evolving nature of organisational design factors and the associated organisational changes in today's digital work environment. The findings have also shown that integrating some of the existing organisational factors, such as people and rewards, which were not identified in the content analysis, into the new digital organisational design is imperative to achieve the digital strategic alignment. In addition, a digital strategic alignment process largely depends on the CSFs put in place not only in the business and functional levels, but also in the corporate strategic level, wherein the actual support usually manifests. The CSFs from which the digital strategic alignment is created, and the macro contexts from which the external forces and the digital trends are derived, also influence the process.

The CSFs seem to be affected by one another and by the interplay of a variety of influences from people with different levels of knowledge. The level of knowledge deepens the level of interdependence and knowledge integration between cross-functional teams and fosters norms of unanimity among shared digital units and business units, as well as develops their digital skills and knowledge of integrated digital solutions, and associated benefits, challenges and risks. As a precursor to the final results and theoretical and practical implications, knowledge integration shows significant promise if linked with the quality management using KPIs to manage, evaluate and develop the digital projects and partnerships, as well as analysing and evaluating the deliberately emergent digital business strategy in the water companies.

The findings lend support and credence to the development of the organisational design model on how to conceptualise the digital strategic alignment process to suit the context of the water sector. As digital, strategic, social and organisational concepts are useful in explaining and designing complex work systems' change processes, the DSAM (Figure 4.3) could similarly be useful in analysing the concomitant changes associated with the introduction or integration of digital solutions, services and processes in water contexts. As the findings have demonstrated, the DSAM provides 20 multi-level CSFs that must be created, aligned and interacted harmoniously with one another to enhance sustainable business performance. The additional 15 CSFs could potentially extend the Star model of organisational design theory proposed by Kates and Galbraith (2007). The following chapter discusses the CSFs (existing and additional factors) and how they influence each other, as well as the implications for the elaboration of the organisational design theory.

Chapter 5: Discussion

5.1 Introduction

In the previous chapter, the two cases were analysed using both within-case and cross-case analyses, and the findings of cases were reported. The CSFs identified in each company were recorded, and the frequency of each CSF in each case study was calculated. Accordingly, 18 CSFs were explored (see Table 4.7 in Chapter 4). Three CSFs were already identified in the organisational design literature, in addition to 15 factors not previously identified in the literature, especially with regard to their coherent direct/indirect impact on sustainable business performance, which is defined as viable sustainability practices measured by economic, social and environmental criteria. This can be considered a novel knowledge contribution to the organisational design theory in the context of digital business strategy (explained in Chapter 6). Especially in the Saudi Arabia's water sector where water companies are undergoing tremendous digital transformations to meet the needs of stakeholders (the government, shareholders, employees, partners, customers and society). Thus, the previous chapter provided an in-depth analysis and comparison of the CSFs identified in the two Saudi water companies and revised the CSFs in light of the existing literature.

The present chapter discusses the findings emerging from the exploratory study and differences between the two companies, and reveals a range of issues that influence the digital strategic alignment process. The chapter is divided into five main areas of discussion. Section 5.2 discusses the strategic drivers for achieving digital strategic alignment in the Saudi water companies (public and private). Section 5.3 discusses the water companies' challenges when aiming to achieve digital strategic alignment. Section 5.4 discusses the cross-case analysis findings regarding the CSFs existing and emerging from the two cases and their mutual influence that enhances sustainable business performance in both companies. Section 5.5 discusses the key findings and implications. Section 5.6 also highlights the implications of the key findings in relation to existing theories (IPV and KBV) and the Star model of organisational design proposed by Kates and Galbraith (2007). Following the analytical discussion, which underscores emerging issues, Section 5.7 presents the research evaluation and validation, and Section 5.8 highlights recommendations. The conclusion of the chapter is in Section 5.9.

5.2 Drivers for Achieving Digital Strategic Alignment in the Water Companies

Drivers are the elements responsible for motivating the case water companies to pursue digital strategic alignment. The analysis chapter showed that the motivation for achieving digital strategic alignment in the Saudi water companies varies from one company to another. The interviewees' responses pointed to key drivers, including economic conditions, social-cultural change, environmental pressures, governmental-political-regulatory drivers, contemporary dynamic market demand and digital advancements. These drivers are external and internal to the companies. Table 5.1 highlights the motivating drivers for achieving digital strategic alignment emerging from the exploratory data. These drivers provide a critical starting point that should be developed further by water companies to establish meaningful and comprehensive digital business strategies aligned with their organisational designs to enhance sustainable business performance. This is generally consistent with the strategic management view of Hussey (1998) that the drivers, visions, values and plans of the firm constitute the critical starting point of innovation trends.

Table 5.1: Summary of the drivers for achieving digital strategic alignment

Drivers	Sample quotations on drivers
Economic/ Market	The global water industry has become increasingly dependent on digital solutions and data. (4NI)
	Today, the market is open, as customers can get water services from elsewhere. We must have a digital strategy that includes the latest digital technologies to be the preferred supplier of utility services in the Saudi industrial cities. (5MI)
	We operate in a competitive market, so our competitors have started using digital platforms, applications and services. The market forces us to keep up with the rapid development of digital technologies to survive. (11MI)
	COVID-19 helped in accelerating the use of digital channels. (5NI)
	Shareholders' needs (profits & growth). (1MF)
Social-cultural change	The national digital culture, community awareness and digital culture drive the company to develop its digital strategy and adopt new digital technologies to meet the needs of stakeholders (employees, partners and customers. (1NI)
	Saudi people used to use governmental digital apps to perform their transactions. They are very advanced in using digital technologies

Drivers	Sample quotations on drivers
	pushing the company to improve its digital services (6NI) and increase productivity. (11MI)
Governmental-political-regulatory	Government digital institutions, e.g., Saudi Communications and Information Technology Commission and National Cybersecurity Authority, impose many policies and procedures for developing and introducing new digital technologies in public companies. So, the company chooses a new digital technology in line with the governmental requirements. (2NI)
	Based on the User Guide issued from the Saudi Ministry of Water (MEWA) on how to serve customers, the company develops its digital strategy, structure, processes, and services to become digital while meeting these guidelines. (3NI)
	The company's digital business strategy is formulated and guided primarily by Saudi Vision 2030 (11NI), which focuses on the digital transformation in all sectors. (18NI)
	The company's strategy has been developed to align with the Saudi water strategy issued in 2018. (4NI)
	Today, Saudi Arabia forces Saudisation (hiring Saudis with high salaries) in the private sector (3MI). The Saudi Vision 2030, Saudisation program and the national digital transformation force the company to digitise 100% of its operations to reduce costs and survive. (7MI)
	The Saudi Government puts pressure on the company for measuring environmental and social performance. (5MI)
Digital technology	The road map for the company's digital strategy depends on global digital trends. (2NI)
	Cloud service providers provide the digital infrastructure the company needs with high flexibility and cost savings. (4MI)

Although the interviewees rightfully identified the motivating drivers for achieving digital strategic alignment, these alone are not enough for leveraging the benefits for water companies. Knowing why digital strategic alignment is important will help managers to develop proper action plans for this to be achieved, and also to understand the requirements of the implementation process. Therefore, the following points discuss the drivers for achieving digital strategic alignment in the Saudi water companies that adopt digital business strategies.

5.2.1 Economic/Market Conditions

The Saudi Arabia’s water industry is in a phase of digital transformation and needs to adapt to radically changing market conditions. This transition is fast becoming a key driver of competitive advantage. Aligning digital business strategy, which drives this transformation, with organisational design goes beyond metrics of efficiency and productivity to those who create sustainable business performance. To achieve the required levels of alignment, Saudi water utilities need to understand how their organisational designs and digital assets are performing together, mainly at functional levels, such as production, operation and customer services, and to create differential value in the process. Particularly, new entrants are flooding the Saudi water industry, and engaging in direct rivalry, while benefiting from the lower barriers of entry supported by the Saudi government and digital developments. Some are inventing new digital business models that create a direct impact on this industry. These forces are exerting pressure on these utilities, which should reorganise to ensure they have depth and scale to satisfy the needs of their stakeholders and outperform their competitors.

The Saudi water industry is currently undergoing a privatisation program and large-scale restructuring. Since 2018, it has been one of the sectors targeted for increased foreign direct investment (FDI) as the government seeks US$11 billion to upgrade the water infrastructure (Oxford Business Group 2021). Moreover, the sharp fall in oil prices in 2020, because of the COVID-19 pandemic, had a significant impact on the Saudi economy, which is heavily reliant on oil revenue. A large share of the revenues has been utilised to subsidise public services (i.e. electricity, water and gas) (Atalla, Gasim & Hunt 2018). As the public deficit increased to 11.2% in 2020, the Saudi Government was forced to make a reduction in subsidies to public services (Trading Economics 2021).

In 2020, the water coverage in Saudi cities was 82%, and the wastewater coverage was 65% (U.S.-Saudi Business Council 2021). This is a relatively low percentage, wherein the progress of public water services provision has not kept pace with rapid population growth and migration to large cities. Therefore, public and private water companies, as well as small-scale local (water transport) companies, have made up for the deficiencies in public water services provision. These companies provide water and sanitation (tankers) services to growing portions of the population (notably, to the remote and isolated areas), and capture different small shares of the market.

Saudi water companies are increasingly facing costs pressures. The top three operating costs for the utilities are energy, employees and chemicals (Black & Veatch Group 2016). Thus, any digital initiatives that can be made towards reducing these costs, especially energy costs, are going to be very important for the utilities' financial viability. In addition, the demand for energy has tremendous potential to grow, and labour costs are increasing faster in developing countries than in developed economies (Manyika et al. 2013). Moreover, economic issues concerning digital advancements are related to the growing importance of digital operation, and the question of how to manage digital processes efficiently and effectively between utilities and stakeholders. The Saudi water utilities, with their various components of (business infrastructure) plants, stations, wells and networks, are vital service providers that primarily fulfil the needs of consumers, necessitating the operation and maintenance of facilities around the clock. These facilities are often exposed to many unexpected breakdowns, causing some stations to arrest their operation, as well as a decrease in water supply. Thus, operating and maintaining facilities will result in high-energy consumption, and this will raise the cost of production and reduce profitability, in addition to environmental damages.

5.2.2 Social-Culture Change Drivers

In Saudi Arabia, social issues related to changes in customer behaviour are motivating forces for achieving digital strategic alignment in water companies. Customers' attitudes are changing. They expect greater transparency and social responsibility. Increased comfort with the internet and digital channels are feeding this change. Customers are pushing water utilities to become more digital to meet their expectations. Today, the main interest of the utilities is to provide digital services that meet their customers' needs. Otherwise, customers will shift to other water companies that provide digital services in line with their expectations.

In Saudi Arabia, community acceptance and willingness to pay need to be addressed (McIlwaine & Ouda 2020). Although the precise measurements of willingness to pay are not known, it can be assumed that the direct effect of raising water prices in 2016 is that customers have become more aware of their bills, which has highlighted issues with the quality and reliability of the companies' digital metering and billing systems, thus reducing the community acceptance of the digital services. This highlights the importance of ensuring digital and organisational readiness before launching them. Therefore, water utilities must quickly improve digital services and create value for what they pay. The trust gained through more robust and accurate digital systems can reduce the reluctance of customers to pay for these services. Thus, utilities can realise value from developing their digital services, and increasing levels of community acceptance and customer trust.

Stakeholder interests constitute another social driver for achieving digital strategic alignment in water companies. There is a distinction between company and stakeholder interests. Digital business strategy affects and is affected by various stakeholders. In the stakeholder theory, it is argued that managers' actions have the potential to influence a wide range of people, and pursuit of strategic goals can be disrupted by unexpected people (Freeman 1994). The social impact of digital business strategy drives water managers to consider the power and legitimate interests of stakeholders who can influence and be influenced by their decisions. Therefore, the stakeholders (e.g. employees, customers and external partners) push the managers to more effectively align digital business strategy with their interests. For example, in private water organisations, shareholders put pressure on these organisations to make profits, while in public water organisations the main interest is customer satisfaction.

Public engagement via social media also stimulates water companies to increase public acceptance. In Saudi Arabia, a customer's voice is strengthened by the social media networks, through which information can be shared (Thompson 2018). For example, Twitter provides unprecedented opportunities for customers to discuss ideas and expectations of public services, and therefore, it encourages greater political awareness regarding public services, which drives water utilities to improve. In short, Saudi digital culture, community acceptance and willingness to pay for digital services, and public engagement via social media are so prevalent in Saudi Arabia.

5.2.3 Environmental Drivers

The Ministry of Environment, Water and Agriculture of Saudi Arabia (MEWA), as the regulator, has given great attention to water conservation and environmental protection. The basis for this was the National Water Strategy (NWS) 2030, which was issued by MEWA in 2018 to align with the goals of Saudi Vision 2030 (www.mewa.gov.sa). NWS aims at achieving a sustainable water sector, safeguarding the environment, and providing cost-effective water supply and high-quality water services. MEWA is keen to meet the

Sustainable Development Goals (SDGs) adopted by United Nations (UN) Member States at the 2015 UN Summit as part of the 2030 Agenda for Sustainable Development, especially with regard to clean water and sanitation, sustainable cities and communities, responsible consumption and production, and climate action (see Figure 5.1). Therefore, MEWA has strategic initiatives, many of which shall be implemented in cooperation with the UN and Saudi water utilities (Alatoom 2019).

Figure 5.1: SDGs 2030

5.2.4 Political-Regulatory Drivers

In 2016, the Saudi Government announced its Vision 2030, which is a new comprehensive roadmap for economic development in the country. It outlines political, regulatory and budgetary changes that will move the Saudi economy onto a more sustainable base. Subsequently, the National Transformation Program (NTP) was released as an implementation plan to help realise this vision. The NTP outlines a number of initiatives and objectives to be undertaken by all ministries. Digitalisation is a key driver and enabler for many of the changes planned in the Vision and NTP. In 2018, MEWA, through its NWS, adopted a number of initiatives to reduce water and energy consumption by increasing efficiency, reducing waste and avoiding unsustainable practices (MEWA 2020). One of the initiatives was a digital platform, called Qatrah. In cooperation with NWC, Qatrah seeks to reduce the country's water consumption from 263 litres per capita per day in 2019 to 150 litres by 2030. MEWA also aims to reuse over

90% of the country's water by 2040 (currently 65%), and reduce water losses to 15% by 2030 (currently 25% in urban areas) (U.S.-Saudi Business Council 2021).

5.2.5 Digital Drivers

The NTP identifies 29 digital initiatives, including five government digital platforms, and a number of public and private digital assets. A well-developed digital infrastructure is integral to empowering the population, and the public and private sectors, with the tools required to facilitate digital transformation, create new digital business and drive greater growth for the country (Vision 2030 2021). Today, there are many governmental digital platforms and apps, and more than 2,500 government services are available online (NDU 2021), which have a vital role in transforming the national culture to digital.

Clearly, Saudi Arabia has made great progress in digitalisation in the last few years. The Digital Competitiveness Report 2021, issued by the European Centre for Digital Competitiveness, ranks Saudi Arabia second globally among G20 countries (MCIT 2021). In addition, the Saudi Digital Transformation Annual Report 2020 includes some significant indicators; globally, it is ranked second in corporate cybersecurity, and first on average mobile internet speeds with 77.5 Mbps, in addition to 12,000 5G towers deployed across Saudi Arabia. Currently, most regions have 5G coverage. Moreover, global rankings give Saudi Arabia high marks for specific digital technologies. For example, it is ranked first in the Arab world for AI, and 22nd globally in 2020. It also ranked seventh globally in financing technical development (NDU 2021). In recognition, Saudi Arabia received the International Telecommunication Union's (ITU) Award for Government Leadership in 2020, and won a global award for unremitting efforts in advancing digital-related legislative infrastructure (MCIT 2021).

Finally, the water sector is undergoing a digital transformation to meet the government's goals by implementing a combination of advanced digital technologies, organisational changes, digital infrastructure construction, privatisation programs and regulatory reforms. Thus, water companies face pressures from their stakeholders (i.e. employees, customers, partners, regulators, economists and environmentalists) to achieve sustainability objectives. In response to these pressures, water utilities can survive and compete by developing digital business strategy aligned with organisational design and considering such stakeholder interests.

5.3 Key Challenges for Achieving Digital Strategic Alignment in the Water Companies

This section discusses the challenges facing water companies for achieving digital strategic alignment that enhances sustainable business performance. Table 5.2 highlights the challenges emerging from the exploratory data.

Table 5.2: Summary of the challenges for achieving digital strategic alignment

Challenges	Sample quotations on challenges
Resistance to change	Resistance to change is a major challenge, which needs to be addressed by a change management and top management support. (2MI)
IT mindsets	The company faces the challenge of working with IT mindsets, which seek to define business requirements to provide information systems to meet these requirements. We need digital mindsets to align among our digital business strategy, digital resources, business needs based on innovative, comprehensive digital solutions. (3NI)
Knowability	Knowability of the digital strategy is a challenge, digital strategy is a new concept in the world and needs specialists. (3NI)
Time	Tight schedules cause technical and organisational problems, as digital systems need sufficient time for testing and deployment, as well as implementing required organisational changes and developing people's skills. Technical issues will affect end-user and customer trust. (10NI)
Inaccurate data	The company must ensure that data (accurate data as input) is taken digitally and processed correctly to achieve the alignment between integrated digital systems and end-user needs. (17NI)
Data security	For public companies, there are some government restrictions on the use of public cloud services due to data security. (9NI) For private companies, they could be affected by cyberattacks. (4MI)
Legacy IT systems	Integrating our legacy IT systems with new digital ones is a challenge because of different manufacturers, different protocols and the inability to transfer data and information. (4MI)
Bureaucracy & old regulations	Bureaucracy is the strongest enemy of digital alignment. Bureaucrats may prevent the implementation of the digital strategy or parts of it, because old decisions made by old regulations put them into practice. (4MI) Old regulations are incompatible with new digital systems. (16NI)
Company size	The large size of the company (17 branches across Saudi Arabia) requires collecting information regarding business needs before implementing any digital change, which in turn causes some delay in conducting new digital changes. (6NI)
Budgets & investments	The digital strategic alignment requires huge investments. If we did not spend additional costs to implement and integrate digital technologies, and develop internal capabilities, there will be misalignment between organisational design factors. (4MI)

The findings reveal some of the challenges that need to be addressed to achieve digital strategic alignment in water companies. One challenge is the resistance of employees and managers who have been running the water companies for many years and have strict regulations to meet water services quality standards. They are also not eager to move on to new digital systems, which can pose risks to their performance. Bureaucracy, old regulations, preconceptions, conflicting ideas, lack of skills, technical problems and lost power are increasing their resistance. Therefore, it is important to provide staff with detailed information on the added value (i.e. for the company, employees, customers and society) of the digital business strategy and the associated organisational changes, which is commonly implemented through change management.

The knowledge of digital business strategy is a common challenge in both companies, which hinders its alignment with organisational design: more strategic organisational knowledge, better digital skills and, most importantly, more digital mindsets can allow for better digital strategic alignment. With regard to the digital skills and knowledge, water companies are realising that it takes a long time to develop the specialist digital skills required for the digital business strategy. They are currently experiencing a lag in digital skills and knowledge availability locally because the digital business strategy, as a new concept, requires people versed in science, organisation architecture and digital technology, as well as sharing and integrating digital resources. Thus, most of their digital initiatives cannot be realised effectively without the required digital skills and knowledge.

Locally, developing digital skills is more difficult than ever because of the fast pace of digital advancement. Over the past 10 years, the emergence of new digital technologies, such as cloud computing, big data, platforms, mobile apps and social networks, and, more recently, RPA, digital twin, AR, VR, etc., is increasing the demand for new digital skills. This is driving some of the older digital skills to obsolescence and extending the demand and supply gaps in the digital skills landscape. Hence, there is a need to increase efforts to train employees and equip them with the right digital skills to reduce these gaps. Skills can also be continuously developed for the next generation of digital technology to meet the market demand. This will sufficiently increase the digital mindset over the next few years, which can anticipate and meet the needs of the stakeholders by innovating comprehensive digital solutions to business problems (Berman & Dalzell-Payne 2018; Chanias 2017; Chanias & Hess 2016; Ross, Beath & Sebastian 2015).

Saudi water sector managers view the use of integrated digital solutions as a challenge due to data security. In public water companies, such as NWC, the government is committed to creating a secure digital environment for the companies by imposing certain restrictions on the use of public cloud services and the integration of digital systems. There is no doubt that private companies, such as Marafiq, are equally committed to cooperating and protecting their data hand-in-hand with the government. Integrated digital solutions open key new gateways to companies' systems and data, requiring enhanced data security and information encryption. Nevertheless, data security should not be a reason not to introduce integrated digital solutions—if the right platform is being utilised and secured. Private companies are receiving help from the security built into the cloud, resulting in fewer security incidents than when using (internal) IT data centres (Mounce 2020).

Another challenge is inaccurate data: more data, accurate data and, importantly, better data analysis can allow for better informed decisions. The water companies are mostly capturing abundant data without identifying implementation plans that improve water services and more efficiently meet customer needs. For example, accurate data generated from trusted digital sources and analysed by big data analytics can be used to reduce water leaks or losses (e.g. thefts) in networks. Where accurate, accessible and well-maintained data are available, the ability of personnel to make good decisions is greatly enhanced. Therefore, quality management, data governance and comprehensive integrated digital solutions that provide and analyse such data are of great help to address this challenge.

The other major challenges for the Saudi water companies are financing concerns, Legacy systems, time and company size. Marafiq, a private company, has considered the need to balance new digital investments with affordability, and has sacrificed long-term capital investments. For example, Marafiq only uses digital meters for large customers (industrial customers), and not for residential customers. In contrast, NWC, a public company, has linked its government financing challenges to levels of productivity in the provision of digital water services without negatively affecting customers' expectations. However, the large size of NWC (17 branches) is a significant barrier to the rapid adoption of digital technologies as it needs a long time to collect information regarding Legacy IT systems and business needs before implementing digital change. This gives smaller companies, such as Marafiq (four branches), the advantage of moving quickly in the right direction.

Thus, these challenges have partly to do with the conservative nature of the water sector and reflect the increased demands of stakeholders.

5.4 Discussion of the Cross-Case Analysis Findings

In the previous chapter, the findings emerging from the exploratory study were briefly discussed, showing that the two water companies developed digital business strategies and implemented digital and organisational changes in tandem to help address the key challenges. Both companies used a variety of integrated digital solutions and developed new organisational factors applicable to their specific business needs. They also benefited in various ways from the digital strategic alignment between digital business strategy and organisational design. In these companies, digital strategic alignment is viewed as a broad range of digital transformations and organisational reforms being driven by macro strategic drivers, such as market conditions, social-cultural changes, environmental pressures, political-regulatory forces and digital trends.

There was general agreement on the intensity of organisational changes as a result of introducing digital business strategies. These shared views placed digital strategic alignment at a critical point beyond the limited forming process, with unlimited innovation potential and the ability to create diverse information that spans the boundaries of knowledge. In comparing the two companies, some existing organisational factors (antecedents), proposed by prior investigators (Galbraith 2011; Kates & Galbraith 2007) and which contribute to digital strategic alignment, were observed in each company. Some of the factors were imperative across the two companies, such as people and rewards. On a more individual level, some of the existing organisational factors (antecedents) were more situated or context-specific, such as values and mission, and sources of competitive advantage. Other context-specific processes and structural practices, such as vertical and lateral processes, departmentalisation, specialisation, shape (number of people and span of control), and distribution of power were developed and incorporated into the new CSFs because of the change in their roles due to the impact of digital business strategies and associated digital technologies. The next section discusses the existing organisational factors (the required antecedents in the alignment process).

5.4.1 The Existing Factors (Antecedents) of Organisational Design

In considering the specific roles that constitute the existing factors of organisational design, understanding how connections between structures, processes, people and rewards are formed and re-formed become crucial. The idea of alignment, positioned as an outcome of multiple influences and interactions of organisational factors in a dynamic and effective organisation (Galbraith 2011), needs unpacking to see the influence of these factors and the roles they play in organisational design. The results presented in Chapter 4 emphasised that organisational design in the context of water organisations is social in nature, requiring the alignment process to acknowledge the evolving current factors of organisational design and their associated changes in the water business contexts. The findings have also shown that successful digital strategic alignment largely depends on the CSFs put in place not only at the business and functional levels, but also the corporate strategic level, where the actual support and strategic work usually manifests.

It was discussed in Chapter 4 that integration of some of the existing organisational factors into the new digital organisational design is imperative to achieve digital strategic alignment. The findings thus provide a key insight comprising the creation of digital strategic alignment between some of the existing organisational design factors and the new 18 CSFs. The process of digital strategic alignment requires compromises, accommodations and interaction between these factors to enhance sustainable business performance, which together underlie the development of the DSAM.

Kates and Galbraith (2007) stress the interweaving nature of the organisational factors and that no single factor alone can support an organisation’s strategy to achieve its goals. According to Galbraith’s (2011) concept of organisational design, there is no one-size-aligns-all design that all organisations must have in common. New factors that align with an organisation’s strategy will always exist. The study agrees with this view and adds that there is a need to consider existing organisational design factors, recognise divergent strategic organisational concepts, reach appropriate compromises, and coordinate subsequent changes. Therefore, the idea of alignment must be unpacked to see the influence of these factors and the roles they play in the context of digital business strategy. Based on the study findings, Table 5.3 below shows, compare and contrast the factors of organisational design proposed by Kates and Galbraith (2007) and the factors of digital organisational design to back up the discussion.

Table 5.3: Traditional and digital organisational design factors

Key Factors	Traditional organisational design factors	Digital organisational design factors
Strategy	- Business strategy	- Digital business strategy
	- A strategic vision (direction) (Values and mission)	- A shared digital strategic vision (Values and mission)
	- Short and long-term goals	- Shared digital strategic objectives
	- Strategy formulation (Competitive advantage comes internally from capabilities, business models and business portfolio)	- Simultaneous incremental–comprehensive development [Formulation and implementation]. (Competitive advantage comes from the internal and external integration approach of scope, scale, speed and sources of value creation and capture)
	- Change management	- Change management
	✗	- Knowledge integration
	✗	- Digital partnerships management
	✗	- Quality management with KPIs
	✗	- Top management support
Structures	- Hierarchical structures	- Agile (flatter) structures
	✗	- Shared digital units
	- Specialisation (jobs) - Shape (No. people and span of control) - Distribution of power - Departmentalisation (forming departments)	- Tasks determination and people distribution (Specialisation, number of employees, tasks and departments are determined based on their new digital interdependencies and expected outputs, matching the digital-tool-based tasks with qualified employees in specialised departments)

Processes	- Vertical processes (Implementation plans and actions, budgeting, R&D, training, ...) - Lateral processes (Workflow, customer orders, and lateral connections) ✗	- Unified digital processes (Within and across a firm including performing pre-planned tasks, customer orders, digital communications, …) - Unified digital flows of information within–in out–out in a firm using unified digital channels.
People	✓ (HR polices; selection, training, skills, mindsets, and competencies)	✓ (HR polices; selection, training, skills, mindsets, and competencies) - Renewed digital skills and knowledge
Rewards	✓ (Reward systems: salaries, benefits and promotions) - Performance systems (Rewards-related metrics)	✓ (Reward systems: salaries, benefits and promotions)
Digital governance	✗	✓ (Data, structures, and digital systems)
Integrated digital solutions	✗	✓ - Interoperability and compatibility - Digital centralisation (resources and services)

Figure 5.2 below depicts the Star model of organisational design and its constituents (in blue) proposed by Kates and Galbraith (2007), which are necessarily needed to develop a digital organisational design that can address the challenges mentioned earlier, and achieve the digital strategic alignment. The people (HR policies), reward systems, and other sub-components of strategy (specifically, change management, values and mission, sources of competitive advantage) are an integral part of the digital organisational design in Figure 5.3 below. These elements are discussed in the following.

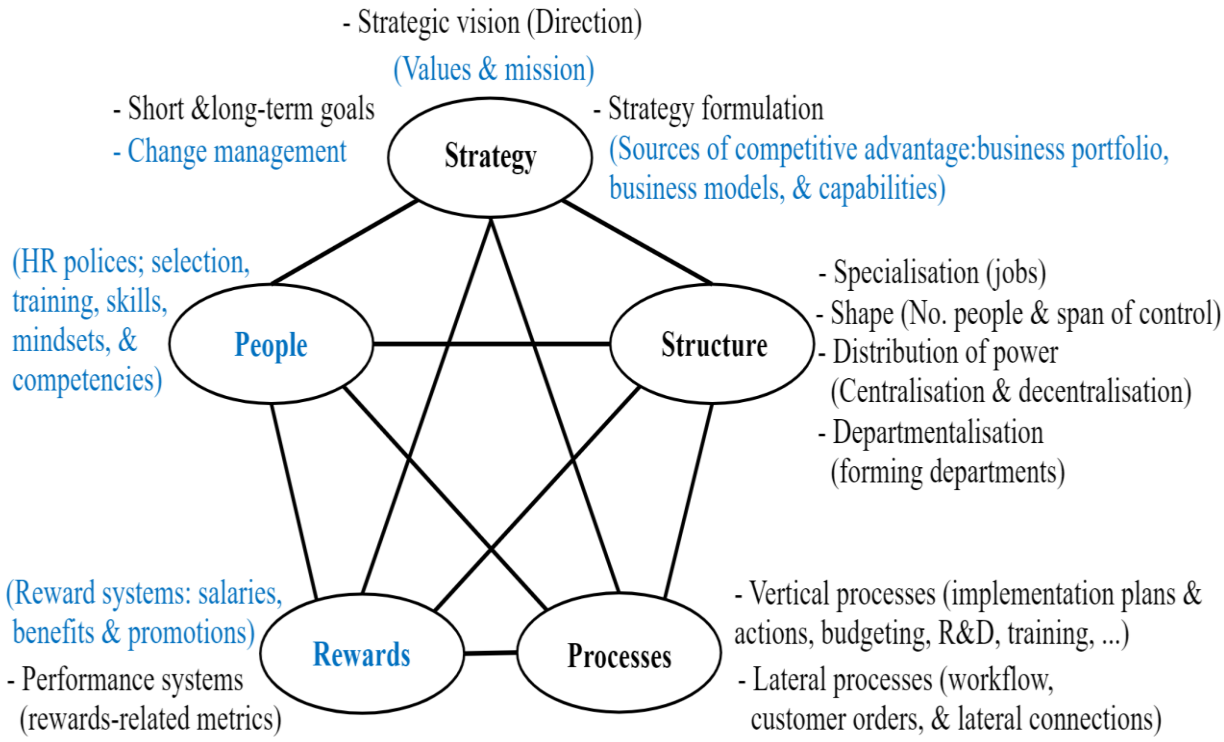


Figure 5.2: The Star model of organisational design and its constituents adopted from (Galbraith 2007, 2011)

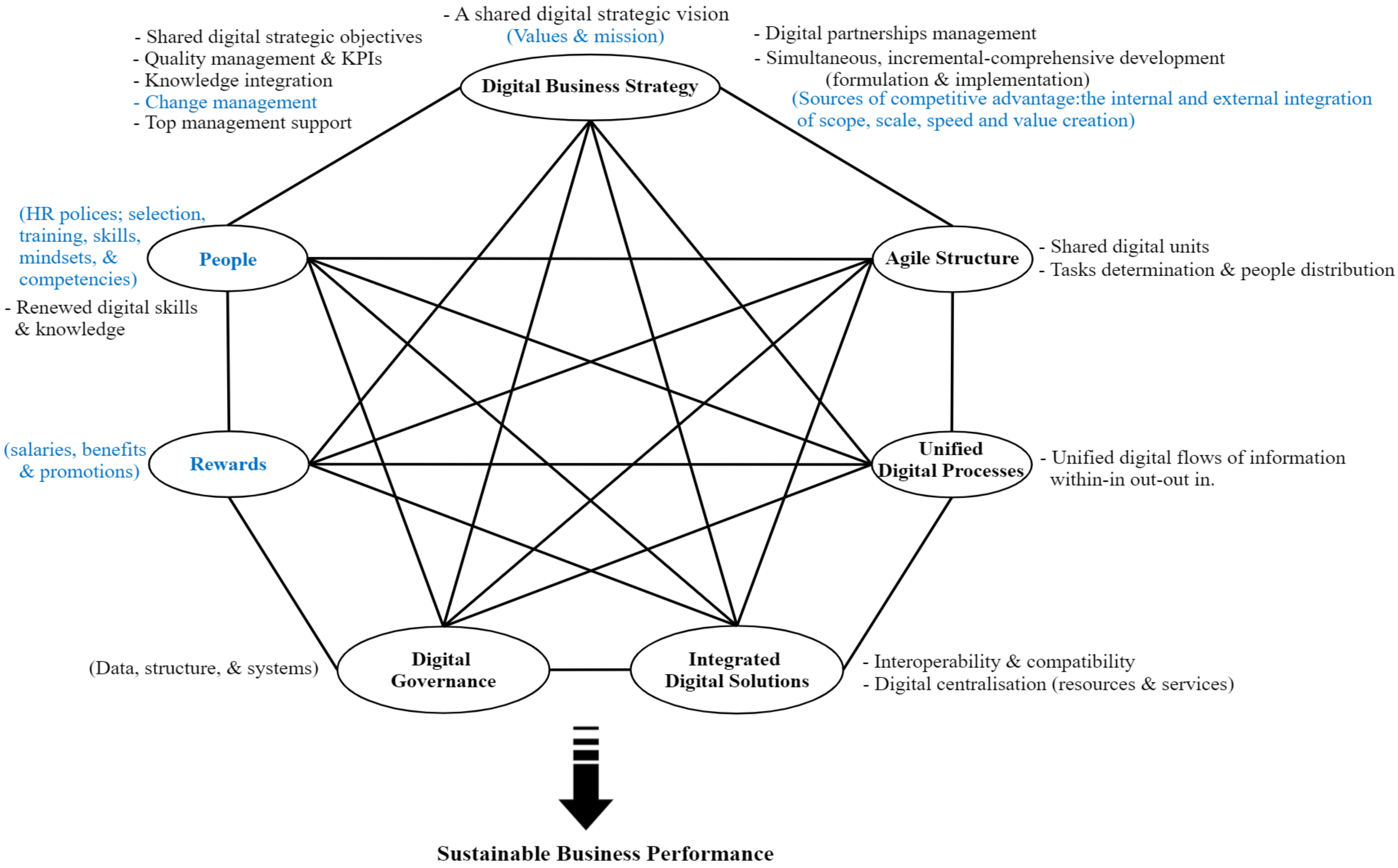


Figure 5.3: The digital organisational design (Source: the researcher's elaboration)

5.4.1.1 Values and Mission

The values and mission of both companies focus on sustainability as a multidimensional concept based on economic value and environmental and social responsibility. The values and mission identify what aspects of the company's actions the stakeholder values the most and grant most employees control over their work while achieving the company's objectives. A company's vision should be divided into strategic objectives (Chakravarthy & Lorange 1991). Values and mission have partly to align with the vision and objectives, and with the drivers affecting the company's actions, and necessarily reflect the needs of its stakeholders (e.g. shareholders, employees, customers) and its culture. According to Johns and Saks (2014), companies that have organisational cultures based on shared values, common mission and objectives, and are open to change, are more likely to succeed. Arguably, even though values and mission were not identified in the exploratory study as CSFs for the alignment, there is a close relationship between vision, mission, objectives and values. Effective mission and values depend on both the company's vision and objectives, and the interests of stakeholders, and cannot be separated from them. Therefore, values and mission are incorporated into the digital organisational design presented in Figure 5.3 as supporting components of digital business strategy.

5.4.1.2 Sources of Competitive Advantage

The sources of competitive advantage are another element of strategy, presented in Figure 5.2. Kates and Galbraith (2007) define three sources of competitive advantage, namely, capabilities, business models and business portfolio. Capabilities are a combination of technologies, processes, and human abilities and skills that differentiate a company to gain competitive advantage, which is the goal of organisational design. Capabilities are built internally and are difficult for competitors to replicate. A business model describes a firm's way of doing business. It includes the value proposition of business, targeted customer segment, distribution channels, cost structures and revenue models, requiring a combination of capabilities to be effective. A business portfolio consists of the products or services that a company produces, offers and manages. Each product or service drives different organisational decisions, requiring similar (or different) business models in the same company (Kates & Galbraith 2007). Thus, in traditional business strategies, the sources of competitive advantage are created and deployed *within* an organisation.

Under digital business strategy, integrated digital solutions can create a differential value, innovative capability and competitive advantage (Bharadwaj et al. 2013), for example, by leveraging digital resources (internally and externally), processes, digital knowledge and skills that can enable better implementation of operation (Benitez et al. 2018). This in turn creates a sustainable competitive advantage in companies, where it is difficult for others to imitate the entire organisational system (Porter 1980, 1996). Overall, in digital business strategy, competitive advantage comes from the internal and external integration of scope (business portfolio of products and services), scale (integrated digital resources) and speed (in digital-business change), as well as sources of value creation and capture such as information and digital business models, in every aspect of an organisation, which is a very different approach compared with traditional business strategies.

However, the two companies diverge as regards the practicalities of developing the digital strategies and the interest of gaining a competitive advantage. NWC, as a public water company owned by the government, focuses on gaining a competitive advantage through customer-centricity, and thus, any actions (e.g. integrated digital solutions, centralised digital services, business models, and the sharing of knowledge and resources internally and externally) that can enhance customer satisfaction take priority in NWC. Although such focus creates competitive advantage, NWC, which holds over 80% of the market share, does not consider them as much as private water companies such as Marafiq.

Competitive advantage in Marafiq is given much attention as the private company mainly aims at profitability. Marafiq operates in a competitive market, and its competitors have started using digital platforms and applications. This drives the company to create a unique combination of digital and organisational resources to outperform its competitors. It depends on multiple partners to leverage their digital capabilities and flexibly develop new digital services. This encompasses engaging in harnessing integrated digital solutions internally and externally to gain a competitive advantage. In digital business strategy, in both cases, the sources of competitive advantage extend beyond the activities and the sphere of influence of single companies, constituting broader contextual integrations in their ecosystems. Although the sources of competitive advantage need further research regarding digital strategic alignment, the researcher believes that competitive advantage cannot be a CSF for digital strategic alignment, but rather a strategic lever for developing and aligning the CSFs. Therefore, sources of competitive advantage are incorporated in digital business strategy and discussed further in the following sections.

5.4.1.3 The People Factor of Organisational Design

The findings of the exploratory enquiry did not find evidence of the impact of digital business strategy on HR policies (i.e. hiring, selection and rotation), proposed by Galbraith (2011), in terms of how the companies concerned could align such policies with other organisational factors and maximise benefit derived from their digital business strategy. However, this study revealed that the process of working in a digital business strategy-enabled company requires water professionals and leaders to reskill in some digital areas to develop their own skills base, signifying a reshaping of existing skills. The digital skills and knowledge gained through mastering the digital platforms and apps were directed towards performing individual roles. Therefore, the innate knowledge obtained through the process of learning remained with certain individuals.

In NWC for example, the concern was that trained digital experts could be tempted by better external offers and go elsewhere, particularly because digital competencies are currently in high demand. Therefore, new HR policies have been used to ensure that reward systems are highly competitive and aligned with peoples' digital competency and performance. In Marafiq, the HR policies were somewhat different. The idea was to reduce the number of administrative employees, field monitors and operators by 30% and increase the number of digitally skilled employees, whether by training its high-performing employees or hiring new employees. This, in turn, reduced the company's operating costs and increased productivity.

In both companies, opportunities existed for some form of digital skills and knowledge sharing and transfer through 'learning by doing' on the job for those less familiar with digital systems. In NWC, the change management manager opined that 'apart from the theoretical training courses, practical digital system training is very necessary'. In Marafiq, an in-house change management team was on hand to set up training courses and provide technical support when needed. Therefore, the two companies learnt to transform and align HR policies through supporting factors, such as developing unified procedures measured by KPIs and providing practical digital training, and through employees' retention and motivation via performance-based competitive reward systems.

This underlines the important role of retraining and development for retaining the business core competencies (employees) within the water sector.

For example, NWC, through change management, embeds new digital and technical training programs in its new digital projects with external digital partners (e.g. digital billing or RPA projects) to transfer the knowledge to its employees. The company also established a new digital library called Hayat Academy, which includes online training videos and online workshops. The digital channel is used to enhance knowledge sharing among all employees and digital partners in all branches. This reduces communication time and coordination costs, and continually grows their digital skills and knowledge.

Marafiq has similar training programs through its Water Academy Centre, but its focus is more on transferring the knowledge from its digital partners to its employees. In the company, each new digital technology-based knowledge transfer process starts with on-site training and ends with ensuring the employees' ability to operate and maintain digital systems after the end of the project's implementation. Focusing on the knowledge transfer process will allow the company not only to achieve digital strategic alignment between the employees' skills and the digital systems they use, but also to reduce subsequent operating costs. Therefore, renewed digital skills and knowledge of people through continuous training, which is usually governed by change management programs and implemented by internal and external teams, is critical to achieving digital strategic alignment in the water organisations.

5.4.1.4 The Reward Factor of Organisational Design

This exploratory study did not find evidence of the impact of digital business strategy on reward systems (i.e. salaries, benefits and promotions), proposed by Galbraith (2011), in terms of how the water organisations could align these systems with other organisational factors (especially integrated digital solutions, processes and people) and maximise benefit derived from their digital strategy. Nevertheless, the research did find that the two water companies use quality management systems with KPIs as a framework for establishing, documenting, measuring and reviewing the companies' strategic objectives, projects, initiatives and sustainable business performance. The case companies have KPIs covering all organisational levels from the top management level to the operational and functional levels. With the digital business strategies, adoption of a quality management system with KPIs requires that all digital processes are identified, unified, governed, and performed and managed systematically to meet customer needs and applicable regulatory requirements, and this achieves customer satisfaction and continuous improvement.

Both companies have documented operating procedures for all digital processes related to customer services and revenue collection. The outcomes of the digital processes are measured and reviewed periodically, which enables the companies to monitor and control allocation and use of organisational resources. The HR digital processes (mainly through HR apps) are well unified, governed and integrated into day-to-day operations, enhancing employee motivation. They also have procedures in place to access, protect, use and evaluate digital data and information, and their sources concerning the digital systems and processes. As they have a compelling strategic rationale for customer-centricity, the two companies regularly evaluate the performance of managers, employees and cross-functional teams in terms of customer satisfaction and associated KPIs. Over and above that, NWC has established the Lean Quality Management System (LQMS), which is a continuous process that oversees all aspects of the digital processes and identifies inefficiencies and unnecessary waste. This system enables the company to visualise the value for all digital information flows, and as recognition, NWC received the KAIZEN Awards for continuous improvement in 2019.

In NWC, all quality evaluations are translated into performance reports for each employee, which helps managers to decide the right reward quarterly. NWC also integrated reward systems in HR departments, with billing systems in customer service centres for calculating and paying performance-based incentives to employees, specifically with repeated tasks (e.g. revenue collection, water disconnection works), which are measured by KPIs.

In short, the digital business strategy uptake and the other organisational design factors that develop around it in the two companies are affected by a wider competing and complementing range of existing organisational factors (antecedents) across the organisational components. These are the values, mission and sources of competitive advantage, as well as HR policies (i.e. hiring, selection and rotation) and reward systems that include salaries, benefits and promotions, as proposed by Galbraith (2011). In many cases, these components not only affect implementation outcomes, but have the potential to impede the intended strategic purposes of the digital business strategy. Therefore, further research is recommended to explore the impact of such factors on digital business strategy. However, the two companies demonstrate the need for 18 CSFs to achieve digital strategic alignment. These factors, constituted as an interweaving set of strategic, organisational and digital factors, and developed and controlled by these companies to enhance sustainable business performance, are discussed across cases in the following sections.

5.4.2 Comparison of Strategic Factors across Cases

The current study uses the theoretical underpinning of IPV and KBV to explore how digital business strategy can affect traditional organisational design factors and to identify CSFs in this process. Twenty-four propositions were posited, 18 CSFs were explored, and six criteria and nine metrics for sustainable business performance were identified, all of which were supported by the empirical data collected for the exploratory study and compared with the findings of the literature. The 18 CSFs, in addition to people and rewards (existing factors), together form the DSAM, which can be used in water organisations to enhance sustainable business performance.

The significant relationships among the new digital organisational design factors (i.e. the 20 CSFs), which were divided into three groups, strategic factors, organisational factors and digital factors, demonstrate that these factors can only lead to enhanced sustainable business performance as long as the company develops these relationships among these factors. Strategic factors, which include a shared digital strategic vision, shared digital strategic objectives, quality management with KPIs, knowledge integration, change management, digital partnerships management, and simultaneous incremental–comprehensive development, as well as top management support, not only influence each other, but also influence other groups of factors in organisational design. Therefore, these factors are discussed in the following section.

5.4.2.1 Shared Digital Strategic Vision and Objectives

One of the most interesting findings about the water companies is the variation in strategic visions and objectives, which inform digital business strategy for the implementation processes. These include visions about the business future and different stakeholders' expectations about existing business practices. The NWC's vision is 'providing high-quality water, wastewater and environmental services at efficient costs while empowering people, protecting the environment and enabling sustainable development' (NWC 2021b), while the vision of Marafiq is 'to be the preferred supplier of utility services in the major industrial cities in Saudi Arabia with a mission to meet customer's needs by providing reliable and sustainable utility services which comply with environmental regulations and maximise stakeholders value' (Marafiq 2021). However, although both the companies have clearly defined strategic visions—focused on sustainability—when asked whether digitalisation was integrated into the company's vision, almost every interviewee mentioned the related digital strategic objectives, implying that the companies' vision must be developed to indicate their digital direction. Hence, it is essential that vision and objectives fit together coherently to develop a digital business strategy capable of achieving them.

Aligning a set of strategic, digital organisational, and sustainability objectives with each other requires creating a shared digital strategic vision that can be divided into aligned, shared digital strategic objectives in the first place. In NWC, shared digital strategic objectives existed, while in Marafiq, the digital strategic objectives were not clearly linked with sustainability objectives. In addition, both companies' objectives were not established in line with a shared digital strategic vision as they were mainly suggested through external and internal consultations and driven by the strategic drivers discussed earlier in this chapter. This situation prevents implementation projects from being strategically and digitally aligned to the business needs and neglects the corresponding development of organisational design factors. Hence, it is implied that formally creating and aligning shared digital strategic objectives in support of the digital business strategy with a shared digital strategic vision greatly enhances the digital strategic alignment between them and the likelihood of implementing successful digital projects.

According to Li et al. (2021, p. 702), 'the digital technology-business strategic alignment refers to the creation of a shared vision between digital technologies and business strategy and activities in an organisation'. The current study goes further to define a shared digital strategic vision as the future of a purposeful organisation to achieve the aspirations of its stakeholders. This vision is particularly appropriate since it integrates stakeholders' interests and seeks to align interests at all organisation levels.

However, in both companies, a clear definition of digital business strategy (and the associated shared digital strategic vision) is required to unify the digital orientation (Hess et al. 2016), foster the integration between IT strategy and business strategy, and embed digitalisation in the company culture. It is thus indispensable that people responsible for implementing digital business strategy should also participate in its development and in designing the integrated digital solutions and processes they use. This type of knowledge integration can help business and digital units to work closely together to improve the mutual understanding between the two groups. For this, shared digital strategic visions and objectives provide rich opportunities for enhancing digital strategic alignment between the components of organisational design.

5.4.2.2 Top Management Support and Change Management

Many interviewees emphasised that shared digital strategic visions and objectives need the support of the top management team. They give special importance to the behaviours and roles of top leaders that have a direct impact on the digital business strategy outcomes as they need to actively demonstrate supportive actions to ensure that shared strategic visions and objectives are internalised. This finding is consistent with that of Dong, Neufeld and Higgins (2009), who identified three types of top management support, namely, resources provision, change management to enhance organisational receptivity, and vision sharing with lower-level managers, to ensure a common understanding (knowledge) of an organisation's objectives.

In both companies, change management is given special importance despite their divergent practices. NWC, for example, has hired an external change management consultant. The consulting company acts as a strategic partner to help NWC in implementing its digital business strategy. It is responsible for launching the company's integrated digital systems (Hayat) in branches, one by one, as well as forming teams in headquarters and branches, managing change and developing a training strategy. Before launching any new digital system, the company establishes a war room (or a control room). In this room, large numbers of visual representations and digital systems are managed by representatives from all branches, in addition to change managers, digital partners and digital IT staff. Those people share their knowledge in making strategic decisions related to the launch and operation processes, for example, fixing technical issues or further training. Teams and consultants report the change process daily (for about a month after the launch) to the head of change management to correct mistakes and take lessons learnt to the next branch or upcoming new digital technology.

In NWC, change management is a continuous process because of its ever-evolving digital solutions, which influences its people's skills and attitudes, and may cause loss of their power or responsibility. In Marafiq, change management is quite different from that of NWC. Marafiq adopts and implements a change management plan internally with the help of HR departments and cross-functional teams to share their knowledge and solve any emerging technical issues. The change management plan is launched and supported by the top management team and communicated effectively to all organisational levels in the company. This helps to implement the change effectively. It also includes continuous training and development programs as essentials for such a plan to succeed and to be able to achieve the company's vision and objectives.

In sum, change management allows the companies to overcome resistance to change, which can be attributed to three main reasons: lack of digital skills, losing power, and emerging technical issues that may limit day-to-day operations and affect end-user and customer trust. People, processes and digital systems are evaluated by KPI. Therefore, a top management team should support and control the rate and level of change (Burgelman 1983). This ensures that high-quality implementation of projects and organisational changes is aligned with the company's digital strategic vision and objectives.

5.4.2.3 Simultaneous Incremental−Comprehensive Development

Regarding the formulation and implementation of digital business strategies, the exploratory inquiry has emphasised that the simultaneous incremental−comprehensive development approach is a CSF for digital strategic alignment. This is because it balances deliberate and emergent approaches with digital business strategy, pointing to its formulation and implementation processes to acknowledge the evolving nature of new digital technologies and the associated organisational change processes in the water company context. Thus, this approach improves the companies' ability to see new opportunities, develop innovative digital solutions and make simultaneous organisational changes, while maintaining a focus on existing advantages.

NWC's shared digital strategic objectives were a significant contributing factor in creating digital strategic alignment for the company's digital strategy projects. NWC's digital business strategy has three levels: first, shared digital strategic objectives including strategic pillars and enablers; second, implementation plans including new digital technologies, structures, processes and people, as well as change requirements and phases and how to align these changes with each other. Knowledge integration is critical at these levels, where the CEO, vice presidents, executive managers, and digital and IT managers, as well as internal experts and external digital consultants, are involved in developing the digital business strategy. NWC also leverages the previous experiences of global water companies with regard to their digital business strategies. It uses company-wide workshops to create lateral relationships and discuss the process of developing its digital business strategy, in addition to using specific workshops to discuss future digital and business projects with potential global and local partners to clarify any ambiguities and share their knowledge if necessary. Last, the third level is to implement the digital strategy as a set of integrated digital initiatives and projects in cooperation with those partners.

In this context, NWC develops its digital business strategy continuously, considering the strategic drivers discussed earlier in this chapter. The company uses the process of simultaneous incremental–comprehensive development, which consists of three paths: two-quarters planning, four-quarters planning, and five-years planning. Each path has an implementation plan, including approved digital and business projects and the associated organisational change processes, which together are linked to the other upcoming plans. Most business departments and shared digital units are involved in a sequential and parallel process, which can be called an agile approach, for implementing a new digital technology in the company. Strategy Planning Department, Digital IT Department, Financial Department, HR Department, Procurement Department, Process Owners, Change Management, and Digital Units, such as Business Analysts Unit, Solution Design Unit, Enterprise Architecture Unit, Implementation Unit, Quality Unit, Launching and Operation Unit, and Projects Management Unit, are all examples of the participants in this process. Through their roles and responsibilities, they work together as cross-functional teams and shared digital units to achieve four outcomes, as follows.

First, a business case includes business needs, scope of work, new digital technology required, benefits, risks, implementation schedules and budgets, as well as a clear picture of the required changes to the company's existing processes, structures, people and other digital systems. Second, another accompanying technical study is developed internally and implemented in cooperation with an external digital partner (integrator) to integrate and align the new digital system design with the enterprise architecture and other existing digital systems and ensure business continuity without negatively affecting customers. It aims to ensure interoperability and compatibility, unifying a range of digital processes and services via company-wide integrated digital solutions, and seamless information flow between systems within and across the company. Third, a quality system with KPIs for the implementation, tests, launch and operation phases aims to achieve the quality of the digital system and integration, and the people working on it. Fourth, all these outcomes are governed, documented, scheduled, measured and developed for reporting performance progress. Thus, the process of simultaneous incremental−comprehensive development is linked to other CSFs to succeed in achieving sustainable business performance in NWC.

Although Marafiq has similar development processes, it differs from NWC in three aspects. First, Marafiq sets annual development plans in line with its strategic objectives, implementation priorities, budgets and investments for each year. Second, Marafiq has two structures in the same workplace, representing Marafiq as a parent company and Marafiq Saur (MaSa) as an operation and maintenance company, and therefore, some annual development plans are separate and others are merged. The development process of its digital strategy aims to integrate and align all digital systems across the two structures to unify the company's databases, processes and information flow and to speed up decision-making processes. Last, since Marafiq is a profit-driven private company, it focuses more on pilot projects, which is a very important tool to ensure the quality of digital systems and reduce costs before contracting out these projects.

Finally, both companies develop their digital business strategies gradually through the simultaneous incremental−comprehensive development approach that considers organisational changes in parallel. This approach blends a set of strategy formulation and implementation approaches such as rational planning and incremental strategic implementation (Quinn 1978), a logical incremental method of strategy implementation (Rajagopalan & Rasheed 1995), comprehensive and adaptive planning (Alam et al. 2018), and co-development of strategy and structure proposed by Kretschmer and Khashabi (2020). This approach is a continuous process and does not have the purpose of outlining an envisioned final state of development (Mueller & Hersperger 2015). In other words, a company's digital business strategy should set general boundaries, but not the strategic details, allowing simultaneous incremental−comprehensive development to be used.

Thus, by making continuous small, iterative and focused changes, the case companies will gradually add value.

5.4.2.4 Digital Partnerships Management and Knowledge Integration

As the process of simultaneous incremental–comprehensive development involves the implementation of a large number of digital projects with different digital partners, the management of digital partnerships becomes crucial to align the digital resources and capabilities, and their multiple digital partners. Although both companies mainly focus on a major digital partner, they also hire multiple digital partners to leverage their digital resources. These partnerships need to be managed effectively to continuously pursue new digital opportunities and work on its alignment with existing ones. This process stimulates collaboration and coordination among those partners themselves and with the companies beyond traditional IT business management. In this context, Hinings, Gegenhuber and Greenwood (2018) suggest that well-maintained relationships with external stakeholders depend on continuous contacts and collaborations in the context of digital business transformation.

Digital partnerships management increases the companies' IPC because it leads to improved knowledge integration between external digital partners and internal employees. According to the logic of IPV, this allows the formation of lateral relationships and improves the feedback from different parties, bringing different views together (Galbraith 1974). NWC, for example, was able to develop a sound incremental plan for digital changes in the company because the top management team encourages digital partners and employees to work together to leverage the current digital resources and explore new opportunities to identify the desired digital solutions. This builds an open (digital) culture that enhances the collaboration and mutual understanding between (external digital) experts and end-users (Hatzakis et al. 2005). As these relationships improve, communications, information sharing and trust are improved (Hatzakis et al. 2005). Wang (2003) has also noted the important role of communication in improving IPC and reducing uncertainty. This literature provides further support for this finding.

In response to shared digital strategic visions and objectives, digital partnerships management can strengthen digital strategic alignment by tightening the connection between external digital partners, internal digital units and end-users, which can reduce uncertainty in decision-making processes. Effective digital partnerships management also improves the companies' relationships network. Through these networks, companies are able to build and maintain close relationships with their partners, which enhance both communication and information sharing (Pavlou & El Sawy 2010). These practices can improve IPC and reduce IPR generated by uncertainty, particularly when working with multiple digital partners. Thus, the benefits gained through digital partnerships management that result from reduced uncertainty allow the companies to address the constantly occurring changes in their business environment.

Last, there is an effect of digital partnerships management on central digital resources and services. Effective management of the partnerships between digital partners and internal units can increase the level of knowledge exchange between the two parties, resulting in a better design of digital organisational architecture and associated digital resources. This allows the companies to implement organisational digital changes quickly and provide needed digital services more effectively. Thus, digital partnerships management is a critical factor for enhancing digital strategic alignment and fostering deep collaboration between various stakeholders in the ecosystem in which the companies operate.

5.4.3 Comparison of Organisational Factors across Cases

There are differences between the possible ways the digital strategic alignment model can be used across different organisational contexts aimed at developing practices that benefit from having a digital business strategy. The study reveals how two distinct water companies envisioned a need for digital business strategy uptake and appropriated different organisational factors to fulfil this need. Indeed, appropriation of suitable organisational factors across the case companies depends on the full potential of integrated digital solutions and negotiations between different stakeholders about digital strategic visions and objectives and the nature, size and capabilities of the companies. In most instances, structures, processes and information flow across integrated digital solutions, such as the Hayat system in NWC, were actively negotiated, developed, governed and incorporated into new internal and external daily practices.

The shared digital strategic visions and objectives are not particularly fixed. They can be changed when new knowledge is gained. Diversity of approaches to solving a problem may result in more robust solutions (Geels & Schot 2007). The effects of organisational design factors can be studied beyond the scope of the case companies. Thus, the process of unpacking previously precluded organisational factors in a way that exposes them for discovery, interpretation, debate and development allows the concerns to expand sinuously between the local contexts to the wider (universal) generalisation. As digital strategic visions are eventually shared, the objectives are jointly developed, and the digital solutions become more centralised, which together influence other organisational factors. Six key and sub-organisational factors, namely, agile structures, shared digital units, tasks determination and people distribution, unified digital processes, unified digital flows of information, and digital governance, are discussed below.

5.4.3.1 Agile Structures, Shared Digital Units, Tasks Determination and People Distribution

As discussed earlier in Chapter 2, agile structures have fewer layers (Zhao et al. 2018), in which each element in a layer of the flat structure is connected to every other element in the layers directly below and/or above it (and this might be more appropriate for digital business strategy as they can provide improved communication and greater flexibility) (Anumba, Baugh & Khalfan 2002).

However, the type of structures observed in both the companies was generally tall and multidimensional, organised by product, function, geography and customer segments. To a large extent, the structures suggested that duties and roles were spread across the explicit and tacit knowledge of the cross-functional teams and individuals. This structural formation is expected because the criteria for selecting those people are based on both integrated digital solutions and specific professional and digital skills and knowledge.

In NWC, the communications with the external stakeholders (e.g. the government, digital partners and customers) are established on digital governance and information sharing protocols. Direct contact is established between cross-functional teams and individuals through the company’s integrated digital systems, such as digital apps and platforms, and is often saved and documented to ensure high-quality performance. Sharing of collective knowledge is required to achieve the digital strategic vision and objectives. In NWC, therefore, there is no obvious boundary between the top management team and those at the bottom of the structure because the integrated digital systems coordinate the different interests.

The tall functional structures, in both companies, do not reflect the agile structures concept that augments high-level professional and digital skills integration, as advocated for in Chapter 2, for implementing digital business strategy projects. However, Marafiq adopts the concept of multi-skilled employees, especially in technical disciplines. Thus, its employees can do more than one job at the workplace, reducing costs, increasing productivity and speeding up service delivery.

The tall hierarchical structures could not prevent information flow in out and out in a firm without distortions. According to Nicholas (1994), traditional hierarchical structures must be overshadowed by flat structures and cross-functional teams to improve communication, increase teamwork, and build trust. However, one of the main conditions that caused long structures to be maintained in both companies is the company size and number of branches involved in any digital project. The cross-functional teams, from the top to bottom and across the structure, working on such projects are too large, which makes it practically impossible to obtain a full representation of the coordination and other site meetings. This highlights the challenges faced by project implementation teams in gathering all teams together into a lateral structure of communication and chain of command. However, these companies use integrated digital solutions for effective communication, through which information is simultaneously distributed and processed by cross-functional teams and individuals (not necessarily managers). Individuals can communicate directly with others in the hierarchy by using available digital tools (e.g. the company's HR mobile apps), which speed up decision-making. Thus, it is safe to say that the essence of digital business strategy is integration and teamwork (and not hierarchy and separate units), underlining the significant relationship between digital business strategy and agile structures.

Another intriguing finding was NWC's shared digital units. The company has different digital units working under the shared, collaborative digital IT department, which serves the entire company. According to the IPV, organisations should hire and share specialists across business units to reduce costs and leverage available resources across the entire organisation, not just for specific departments (Galbraith 1974). Therefore, it makes sense for shared digital units to bring people with different digital skills and knowledge to work together to serve the entire company. Thus, NWC clearly sought to establish new digital units to work together as a continuous process to align and integrate digital technologies in its organisational design with the help of cross-functional teams. In contrast, Marafiq hires digital companies and consultants when needed, with the help of cross-functional teams. This can be interpreted by the fact that establishing new digital units is costly and may be unprofitable when it comes to the company's size and its limited resources compared with NWC. Therefore, Marafiq seeks to effectively manage these partnerships, leverage their specialised knowledge, and achieve digital strategic alignment in this aspect.

In both the companies, digital business strategies altered the way they define, divide and group the tasks required to reach their strategic objectives. Both companies depend largely on developing their digital systems while redetermining necessary tasks and redistributing employees to achieve desired outcomes. In NWC, for example, in the past, mechanical water meters were read by a large number of employees (called meter readers). After using digital meters, which sent consumption data (without human intervention) every 15 minutes to a digital billing system at the headquarters' data centre, the number of tasks and employees was greatly reduced. Thus, NWC removed such tasks and redistributed and trained those employees for new digital tasks, such as digital monitoring and control tasks. Another example is that in Marafiq, in the past, water pressure in the city's water network was read by a number of employees, who travelled around the city every day to complete this task. However, when the company started using the SCADA system, water pressure reading tasks were removed as they were completed more efficiently by the SCADA system. This reduced the number of employees in operations, improved efficiency by reducing operating costs and the number of cars in the city, and served the company, its employees and society.

Integrated digital solutions enable the companies to determine the number of employees and departments, and group tasks based on their new digital interdependencies and expected outputs, matching the digital-tool-based tasks with qualified employees in specialised departments that achieve their shared digital strategic visions and objectives. This is not possible with the traditional organisational structure that adopts a predefined division of tasks, span of control and reporting structures as a given. Thus, digital business strategy requires agile structures that allow a firm to continuously eliminate some current tasks and activities when needed since they can be completed more effectively and efficiently through integrated digital technologies (Kretschmer & Khashabi 2020).

5.4.3.2 *Unified Digital Processes and Flows of Information*

The case companies have shown that their unified digital processes contribute significantly to the digital strategic alignment, even though these processes are not the same in both cases. The unified digital processes were shaped and improved by considering alignment. Each company assessed its particular organisational niche and developed unified digital processes aligned with their needs. NWC, for example, solicited the digital expertise of an external digital processes consultant, who helped shape the company's unified digital processes by using a process mining technology. The consultant provided training, configured integrated digital systems, and helped establish an in-house cross-functional team to study the company-wide digital processes. The digital software helps the company to easily capture information from transaction systems and provides detailed information about how processes are performing and how information is processing. It creates event records as actual processes are done and how to improve them. This accelerated, unified and optimised its digital processes. Similarly, Marafiq contracted with an external consulting firm to improve its organisational processes. The consultant was able to reduce more than 50% of the tasks and processes by using the firm's integrated digital solutions. Thus, some tasks were decentralised, and then became centralised through, for example, customer service platforms or HR apps.

In both companies, the importance of unified digital processes lies in its dual impact on both organisational design factors and sustainable business performance. The companies were forced to unify digital processes across different branches for digital integration. NWC, for example, focuses on increasing its portfolio of integrated digital technologies to unify its digital processes in all branches. It believes that they are best managed centrally and carried out digitally in a similar fashion across different branches and geographies. This enables the company to unify data sources for maximising the quality of data, strengthens their capacity to process information, and reduces IPR generated by their turbulent environment.

In addition, unified digital processes enable the unified digital flow of information across various functional areas within the organisation and externally with others and allows external stakeholders to use the company's digital resources (e.g. customer apps or iSupplier portal) to process information. This in turn reduces costs, time and effort. Using unified digital processes, Marafiq, for example, has unified information collecting and processing tools to better control water quality, energy efficiency and air pollution as they provide transparent information in a timely manner. This also enables the company to achieve its vision and objectives, as represented in better production processes and enhanced environmental management. Therefore, the water companies need not only to make investments to improve and unify digital processes to process increased amounts of internal information, but also to make corresponding investments in co-innovation processes (through digital partnerships) to access external information and create value from this information.

Last, under digital business strategy, integrated digital solutions require unified digital processes, rather than traditional processes. This unifies digital flows of information internally and externally and enables the companies to monitor the entire digital processes instead of functions or departments. For example, NWC's digital metering system displays all digital meters installed or being installed in all cities in Saudi Arabia; thus, at any time, NWC's headquarters can access the system to monitor the implementation process and address any challenges in branches, if needed. These companies monitor such processes that can be related to more than two departments in the same branch to ensure that this objective, which is measured by KPIs, is achieved.

5.4.3.3 Digital Governance

In Chapter 4, the exploratory investigation revealed that under digital business strategy, digital governance is required for all organisational design factors to enhance digital strategic alignment in the water companies. The digital governance allows aligned, controlled and coordinated actions for the sharing of data and digital resources within and across organisational boundaries (Bonnet & Westerman 2014). In the development stage of digital business strategy in both cases, there were changes to five main factors of organisational design: (1) agile structures, (2) unified digital processes, (3) integrated digital solutions, (4) people and (5) rewards. In this stage, it was very important to change the traditional hierarchical structure to agile structures to align with digital business strategy. Accordingly, there were three structural dimensions, which needed to be aligned: (i) the formation of cross-functional teams, (ii) the formation of shared digital units, and (iii) the formation of structural changes by redetermining tasks and redistributing people. Thus, the two companies needed to implement clear roles and responsibilities to address the overlap between the three dimensions, which often results from integrated digital solutions and processes, and achieve alignment in their implementation process.

The two case companies have shown that within any project cross-functional team structure, the digital governance of the participating organisations that make up the project was critically important. The two cases were digitally governed by procurement policy that encompassed clearly written roles highlighting contractual terms, obligations and expectations. This policy aims to govern purchasing processes to ensure that the projects they implement are transparent, objective, time- and cost-effective and controlled by risk management, which ultimately ensures the quality of project implementation. In this regard, the partners had to follow NWC's terms and conditions regarding rights and working conditions, which are often measured by KPIs. Thus, NWC developed a digital platform (iSupplier) to deal with its digital partners digitally. Marafiq also uses its supplier relationship management (SRM) system to communicate digitally with external partners and contractors. These platforms ensure transparency and governance of processes and eliminate paperwork between vendors and the companies.

However, digital strategic alignment needs a digital governance policy regarding unified digital processes, enabling digital and business units to manage daily activities and to work together through clear procedures, roles and responsibilities. This can help facilitate unified digital flows of information within–in out–out in the companies and ensure the quality of data and information. This policy should also include knowledge integration (relational) mechanisms, whereby it is necessary to create a digital work environment for collaboration and implement regular (online) workshops and meetings as a part of agile organisation (Indriasari, Supangkat & Kosala 2020). Thus, top management members should plan to revisit the digital governance policy periodically to ensure knowledge sharing and collaboration on projects and define proper mechanisms for efficient information sharing protocols (data access). Thus, digital governance works better with teamwork, which can be sufficiently rewarded through performance-based rewards. Last, neither of the two companies followed an existing approach to govern the entire organisational design and achieve digital strategic alignment.

5.4.4 Comparison of Digital Factors across Cases

Based on the findings of the exploratory study, the integrated digital solutions and the associated interoperability and compatibility and digital centralisation of resources and services were identified as CSFs that directly influence both organisational design factors and sustainable business performance. These findings are discussed below.

5.4.4.1 Integrated Digital Solutions

The study revealed that integrated digital solutions emerged and developed rapidly in the water companies as they directly influence sustainable business performance. Although scholars have discussed the impact of a specific emerging digital technology on organisations' performance, such as cloud computing (Schniederjans & Hales 2016), IoT (YU et al. 2015), big data analytics (Akter et al. 2016; Dubey et al. 2019; Wamba et al. 2017) and other Industry 4.0 technologies (Dalenogare et al. 2018), in this study, the water companies tended to integrate these digital technologies to innovate integrated digital solutions and build a digitally enabled infrastructure, thus holistically supporting their operations and achieving sustainability objectives. The result can help in understanding the integration of digital solutions and their coherent effect on organisational design and sustainable business performance.

This is consistent with the findings (economic and environmental performance) of Li, Dai and Cui (2020), who identified integrated digital technologies, such as cloud computing, IoT and big data analytics, as the firm's IPC, and the digital supply chain platform as an information exchange channel to access external information. The current study identifies the integrated digital solutions as a unified construct that includes two sub-factors: interoperability and compatibility and digital centralisation of resources and services, which are bound together to compose the construct. Today, every digital technology can provide integration along with the service itself, thereby forming several integrated digital solutions (e.g. digital metering systems). In this study, therefore, integrated digital solutions are all integrated digital technologies and associated solutions that represent the firm's IPC, whereas digital platforms and apps (e.g. iSupplier or HR app), which are an integral part of integrated digital solutions, are unified information exchange channels (internal and external).

In NWC, for example, integrated digital solutions are a key enabler of improving sustainable business performance (NWC 2021b). There are multiple projects, and initiatives, that have been identified in multiple streams of digitalisation and mapped with business outcome and impact. Priorities of digital investment are set accordingly. There have been some marquee programs of digitalisation in NWC, which has had significant impact on billing, customer services, and internal and external processes. In 2017, NWC quickly recognised the benefits of digitalisation and initiated a nationwide program to replace mechanical meters with 'digital meters' incorporating digital meter reading systems. In 2019, NWC put the final touches to an aggressive digital metering program, which was driven by the company's digital business strategy. A new digital meter was installed every minute on average—two million in total across the country (NWC 2021b)—cutting the utility's meter reading costs by 75% and creating a wealth of data, allowing the company to easily achieve its improvement targets.

NWC's CEO has stated, 'Water conservation is a very important issue for us, so our new integrated digital systems will help us make the best use of the water we have' (NWC 2021b). The ability to manage, monitor and control water systems could have a major impact on water consumption, energy conservation, carbon dioxide emissions and water loss. Today, more than ever, the water utilities need to change the way they manage their scarce water resources and deliver water and sanitation services to the population, as the water-related necessities of all sectors are also increasing. Thus, integrated digital solutions are needed to address these issues, which affect all the country, socially, economically and environmentally.

Data analytics is another solution for informed decision-making and business directions. NWC uses social networks such as Twitter and Facebook to analyse data and monitor customer feedback. This can provide knowledge to make the necessary improvements to the firm's products, services and operations (Bharadwaj et al. 2013) to create a sustainable competitive advantage (Erevelles, Fukawa & Swayne 2016) and satisfy the stakeholders' needs. Business intelligence (BI) systems is a crucial part of NWC, with enhanced capabilities of self-service and executive-worthy dashboards. Big data analytics is being explored at the moment for unstructured data analyses.

In Marafiq, integrated digital solutions also affect sustainable business performance. Through its digital strategy, Marafiq aims to provide services and capabilities to deliver environmental, societal and economic value to Saudi Arabia. The digital strategy mostly focuses on integrated digital solutions through a set of principles including *digital infrastructure*, which was established to ensure flexibility to adapt and integrate the emerging digital technologies, such as cloud computing, big data, IoT, AI and ML, which is the key enabler of its digital strategy. Marafiq has already begun the journey with positive performance improvement outcomes to date, in terms of its infrastructure, using the SAP HANA platform over a private, secure in-kingdom cloud (SAP HEC). *Core applications* concern enterprise resource planning, ERP (SAP ECC), to leverage digital technologies and digitalise the core SAP S4Hana to achieve unified and seamless user/customer experience and mobility, moving from t-codes/transactions to simplified processes, supporting new/innovative business models, and adopting leading public cloud solutions (SaaS-Software As A Service, EX. SAP Success Factors, Ariba and Advance Analytics). The aim is to extend capabilities beyond the core.

As regards *digital metering*, Marafiq has already started using smart meters for industrial customers. Moreover, the *information technology (IT) and operation technology (OT) integration* meant integrating IT and OT to leverage the capabilities of the SAP ERP, introducing digital and predictive capabilities, and bringing real-time information for better management visibility and decision-making. Marafiq successfully began this journey in 2018 and continues to move forward to integrate other new digital technologies, such as Digital Twin. Thus, Marafiq is internally and externally motivated to continually develop its integrated digital solutions (Marafiq 2021).

The water companies do not only rely on internal IPCs using integrated digital solutions, but also integrate them with digital platforms that access more information externally (e.g. the government or supplier platforms), thus realising higher sustainable business performance. These results can further contribute to the understanding of the contextual conditions of the water companies to develop such integrated digital solutions.

5.4.4.2 Interoperability and Compatibility

This study found that integrated digital solutions would not perform their role and enable the companies to obtain the desired outcomes without interoperability and compatibility. If a company has non-integrated digital technologies due to a lack of interoperability and compatibility, this will affect the unification of digital processes and information flow across the different digital technologies and increase daily tasks and number of employees. Moreover, it will hinder digital governance practices and information sharing protocols, which, in turn, eliminates the need to manage digital partnerships and knowledge sharing. Considering that, the water companies' digital systems emerge as a way of leveraging integrated digital systems to improve, for example, the KPI of water networks by deploying sensor networks through IoT technology, such as SCADA systems, or distributed control systems in both companies and integrating data silos within and across the organisations involved in the process. By analysing the data, these companies detect water leakages in the water networks. This also enables the companies to identify geographical locations of the leaks, identify affected network segments, calculate the number of consumers affected, and identify the closest available field staff members to quickly resolve the issue. Thus, it improves the efficiency of water networks and reduces water losses, energy consumption and operating costs, while increasing the predictive ability of demand management. To gain these benefits, digital technologies require interoperability solutions to be well integrated.

Another example from NWC is its digital water meters that use a fixed communication network with the OMS, and transmit data between digital meters at the consumer site (in any city in Saudi Arabia) and the data centre in the headquarters in Riyadh. The wireless network enables the company to remotely access the meter, request information and control it. The digital metering system allows consumers to track their usage on a daily, monthly or yearly basis through eBranch or customer app. To operate efficiently, digital meters must be interoperable and developed properly with other existing digital systems.

Last, the wide application of integrated digital solutions in the value chain of water companies is restricted by the interoperability and compatibility between different digital systems, which, in turn, may hinder sharing of data and information across the systems and people involved (Howell, Beach & Rezgui 2021; Howell, Rezgui & Beach 2017). Such issues can be addressed by digital partnerships management that can develop communication and information sharing protocols and strive to standardise systems and specifications with partners, ensuring the interoperability and compatibility between different systems and achieving the companies' digital strategic visions and objectives.

5.4.4.3 Digital Centralisation (Resources and Services)

Although the two companies are part of the same water industry in Saudi Arabia, the differences in administrative heritage have had a strong impact on change processes to digital services delivery. A heritage of strong local government water directorates (and, after privatisation, NWC's branches) and more traditional fragmented service processes inhibited NWC's first attempts at nationwide digital services. Over time and with effective central resources management, NWC gradually transferred control from local branches to central management, which enabled the successful implementation of centralised digital services at the country level. This increased control over the company's internal organisational design changed the concentration from external embeddedness to an internal one, thus enhancing NWC's organising capability. NWC's overall decision-making processes have become increasingly centralised, whereby customer interaction shifted to a higher management level, including customer care's top management in key digital-related decisions.

For Marafiq, the transition to centralised digital services was easier than for NWC, as Marafiq was already organised on a commercial basis. Rarely mentioned by the two companies' interviewees, but perhaps important to the digital business strategy implementation processes, is the size and resources of the companies. NWC, a very large company owned by the government, has more resources slack, allowing the scale and scope of digital business strategy to be experimented and innovated, compared with Marafiq. The importance of centralised digital services for developing unique customer services can be seen in both companies, but Marafiq, being a private company, is restricted to its limited resources. Literature shows that more complex integrated solutions require increased central coordination (Davies, Brady & Hobday 2006); this study found the same regarding the digital centralisation of services and resources. Digital challenges discussed early in this chapter, refer to the need for unified digital platforms, unified information flows, consistent data quality and cybersecurity. Moreover, the lack of people with high-level digital skills and knowledge (e.g. data scientists, Web designers and app developers) means that these resources and services must be concentrated centrally and operated by the company-wide units, and this is consistent with the IPV perspective.

In Marafiq, the customer app has supported its digital services across local branches, allowing the central management to support them and control customer relationships. In contrast, NWC implemented comprehensive projects to centralise digital resources and services, introduce digital competences, and unify digital processes that had been spread across various city silos before privatisation. NWC did this by establishing Hayat system as a package comprising the Oracle Utilities Customer Care and Billing (CC&B) application along with multiple digital integrations (more than 20 digital systems supporting over 150 digital processes), in addition to a main data centre and a disaster recovery centre in Riyadh. High availability of such digital systems is vital to daily digital processes, but maintaining reliable digital systems is even more crucial for NWC because they support the water sector's core systems.

In addition, NWC has the iSupplier platform to deal digitally with its digital partners, suppliers and contractors (NWC 2021b). The company also provides the NWC forum and digital-enabled knowledge-sharing platforms, which help generate innovative ideas from knowledge sharing between employees and other stakeholders (NWC 2021b). The comprehensive vision of digital centralisation is a key lever for business improvement in NWC, and thus, the company won the national Global Water Intelligence's Water Agency of the Year award for 2020 (GWI 2020).

At Marafiq, the digital services and the unified data centre (data bank) were established on its SAP cloud services. Central digital customer services were of a smaller scale and mainly included assigning front-end tasks to local branches and back-end tasks to a central unit. This was true for NWC, but it experienced difficulties in country-wide orchestration of its central digital services in remote sub-branches, mainly because of the lack of digital integration due to hard-to-reach geographic locations. In summary, the findings show that central digital services and resources are intertwined and in practice interdependent, and this is consistent with the findings of Sklyar et al. (2019). In both companies, the digital centralisation of resources and services was entangled with the organisational design and was orchestrated by integrated digital solutions.

5.5 Discussion of Key Findings

The findings of the study provide two examples of policies and practices involved in an attempt to achieve digital strategic alignment. The findings indicate that the digital business strategy is seen as an important means of improving the water companies' performance, but it needs to be aligned with other organisational design factors. In addition, governmental, political and regulatory mandates, competition, and stakeholders' interests are acting as motivating drivers that lead the alignment efforts. Given this, there is now a growing awareness, more than ever, of the need for water companies to actively seek better approaches, better structures, better processes, and new integrated digital solutions and practices for achieving digital strategic alignment. However, there are some misalignments between the motivating drivers, digital business strategies, traditional organisational design factors, and idiosyncrasies of the water companies. From evaluating the findings of the cases, seven key observations can be extracted. Table 5.4 provides a summary of the results and implications (recommendations) that were drawn from the case companies' analysis.

Table 5.4: Summary of key findings and implications

Key issues	IPV Galbraith (1974)	KBV Grant (1996a, 1996b, 2018)	The Star model of organisational design Galbraith (2011); Kates and Galbraith (2007)	Key findings	Implications/Recommendations for digital strategic alignment
Strategy	Deliberate strategy An organisation should be planned and designed simultaneously with strategy planning and resource allocations	Dynamic and emergent strategy Strategy formulation and implementation are inseparable	Deliberate strategy	Digital business strategy needs to be seen as a deliberately emergent strategy, allowing the simultaneous incremental−comprehensive development to be used.	Digital business strategy formulation and implementation should be set as a simultaneous incremental−comprehensive development approach. This allows companies to capture new opportunities and innovate comprehensive digital solutions for emerging business issues while simultaneously developing organisational design factors.
Structure	Hierarchical structures	Dynamic (designed and emergent) structures Structure follows strategy	Hierarchical structures Strategy drives structures	Agile-based structures	Companies should adopt agile (flatter) structures to create a shared value for all stakeholders, benefiting from integrated digital solutions and a network of cross-functional teams.
Processes	Should increase IPC and reduce IPR	Should create, transfer, and integrate knowledge internally and externally by reflective decision-making processes	Should move information vertically and laterally, including external processes	Unified digital processes.	Companies should create, optimise and unify their digital processes to increase IPC and reduce IPR, and enable the unified digital flow of information within–in out–out in the companies.

Key issues	IPV Galbraith (1974)	KBV Grant (1996a, 1996b, 2018)	The Star model of organisational design Galbraith (2011); Kates and Galbraith (2007)	Key findings	Implications/Recommendations for digital strategic alignment
People	The focus is on grouping people with specialised skills in specific units to serve the whole organisation.	The focus is on integrating the common and specialised knowledge of people to create and share knowledge	The focus is on HR policies such as employment, selection, rotation and training	People need to constantly renew digital skills and knowledge.	Companies should focus on renewing their employees' digital skills and knowledge through continuous training implemented by change management and knowledge integration processes, to retain core competent staff within a company and its industry.
New key factors in organisational design					
Digital governance	N/A	Structural governance	Structural governance	Digital governance needs to be a key factor in digital organisational design.	Companies should develop a digital governance policy regarding all digital organisational design factors, including external digital and business partnerships, and information access and use.
Integrated digital solutions	N/A	N/A	N/A	Integrated digital solutions must be a key factor in digital organisational design.	Companies should design integrated digital solutions that link the entire organisational design within the company and externally with others (i.e. external digital resources). It should be implemented by cross-functional teams to encourage knowledge sharing, problem-solving and co-innovation.

Key issues	**IPV** **Galbraith (1974)**	**KBV** **Grant (1996a, 1996b, 2018)**	**The Star model of organisational design** **Galbraith (2011); Kates and Galbraith (2007)**	**Key findings**	**Implications/Recommendations for digital strategic alignment**
Sustainable business performance	Cost reduction and efficient use of resources (economic perspective)	Developing competencies and capabilities through knowledge integration improves sustainable business performance	The alignment between organisational design factors encourages employees to improve their performance, often measured by KPIs. This can be reflected in the economic performance.	Sustainable business performance is directly influenced by six factors: digital skills and knowledge, unified digital processes, unified digital flows of information, integrated digital solutions, digital centralisation, and interoperability and compatibility. The other 14 factors influence indirectly the sustainable business performance.	Companies should use the DSAM as a clear approach that involves 20 CSFs that work together to enhance economic, social and environmental performance.

The insights gained from the organisational design analysis and the empirical data suggest that the introduction of a digital business strategy is viewed not only as a value-added organisational element for a firm, but also as a comprehensive organisational tool that translates the firm's vision and objectives throughout the organisational design. Essentially, digital business strategy is not just a matter of implementing integrated digital solutions, but, crucially, it is the continuous development of the digital solutions that will eventually become an active part of the organisational design and will involve central shifts in processes, structures, people, systems and capabilities. As a result, there is a need for a simultaneous incremental−comprehensive development approach to align digital business strategy, integrated digital solutions and other factors of organisational design, seeking to create the ongoing digital strategic alignment that enhances sustainable business performance.

However, this approach needs periodic updating as it aims to ensure good performance of implementation that is typically measured by KPIs. The organisational process, which includes significant changes in the business digital infrastructures, assets and resources, requires huge investments that the companies cannot afford at once. Therefore, these companies, on the basis of their nature and available resources, gradually introduce new integrated digital solutions, make changes to their digital infrastructure, processes and structures, and cumulatively develop their people's skills. Thus, they redesign their digital architectures and organisational design incrementally and simultaneously, which ultimately enhances the digital strategic alignment.

The process of introducing integrated digital solutions into water companies is a process of organisational reformation in which different actors seek to persuade others to accept their views of the ways that particular digital solutions should be used to resolve identified problems. In this case, the process is one of the prominent social interactions involved in shaping the organisation. Thus, the development effort is contingent on knowledge integration in which different people with different opinions mutually share their knowledge through persuasion and negotiations. The greater the level of mutual knowledge, the better the quality of decisions made in an organisation. Building on the knowledge gained over time, the organisations create an ongoing digital strategic alignment process that is exemplified by the issues of organisational change, wherein the top management support can inhibit or enhance the integration of digital technologies, processes, people and functions to enhance sustainable business performance.

To understand the development of integrated digital solutions, people should focus on the ideas, tools and techniques contained within a digital technology, not the implementation of the digital technology itself. Just as the people in the companies bring their own ideas, roles and responsibilities, so does the selected digital technology. It is unrealistic for people to choose and align all their interests with new digital technologies or processes because they may not have an immediate impact on their performance, but rather a gradual influence over time, especially when integrated with other technologies internally or externally. Rahrovani (2020) argues that alignment is an ongoing dynamic process based on the idea 'that alignment is a moving target' (Coltman et al. 2015, p. 94). Therefore, digital strategic alignment that mobilises a combination of organisational design factors is important for creating sufficient momentum to reduce resistance.

Digital strategic alignment requires a well-detailed explanation of why it is necessary to introduce new digital technologies, which, in turn, will change work practices and provide expected solutions. Thus, every one of the company's stakeholders needs to understand what occurs and why, otherwise they may see the change as a risk to their interests and practices. In this study, therefore, change management is a recommended factor in involving all employees in the company's digital strategy development as part of the change process, and making digitalisation everyone's job.

The two companies clearly show that integrated digital solutions embody various ideas that may not be accepted by all the end-users they were designed for. These ideas are recorded in the process and form the basis on which the digital business strategy defines the requirements for the entire organisational design. The digital strategic alignment process involves obtaining critical feedback, often derived from quality management reports using KPIs, based on experiences from stakeholders, where the feedback is translated into digital and organisational improvements by using cross-functional teams. During the process, the listed functions of a digital change based on the influences of the stakeholders and their own interests, once aligned, the use of integrated digital systems and associated digital platforms and apps may also provide different outcomes from the initial ideas. This situation is well documented in NWC, where a large number of gradual ideas have developed its Hayat system incrementally.

The digital strategic alignment process may also address some uncertainties or threats. If the end-users of the digital platforms face technical issues, a lack of digital skills, or even perceive the potential of loss of power or the choices of the digital solutions to be unclear for developing their current work practices, they will resist the change and may pursue alternative digital choices. In Marafiq, for instance, attempts to introduce a customer service mobile app with the same main digital partner, aimed at unifying the interface, did not gain the full agreement and support of the end-users, and thus, Marafiq contracted with a different digital partner to provide the service. Moreover, the digital business strategy-enabled water companies are operated by distinct professionals who are tasked with new roles and responsibilities within the integrated digital systems. The appropriate integrated digital solutions behave as unlimited innovations and are able to link the diverse knowledge and objectives, which in turn forms a comprehensive whole. The better the integrated digital solutions can connect organisational design factors internally and externally, the greater the chance is of its acceptance and utilisation by the end-users.

This leads to the importance of change management to renew employees' digital skills and knowledge through continuous training. Employees adhere to specific practices for reasons best known to them. To change these practices, the companies need to perform a critical evaluation of alternative solutions benefiting from available digital technologies. This study provides insights into the formation of digital business strategy in water companies by arguing that digital business strategy is as much related to the integrated digital solutions as to the organisational change in existing structures, processes and people practices. Therefore, having change management in place before and during the launch of digital solutions is critical.

This recommendation is for the water companies willing to develop a digital business strategy and implement integrated and innovative digital solutions and align them with people's interests and practices. For example, NWC elected to hire a team of change consultants to lead the change process, but ultimately formed an 'in-house' cross-functional team to sustain the initial success. The cross-functional team was the one that ultimately ensured that the entire organisational design became more aligned with the integrated digital solutions and the digital processes they required. As the two companies demonstrated, it was neither easy nor technically simple to enlist top management to support the entire implementation process.

Another key finding is the importance of agile structures to create shared value for all stakeholders by facilitating digital communication channels between all organisational levels, regardless of hierarchical positions, in addition to the importance of constantly redetermining tasks and redistributing people based on new digital information interdependencies emerging from digital solutions. Both are crucial to create alignment among new tasks, people' capabilities and digital solutions, which opens up new potential for increasing efficiency and leveraging new digital resources to achieve a firm's shared digital strategic vision and objectives. This also supports the argument as to whether tasks redetermination and people redistribution alone can lead to digital strategic alignment without unified digital processes and information flow to support the digital business strategy implementation efforts.

Unified digital processes in organisational design are vital. These processes can help the companies to continuously monitor projects implementation, diagnose problems, pre-emptively prioritise and manage maintenance issues, and remotely control and optimise all aspects of the operation using unified information-driven insights. This, in turn, contributes to solving technical issues immediately, helping the firms overcome employees' resistance to change, and motivating employees to produce desirable performance, and thus results in high-quality outcomes and reduction in coordination costs among departments, employees and cross-functional teams (Kretschmer & Khashabi 2020; Leifer & Mills 1996).

Using the IPV, Premkumar, Ramamurthy and Saunders (2005) suggest access to IPC through IT support. Melville and Ramirez (2008) indicate that IPC can be improved through IT investments. Cegielski et al. (2012, p. 189) define IPC as the firm's capability 'to utilise and structure information in a meaningful fashion that supports decision-making' and cloud-based infrastructure as a tool for organisational IPC. Li, Dai and Cui (2020) identify cloud computing, IoT and big data as the firm's IPC, and a digital supply chain platform as an information exchange channel to access external information. This study defines integrated digital solutions with a more comprehensive concept that includes all integrated digital technologies in a firm.

Today, most new digital technologies have the potential to be integrated with other digital technologies, which can provide many digital solutions. Accordingly, this study identifies integrated digital solutions as the firm's IPC, and digital platforms and apps that are an integral part of integrated digital solutions as unified information exchange channels (internally and externally). The finding supports IPV by confirming that the IPC, which increases the quality of information, contributes to enhancing sustainable business performance. The effect of economic, social and environmental drivers implies that water companies should access sufficient information internally and externally to enhance their IPC and reduce their IPR. The effect of alignment between IPC and IPR is therefore demonstrated in this study. Thus, the result is also consistent with the IPV perspective, suggesting that IPV is a useful theory for characterising the impact of integrated digital solutions on organisational design and sustainable business performance.

However, there is clearly a dearth of studies that focus on evaluating the digital strategic alignment between integrated digital solutions and its surrounding organisational factors in the context of water companies. The analysis of the case studies shows that what may work for a public water company, may not work for a private water company. By following the digital strategic alignment process within a context, insights can be obtained through the dynamic negotiation, where and when barriers arise, and how the organisational design factors develop through them, ultimately reshaping the organisational design.

Even with a large amount of research in the development of digital technologies within water contexts, these technologies have had less attention when it comes to their continual alignment process with other organisational components that in turn lead to improved sustainable business performance. As noted by Li, Dai and Cui (2020), the previous research has drawn inconsistent results about the impact of integrated digital solutions on sustainable business performance. In the water industry, however, this study confirms that the adoption of integrated digital solutions influences the organisational design and sustainable business performance. This can be seen in the positive results of the integrated digital solutions on sustainable business performance in both companies, which are also positively reflected in the results of the targets of the Saudi Vision 2030 and NTP, aimed at the gradual deployment of integrated digital solutions and the associated development of water practices.

This suggests that the development of integrated digital solutions and attempts make them appropriate for water practices and can be viewed as part of an ongoing digital strategic alignment process. The application of the alignment in the water companies makes clear two issues: first, the process of introducing integrated digital solutions into water practices will always be subject to compromises and negotiations; second, digital platforms will be developed within water contexts, exactly in accordance with stakeholders' interests. Simply put, end-users determine the path of integrated digital technologies, and it is not that integrated digital technologies determine the path of usage. These results, therefore, have some key implications to the organisational design factors.

5.6 Implications of Key Findings for Organisational Design, IPV and KBV Theories

The traditional organisational design factors are promoted as having the potential to improve performance as they are aligned and interacting harmoniously with one another (Kates & Galbraith 2007), which may be correct. Nevertheless, with the introduction of digital business strategy, rather than traditional business strategy, into organisational design, the alignment is different. Digital business strategy is not only about new trends in digital technologies. To realise what the digital technologies are designed to achieve, companies need to bridge the gap between the organisational design intents and the digital business strategy development process. The continuous development process, at least within water contexts, has been demonstrated to include disruptive changes (possibly painful for some actors) to the status quo, and compromises and negotiations regarding organisational design factors involving structures, processes, people and technology. Therefore, the extent of change to the digital business strategy-enabled water companies and the outcomes of the continuous development processes cannot only be hinged on the existing factors embedded in the original organisational design, but rather on the negotiated outcome of the new digital organisational design, which was explained in the DSAM.

The implications of the findings for the organisational design, IPV and KBV theories are discussed under four emerging issues: planned and emergent nature of digital business strategy in water contexts, misalignment between existing organisational design factors and realities of digital business strategy development, divergent perspectives between digital business strategy and the idiosyncrasies of the water companies' practices (public and private), and external influences and digital strategic alignment process.

5.6.1 Deliberate and Emergent Nature of Digital Business Strategy in Water Contexts

This study locates digital business strategy analysis of organisational design in two water organisation contexts, specifically across a public water organisation (NWC) and a private water organisation (Marafiq), as analysed in Chapter 4. This indicates some important principles for the study of digital strategic alignment in water contexts: first, the social context in which digital business strategy is used and, second, the planned and emergent nature of digital business strategy. Thus, the issue is intended to consider the specific ways in which digital business strategy is incorporated into organisational design and applied in different work practices.

First, the organisational consequences of the digital business strategy rollout are not unidirectional in their manifestation. This shows that digital business strategy in water contexts is a mutually constitutive strategy and highlights the irrational nature of digital business strategy as it is subject to socially constructed motivating and rational forces that operate within and across various institutional fields. The water contexts in which the digital business strategies are used, and the boundaries of social constituents, vary from one company to another. Recognising the contextual differences in the development of digital business strategy and the expectations from these contexts is essential. This can be attributed to, for example, the introduction of new digital solutions in a particular context that can lead to different responses and actions and may require appropriate digital business strategy aligned to that context. Thus, the digital business strategy marks the starting point of the digital organisational design, which is influenced by the integrated digital solutions and the social dynamics.

There is a reiterative relationship between the digital business strategy and the integrated digital solutions selection in both companies, which is fundamentally different to the well-structured digital business strategy proposed in the literature (e.g. Bharadwaj et al. 2013; Chanias, Myers & Hess 2019; Holgeid et al. 2019; Holotiuk & Beimborn 2017; Park & Mithas 2020; Sia, Soh & Weill 2016; Stoffels & Ziemer 2017; Ukko et al. 2019; Yeow, Soh & Hansen 2018). The literature on digital business strategies appears to focus on standard and systematic strategies that can be adopted across different contexts. However, practically in water contexts, social interaction and stakeholder interests change digital business strategies, integrated digital solutions, and other components of organisational design. This is consistent with Pollock and Williams (2010), who argue that technology acquisition can be attributed to rational determinism or social relativism across different scientific disciplines. The study, however, has demonstrated that neither (digital) technological imperative nor social imperative adequately capture the entire digital transformation process. Indeed, digital business strategies and associated digital technologies are reshaped based on the interaction between stakeholder interests and potential and maturity of digital technologies in the water contexts in which they are used.

Second, aside from the dynamic, subjectively grounded approaches to digital business strategy development, the actions taken by the two companies reveal a picture of the deliberate and emergent nature of digital business strategy. The question of how digital strategic alignment occurs within an organisation requires us to understand the series of actions that organisations undertake—whether planned or emergent (Galliers 2011; Marabelli & Galliers 2017). This is especially important for an organisation to align the digital business strategy with its context, and to be able to understand what organisational changes are required and how they can be planned and implemented as part of its strategic approach.

Hamel and Prahalad (1985) argue that many organisations start with an ambitious vision and strategic intent. Their strategic objectives are also developed while ensuring enhanced resources and capabilities. In this process, the organisations depend on the creativity of their employees to achieve their strategic objectives. Accordingly, unplanned strategies may emerge because of the exploitation of knowledge created (Grant 2016). Strategy, under the KBV approach, is not seen as a top-down process in which strategy formulation and implementation are separate, as is the case with the IPV approach, but one in which strategy can be continually developed with the emergence of new good ideas or technologies. At this point, it can be seen that the IPV and KBV theories seek to create strategy and improve performance in two different ways: IPV focuses on (deliberate) rational planning (Galbraith 1974), while KBV invests in the creation and exploitation of knowledge that arises anywhere in the organisation and putting it into practice, which refers to what is known as emergent strategy (Grant 1996b, 2016).

Moreover, in the strategy formulation process, Carlisle (2002) states that there are three key limitations to the IPV of strategy: first, an excessive reliance on the IPV analytical framework to understand and explain strategic decision-making processes; second, an incomplete view of human nature that involves effective human relationships; and third, a neglect of internal processes (dynamics) of change and their impact on an organisation. Thus, the IPV of the strategy formulation process neglects other organisational factors on which the success of digital information processing depends.

In this regard, the findings of this study indicate that formulation and implementation efforts of a digital business strategy is an integrated evolutionary process that manifests from social interactions between stakeholders (e.g. top management team, employees, digital partners and consultants), the disposition of these stakeholders, and the context in which they operate in. Within the two companies and their respective organisational contexts, actors have different roles and are accountable for delivering the work and achieving their own interests; thus, coordination, responsibilities and control are negotiated in the wider context with unique, measured objectives and goals. Therefore, the agreement between actors becomes a variable within the development process of the dynamic digital business strategy, rather than a pre-planned arrangement.

NWC, for example, adopted a simultaneous incremental−comprehensive development approach, which consists of three paths: two-quarters planning, four-quarters planning, and five-years planning. Each path should result in an implementation plan involving approved digital and business projects, and associated organisational change processes, which together are linked to other upcoming developments. Marafiq, on the other hand, signed, with a main digital partner (vendor), a flexible licensed agreement aiming to incrementally introduce SAP's new integrated digital solutions, such as cloud computing and CRM, covering training and technical support. The finding of this study is consistent with Yeow, Soh and Hansen (2018) in that both planned and emergent alignment actions are required to pursue pre-planned changes while addressing emerging and unpredictable issues during the process of the alignment (Karpovsky & Galliers 2015; Marabelli & Galliers 2017). The current study adds to the view that digital business strategy should not only be treated as a planned and emergent strategy (Yeow, Soh & Hansen 2018), but also needs to adopt simultaneous incremental−comprehensive development as a strategic approach that considers and aligns digital and organisational changes, such as structures, processes, people, digital resources and infrastructures, in parallel. This result provides a novel knowledge contribution, and elaborates the organisational design theory and extends its scope as to how it relates to water contexts.

The idea that digital business strategy evolves and continues to effect change in the water companies is almost incontestable. The speed and variety of digital innovation are faster and greater than ever; new digital technologies emerge frequently and their influences on the water companies are not always predictable. Therefore, digital strategic alignment is necessary to leverage digital technologies in enhancing the companies' sustainable business performance. However, the speed, dynamics, stakeholders' interests, and direction of change remain contested areas. Accordingly, this study adds to the deliberate and emergent nature of digital business strategy by revealing that professional and digital knowledge-based people are in a constant loop of learning to realign with the constantly emerging digital solutions and the concomitant digital processes associated with digital business strategy development. Thus, the significance of the result lies in understanding the relationships between the people, tasks, rules, responsibilities and regimes, thereby shaping the digital organisational design in such contexts.

5.6.2 Misalignment between Existing Organisational Design and Realities of Digital Business Strategy

Digital business strategy has been intensely debated by strategy scholars. However, the literature has rarely put forward specific approaches to aligning digital business strategy with organisational design. This can be attributed to the fact that standardised approaches to the deliberate and emergent nature of digital business strategy (Yeow, Soh & Hansen 2018) may not be suitable for various industries. The water industry is conservative in nature, and water companies are under intense pressure to provide clean, sustainable water services around the clock, ensuring business continuity without negatively affecting the water-related necessities of all stakeholders. Such approaches are consensual in nature and need multilateral compromises and negotiations. If the agreement is disrupted, the alignment process may change significantly, and may not reflect the aims of any approach.

The issue that emerges from this study is that neither of the two companies followed an existing approach to achieve digital strategic alignment. In both cases, digital business strategies were introduced on individual bases and in collaboration with external consultants. The case companies settled and continue to develop their digital business strategy in the way it was introduced, provided it aligns with their business contexts, supports their organisational needs, and contributes to their particular professional niche.

The organisational design factors were never cast in stone in both cases. They were developed and amended by considering alignment.

However, this can produce misalignment among multiple organisational design factors and thwart the required alignment efforts. The organisation design represents a black box, which requires unravelling by examining the interrelated relationships of each factor through empirical investigation and validation. At the implementation stage, the organisation design process will encounter the collective absence of many people, who were not initially involved in the formulation process to be able to amend the digital organisational options to align their interests at this phase. If the organisational design requires the development of new factors to reorganise their processes, structures or people, then the alignment process inscribed in the organisational design will be dramatically affected. Therefore, the direction of developing an aligned organisational design should be oriented towards motivating water companies to use a clear and easy-to-follow model for achieving the digital strategic alignment, which this study aims to develop.

5.6.3 Divergent Perspectives on Aligned Digital Organisational Design and the Idiosyncrasies of the Water Companies' Practices (Public and Private)

One of the key digital factors found in this study as a result of the introduced digital business strategy within the two companies is the integrated digital solutions and the associated digital platforms, which are integrated and connected in a seamless web within and across the companies at multiple organisational levels. The case water companies use collaborative digital platforms as enablers to work with external partners in a collaborative manner.

Marafiq, for example, has a joint digital platform with its external business partners. This platform is connected digitally to its internal integrated digital systems and enables the company to share information with those partners in real time. In the Marafiq water treatment plants, the integrated digital systems and sensors capture and analyse data and detect carbon emissions and air pollution that exceed permissible limits, and then send alerts digitally to the operation staff in the field. This helps detect problems and take actions at the right time, ensuring the continuous operation of the treatment plants. The means that factories (industrial partners) will continue to produce, because the result of a stoppage in industrial sewage treatment plants is the complete stoppage of the factories' production. This leads to operational losses for factories, and reduced revenue for Marafiq (a private company depending on profits to survive), due to operational losses in its water treatment plants. This joint digital platform makes the unified digital flow of information between different parties easier, faster and secure, which in turn improves productivity, protects the environment from air pollution, and reduces operating costs and time.

Deep collaboration, thus, is the cornerstone of inter-organisational interactions in water businesses. For ensuring that digital work is done, efficient collaborative efforts that enhance the digital business practices must be realised. The essence of the integrated digital solutions is the coordination of organisational design to perform corporate tasks, which cannot be implemented efficiently and effectively by reliance on individual knowledge contributions. The reliance on various digital skills and knowledge and the effectiveness of the existing integrated digital solutions and processes collectively are responsible for tasks being performed, and therefore, the companies benefit from shared digital units and cross-functional teams' effort in the orchestration process.

Currently, there are no policy protocols or standards for guiding the use of integrated digital solutions across multiple digital partners in the water sector. As discussed in Chapter 2, Hauser and Roedler (2015) state that in the water industry, digital technologies, which consist of different components from different vendors, need to have a standardised interoperability reference. Interoperability is often related to standards (or standardisation) as these contain information, processes and guidelines, which determine and organise a smooth data flow within multiple systems and, in turn, can protect data (Hauser & Roedler 2015). The water companies look to multiple digital partners with different options as standardised information allows more partners to provide their products, thus reducing the threat of partner lock-in.

However, similar perspectives exist among competing digital partners in terms of unwillingness to produce products that allow interoperability and compatibility, which might negatively influence their market share or even cause business bankruptcy. The current situation has consequences not only for the different stakeholders, but also for the basic issue (digital integration) the water industry intends to address. The incompatibility of the inscribed uses of the integrated digital solutions and the digital strategic visions of the water companies means that the digital platforms cannot be incorporated into practice without risking unplanned or unpredicted outcomes. Therefore, the current situation requires effective digital partnerships management and a policy mandate to address this issue and look beyond the competition and vendors' commercial interests by transforming the water sector into an efficient digital business ecosystem.

5.6.4 External Influences (Regulatory Gaps) and Digital Strategic Alignment Process

The Saudi Vision 2030, which focuses on digitalisation in all sectors, has quickly become the newest direction among practitioners and academics in different industries. This effectively will increase the level of digitalisation criteria for the government and private sectors and will favour those digital business strategy-enabled water companies. The NTP concentrates on supporting water practices by enabling water companies to digitalise and streamline processes and share information and digital resources, with an emphasis on improving water performance and eliminating environmental waste through collaboration. The challenge associated with achieving the Saudi Vision and the NTP is how to do, not what to do.

The study finds that 'the what and the why' of digital business strategy have been broadly discussed, and there are many studies that describe how digital business strategy would address water-related problems (e.g. Stoffels & Ziemer 2017), but the key concern stakeholders have is with how to formulate and implement the digital business strategy in water contexts and align it with organisational design. While the NTP and NWS clearly set clear targets for the digitalisation of the water sector (discussed earlier in this chapter), there is still no clear roadmap to achieving this and overcoming some of the organisational issues associated with, for example, digital skills, knowledge gaps, digital processes, and digital resources and information sharing, which are crucial to answer the 'how' question related to effective digital business strategy development. The greater the clarity of tasks and objectives, the greater the ability of employees to perform the tasks and achieve the objectives with a high level of efficiency (Pandey & Rainey 2006). Thus, the digital strategic alignment of the concomitant organisational change processes related to the digital business strategy has largely been relegated in this regard.

This study acknowledges that water digital solutions often do not exist in isolation and supports the concept of sharing digital resources with other stakeholders (Bharadwaj et al. 2013), whether they are the government, digital partners or even competitors, to capture new value in the business ecosystem. Therefore, collaborative efforts are required from stakeholders who can influence the alignment process. The stakeholder levels may also involve a complex coordination between digital vendors, systems and app developers, the mobile OS (e.g. Windows, Apple and Android), hardware and software manufacturers, and telecom companies, as well as social networks such as Twitter and YouTube, and public and research institutions. Negotiations of objectives and business requirements across these players need a collaborative effort (managed by digital partnerships management) in order to share visions on a whole range of issues, which may include:

- development of integrated digital resources
- development of standardised and efficient digital processes with high-speed information processing
- development of digital procurement arrangements
- development of knowledge integration processes and training strategies, and establishment of co-innovation centres consisting of multiple parties
- development of information sharing protocols and processes that align with the various end-users' needs, for the stakeholders to follow.

Another area that needs to be considered relates to support policies for the private water companies, such as Marafiq. The exploratory study reveals how the private companies particularly struggle with the digital business strategy implementation process. The large companies, such as NWC, have more slack resources, which in particular allow them to innovate and invest in their people. Moving forward, the private companies, which suffer from a lack of slack resources, may be affected in terms of the pace of digitalisation. Unclear goals, and financial shortfalls, which are consequences of inefficiencies, uncertainties and complexities of the process, are the forces of policy implementation failure (Bardach 1977). Without support for the private water companies, the digitalisation efforts can only present ambitions that have nothing to do with the ability of the companies expected to implement them.

While the government attempts to advance digitalisation by 2030, there may be only partial benefits if only a large water company can afford to implement it. Successfully implementing technology requires reducing barriers to users' growth (Markus 2004).

Therefore, support policies, especially for the private water companies, are very important for digital projects implementation across the water sector. The MEWA, as a water regulator, needs to develop and implement a compliant template that can measure end-users' feedback, attitudes and behaviours regarding the public and private water companies' digital services and activities, and their sustainable business performance in light of the support policy, so these companies can adapt the template to link organisational, strategic and digital objectives with their outcomes through KPIs.

Finally, with the regulatory pressures, the increased use of integrated digital solutions, and the availability of data, water companies need to be faster and more agile, and develop better organisational practices to use these data. This can speed up the digital transformation that may differentiate one company from another in the sector. By transforming to integrated digital infrastructures (i.e. integrated public cloud, private cloud, and other in-house digital technologies), water companies will be able to share and integrate their digital resources with external partners (e.g. government agencies and digital partners) and consequently operate more efficiently in their ecosystem. With the generation of large data, both structured and unstructured (derived from IoT, cloud computing, machine generation and social media), water companies can be transformed into data-driven organisations to make informed decisions that create sustainable business performance. For this to happen, water companies must make a concerted collaborative effort internally to align organisational factors with one another, and externally to align with digital partners' and relevant government agencies' digital strategies and practices and with the Saudi Vision and its overarching executive NTP. A lack of this alignment could have a negative impact on the objectives and initiatives outlined by the government, and thus, shared digital strategic visions and objectives and constant review will be essential.

5.7 Research Evaluation and Validation

This section aims to validate the findings of the research by evaluating the trustworthiness with academics and water industry experts. In Section 3.6.5, the research trustworthiness approach was briefly discussed. In this section, the purpose, objectives and processes used to validate the research outcomes are discussed in detail. The focus groups' evaluation results are also presented in this section.

5.7.1 Evaluating the Trustworthiness of the Research Results

As this study generally uses a qualitative research approach, it is more appropriate to evaluate the study's quality and findings by qualitative (interpretive) tools. The trustworthiness of qualitative investigations is typically judged by their credibility, dependability, confirmability and transferability (Lincoln & Guba 1985). The criteria are similar to the validity, reliability and objectivity that are used in quantitative research approaches. Table 5.5 summarises the evaluative roles of the criteria for both quantitative and qualitative research evaluation.

Table 5.5: Criteria for evaluating rigour/trustworthiness in quantitative and qualitative research

Criteria	**Rigour (Quantitative research)**	**Trustworthiness (Qualitative research)**
Truthfulness	Internal validity	Credibility
Consistency	Reliability	Dependability
Neutrality	Objectivity	Confirmability
Applicability	External validity/Generalisability	Transferability

Sources: Guba (1981); Lincoln (1995); Lincoln & Guba (2016).

Lincoln and Guba (1985, 2016) state that researchers should be able to address the following questions, which relate to each criterion, to establish the trustworthiness of qualitative, interpretive research. These are:

- *Credibility*: How can the researcher demonstrate confidence in the truth of the research findings for the subjects or respondents in the context in which the research was conducted?
- *Dependability*: How can the researcher determine whether the research findings would be replicated if the research were repeated with the similar (or same) subjects or respondents in the similar (or same) context?
- *Confirmability*: How can the researcher determine the degree to which the research findings emerge from the characteristics of the subjects or respondents and the conditions and context of the research, and not from the interests, motivations, biases and perspectives of the researcher?

- *Transferability*: How can the researcher show the extent to which the research findings may have applicability in another context or with other subjects or respondents?

During the research process, the criteria for establishing the research quality were carefully considered. Table 5.6 shows how each criterion was met throughout the research process.

Table 5.6: Achieving the trustworthiness of the findings of the research

Trustworthiness criteria	**How each criterion was met**
Credibility	Multiple data sources (primary and secondary)—detailed literature review, company documents, interviews and focus groups.
	31 online interviews with experts (executives and managers) in the water and digital fields representing four NWC branches and two Marafiq branches in six different cities.
	Two case studies (large water companies) representing context-specific digital business strategy analysis.
	An academic publication in a peer-reviewed journal for scientific validation.
	Evaluation of the CSFs with the water sector experts through online focus group sessions.
Dependability	Multiple methods led to complementary findings.
	The entire process of the research was documented (the collection, analysis and interpretation of data).
	A review of the literature covering a wide range of time.
	Analysis of findings with two exemplar digital business strategy-enabled water companies.
	Cross-case analysis of two case studies (cross-validation).
	A first-order analysis (using mind maps) of the interview transcripts was provided for the focus group members so that the plausibility of the initial factors could be judged, and the possibility of improvement could be discussed.
	A detailed second-order analysis (thick descriptions) of the themes and contexts was presented so that others could judge the plausibility of the results and the applicability to another context.
Confirmability	Multiple primary and secondary data sources.
	Cross-case analysis of two case studies (cross-validation).
	A first-order analysis (using mind maps) of the interview transcripts was provided for the focus group members so that the

Trustworthiness criteria	How each criterion was met
	plausibility of the initial factors could be judged and the possibility of improvement could be discussed.
	A detailed second-order analysis (thick descriptions) of the themes and contexts was presented so that others could judge the plausibility of the results and the applicability to another context.
	Rigorous scrutiny by academics through a peer-reviewed journal.
	Evaluation of the CSFs with water industry experts through focus group sessions.
Transferability	Theoretical sampling/analytical generalisation of specific contexts.
	Cross-case analysis of two case studies (cross-validation).
	A first-order analysis (using mind maps) of the interview transcripts was provided for the focus group members so that the plausibility of the initial factors could be judged and the possibility of improvement could be discussed.
	A detailed second-order analysis (thick descriptions) of the themes and contexts was presented so that others could judge the plausibility of the results and the applicability to another context.

In view of the use of multiple and rich sources of evidence to increase confirmation, the credibility, as a concurrent process, was undertaken continuously throughout the two-stage exploratory process. The transferability of the findings to different contexts is key to theory development. The purpose is to shift from the specific findings associated with the individual case studies to interpret the theoretical knowledge obtained from the two cases. The results are structured and detailed to describe the exploratory study as completely as possible. Chapters 5 and 6 explain the practices of each company in detail. Beyond the research design process, the trustworthiness of the research findings was also corroborated by the water sector experts' evaluation through two focus group sessions. In the next section, this method is discussed.

5.7.2 Evaluation Method with the Water Industry Experts

As a validation method, water industry experts' feedback to evaluate the feasibility of the initial results is presented in this section. According to Bryman (2016) and Bell, Bryman and Harley (2019), this validation aims to determine whether the research findings are consistent with the interviewees' responses. The focus group discussions with water industry experts aimed to:

- gain an in-depth understanding of how to achieve the digital alignment in water companies
- confirm whether water industry experts agree with the initial CSFs for digital strategic alignment identified in a first-order analysis (using a comprehensive mind map for all interviews)
- collect experts' opinions on the feasibility and applicability of the research recommendations raised by digital business strategy-enabled managers
- determine the benefits the water companies will gain from following the research recommendations contained in the research results.

The focus group discussions thus support the trustworthiness of the research findings, the practice recommendations, and the developed digital organisational design represented in the DSAM in order to identify the impact of the CSFs on sustainable business performance. Focus group discussions that enable the participants to evaluate the findings of the research are preferred (Riley & Rosanske 1996) (see Table 4.1 for description of focus group participants for the research). The next section presents a brief outline of the focus group sessions.

5.7.3 Engaging with Focus Group Participants

Each company's initial findings were discussed separately in an online interactive focus group session for each company. The session included a presentation by the researcher to the selected participants at different times convenient for all the participants. It also included the following:

- a brief introduction to the research objectives and methodology
- a brief confirmation of the focus group rules, including obtaining non-confidential information, maintaining the confidentiality of the research data and participants' identity, and not repeating what is said in the session to others
- an overview of digital strategy and organisational design factors in the literature
- discussion and feedback of the initial findings of CSFs of digital strategic alignment in the company, and whether they have other factors
- implications and recommendations.

The focus group discussions were conducted online via Zoom and audio recorded, and lasted approximately 90 minutes. The participants were allowed to discuss, ask questions, or make comments during the presentation, which allowed interactive discussions and contributed to a deeper understanding of the CSFs for digital strategic alignment. In the next section, the findings of the discussions are presented.

5.7.4 Findings of the Evaluation with Water Industry Experts

Overall, the participants' opinions from both companies indicate a consensus on the benefits of the research outcomes to improve the understanding of digital strategic alignment. They agreed that there are causal relationships between the CSFs that influence sustainable business performance. The causal relationships across the organisational design factors are enforced by the companies' system, shared visions, and responsibilities across multiple organisational levels. Accordingly, the applicability of the research to digital business strategy-enabled water companies proved to be positive by the participants. In addition, they recognised the importance of achieving not only the digital objectives, but also meeting different companies' strategic, organisational and sustainability objectives. Thus, the participants were particularly aware of the current drivers and challenges affecting water companies pursuing their digital business strategy ambitions.

The participants view the CSFs identified in the research as comprehensive for achieving the digital strategic alignment that affects sustainable business performance in water companies. They believe that the CSFs have covered all the important issues that affect their experience with the rollout of digital business strategy. They are also consistent with their expectations of the proper alignment required for the effective use of digital business strategy across water contexts. Particularly, the CSFs associated with digital business strategy within a context require the provision of a digital work environment, which includes shared digital strategic visions and objectives, required digital and human resources, digital business infrastructures, and appropriate work policies for sharing resources and information internally and externally. The unified digital processes influence multiple organisational levels of the companies through improved information processing. Together, these factors first establish their digital ambitions and enable companies to make rational decisions on their own business, with KPIs to measure their progress in terms of integrated digital solutions, retraining requirements, agile organisation, and expectations of stakeholders.

Eventually, in both focus group sessions, a consensus was reached on the importance of digital organisational architecture, wherein a company first needs to design its digital architecture, and then establish structures, processes, people, policies and digital resources based on the digital architecture in response to the company's holistic vision and objectives. In other words, a company should re-establish itself digitally from scratch using a simultaneous incremental–comprehensive development approach. As visions and objectives are eventually shared, the digital processes are jointly unified and developed, and the digital resources and services become unified or transformed and enforced with digital contractual protocols and obligations. All the participants evaluated these results as digitally, financially, socially and environmentally feasible for water companies.

5.8 Recommendations to Achieve Digital Strategic Alignment in Water Companies

The exploratory study identified some recommendations made by the interviewees, focus group participants and overall research findings for achieving digital strategic alignment in water companies. The key recommendations drawn from the research can be summarised as follows:

- The ambition towards a digital business strategy-enabled company is feasible to pursue but requires radical changes in the current organisational design factors and business practices.
- Shared digital strategic visions and objectives that involve digital, strategic, organisational and sustainability dimensions are necessary to efficiently align with stakeholders' needs.
- Development of a digital business strategy as a deliberately (planned) emergent strategy can contribute to quickly leveraging its benefits, discovering and exploiting new opportunities, and coping with changing market conditions, especially with the use of a simultaneous incremental–comprehensive development approach.
- Integration of knowledge internally and externally at every stage of digital business strategy development can enable stakeholders to become aware of

policies, implementation plans and required changes, and to provide operational inputs for effective implementation processes.

- Adoption of a quality management system with KPIs for all organisational levels and activities can contribute to providing a clear path for correction, support and development, while aligning organisational design factors.
- Having a continuous change management program in a digital business strategy-enabled company is vital, and may help overcome people's resistance to change and motivate them to produce desirable performance.
- Top management support can contribute to quick digital rollout and company-wide agreement to support major digitalisation- and organisational-related changes.
- Digital partnership management can improve relationships and understanding among inter-organisational (multi-level internal and external) digital strategy projects stakeholders.
- A digital business strategy-enabled company should be agile structured and act as 'a learning organisation' where knowledge workers continually learn new digital skills and practices, which will enable them to effectively acquaint with the rapidly evolving digital water technologies, especially with having cross-functional teams and shared digital units.
- Cross-functional teams need decision-making autonomy to overcome traditional structures and achieve the desired alignment.
- People and task redeployment in addition to early-stage retraining may be necessary to efficiently use ever-changing digital technologies.
- On-the-job digital training can expedite people's knowledge of integrated digital systems.
- Unified digital processes are necessary to efficiently unify the digital flow of information, both internally and externally, which in turn reduces costs and effort, and achieves stakeholder satisfaction.
- The integrated digital solutions that involve internal and external digital platforms for information sharing may play a critical role in a dynamic environment.
- Integrated digital solutions can generate a large amount of data that have to be leveraged to reduce operating costs, resource usage, and CO_2 emissions through

intelligent management, and thus, water companies are better placed to transform into data-driven organisations.

- Leveraging digital assets internally and externally (e.g. government agencies, digital partners or even competitors) may help water companies to operate more efficiently in their ecosystem.
- Digital strategic alignment can contribute to aligning ecosystem actors but requires deep collaboration between stakeholders.
- Water companies can develop information sharing protocols and strive to standardise systems with digital partners, ensuring interoperability and compatibility between different technologies.
- Digital resources and services work better when they are concentrated and managed by company-wide units.
- Digital strategic alignment requires development of a digital governance policy for all organisational design factors.
- Trialling new integrated digital solutions at water and wastewater plants and networks, not only in offices, is recommended.
- MEWA needs to encourage water companies to pursue digitalisation by creating support policies, such as training, development and sharing of digital resources and expertise, as well as subsidies and cost reduction.
- The Water Regulator needs to measure end-users' attitudes and behaviours, digital activities and services, and public and private water companies' performance regarding the support policies.
- MEWA needs to ease and expedite regulatory and digital reforms to include more private water companies in the market and encourage competition.
- MEWA needs to support water companies in using public cloud computing and ensuring that public data are protected and managed appropriately, and thus meet both stakeholder expectations and regulatory requirements.

5.9 Conclusion

This chapter discussed the cross-case analyses findings of the two case-study companies. This research presented evidence of a unique theoretical and empirical contribution to the strategy, and IT literature. Digital strategic alignment efforts have often been driven by market conditions, digital advancements, social-cultural change, environmental pressures, and governmental-political-regulatory policies drawn together under the Saudi Government's Vision 2030 and stakeholder interests. The research has shown that current digital business strategies circulating in the literature do not provide a clear picture of how to create digital strategic alignment between digital business strategy and organisational design.

The prevailing situation as presented in both cases is that there is no 'one existing approach' to achieve digital strategic alignment. Every water company's approach is different in its circumstance. The different companies operate within their particular professional niche and rely on organisational design factors that align their business needs. The empirical study of the cross-case companies is different from the literature in terms of the formulation and implementation of digital business strategies and the theoretical analysis. The importance of this research for the strategy literature is that it improves not only the understanding of the digital business strategy development process, but also how the process aligns with other factors of organisational design. Both companies have shown how they understand the digital business strategy differently, and make sense of its realities by building a context-specific rationale of its benefits and stakeholder negotiations on its uses. Understanding the stakeholder interests provides a means to understand the cohesion of rationality, policies, power, knowledge and practices, which are inextricably linked.

Regarding the use of the organisational design, IPV and KBV theories in relation to the digital business strategy in water companies, this research also makes a significant contribution, particularly to issues relating to building upon combined insights from these theories, such as the planned and emergent nature of digital business strategy; simultaneous incremental–comprehensive development processes; integrated digital solutions, processes and infrastructures in digital organisational architecture design; agile structures; tasks and people redeployment; and learning organisation building through knowledge integration, cross-functional teams and shared digital units, and continuous digital training.

This chapter also suggests four theoretical and practical implications of the results, which are of relevance to the digital strategic alignment: (1) the deliberate and emergent nature of digital business strategy in water contexts, (2) misalignment between existing organisational design and realities of digital business strategy, (3) divergent perspectives between aligned digital organisational design and the idiosyncrasies of the water companies' practices, and (4) regulatory gaps and digital strategic alignment process.

Finally, digital business strategy is subject to social negotiations between multiple actors. These negotiations often result in shared digital strategic visions and objectives, and expectations, across organisational design factors to fulfil the interests of stakeholders and achieve digital strategic alignment in which all the factors are aligned and interacting harmoniously with one another to enhance sustainable business performance. The key findings of the research are further discussed and consolidated in the next and the final chapter, highlighting the study's theoretical and practical contributions, limitations and recommendations for future research.

Chapter 6: Conclusions, Contributions and Limitations

6.1 Introduction

This chapter summarises the overall work of the thesis, which was conducted to achieve the study's aims and objectives, by presenting the key findings, research contributions, limitations and recommendations for future research directions. Section 6.2 addresses how the study's objectives were achieved. Section 6.3 highlights the theoretical and practical contributions. Following this, Section 6.4 presents the limitations of the research. Next, future research opportunities are made in Section 6.5. Finally, the study ends with a reflection on the achievements in the study's conclusion in Section 6.6.

6.2 Achievement of Research Aim and Objectives

Before completing the study, it is appropriate to reaffirm the aim and objectives of the thesis, which were achieved. The overall aim of the research was 'to explore the impact of digital business strategy on organisational design (i.e. strategy, structures, processes, people and rewards) and identify the success factors needed for digital strategic alignment that enhances sustainable business performance in water contexts'. Three research objectives were developed in Chapter 1 (Section 1.2) to achieve the research aim. These objectives were achieved through a combination of methods, as outlined in Table 6.1. This section also briefly describes the processes used to achieve the research aim and objectives.

Table 6.1: Methods for achieving the research objectives

Research aim	Research Objectives	Methods of achievement	Related chapters in the thesis
To explore the impact of digital business strategy on organisational design (i.e. strategy, structures, processes, people and rewards) and identify the CSFs for digital strategic alignment that enhances sustainable business performance in water contexts.	RO1: To explore the impact of digital business strategy on organisational design factors.	Review of literature.	Chapters 2 & 3
	RO2: To identify the CSFs of digital strategic alignment (new digital organisational design factors) that support sustainable business performance.	Two case studies involving 31 in-depth online interviews, two online focus groups (each having four participants), and document analysis.	Chapters 3, 4 & 5
	RO3: To develop a digital strategic alignment model (based on a novel digital organisational design) to help improve sustainable business performance.	Back-and-forth iteration between literature and empirical data of the case studies.	Chapters 2, 4 & 5

6.2.1 Research Objective One (RO1):

'To explore the impact of digital business strategy on organisational design factors'

The first objective was achieved through two means: a review of the relevant literature and the empirical case studies. The research work began with a review of the relevant literature to gain a detailed understanding of the nature of the digital business strategy and its impact on organisational design. This was discussed in Chapters 2 and 3. The literature review in Chapter 2 summarised the theoretical insights that support digital business strategy, and how they change traditional organisational design factors. Hence, the research identified key themes, concepts and variables, which were used in both the interview questions and the initial theoretical framework of the research.

Based on the literature review in Chapter 2 and the empirical case studies in Chapter 4, this research summarised the drivers and challenges in the Saudi water sector in Chapter 5. The analytical discussions in Chapter 5 have also revealed that the digital business strategy-enabled water companies do not have a clear and easy-to-follow model for achieving the digital strategic alignment between digital business strategy and organisational design factors. Although the CSFs identified for the digital strategic alignment process are similar in many respects, each water company has focused on some factors more than others and used its own methods to manage the alignment process. This was interpreted by the fact that these companies consider their business nature, size and available resources in the process.

Furthermore, the digital strategic alignment process is complex and dynamic. There are many stakeholders' interests and various constraints, both digital requirements and people's needs, involved in the process. The rapidly developing nature of the digital technologies and the other contextual issues (drivers and challenges) are among the issues that fluctuate the alignment process across different contexts. Thus, it is necessary to thoroughly address these issues in order to achieve a successful alignment of digital business strategy with organisational design. To address these issues, this thesis asserts that under digital business strategy, integrated digital solutions are inextricably embedded in forming and supporting the majority of organisational design factors (strategic, organisational and digital factors), and that they are mutually constitutive—their ongoing relationships influence each other and create value over time.

Overall, the main drivers and challenges identified about digital strategic alignment concern the theoretical perceptions about strategic and digital issues in organisations. A review of the literature revealed gaps in understanding across two parallel fields of study: strategic studies and IT studies. Strategic studies have traditionally been strategic-centric, disregarding the finer points of digital influence. Equally, in the field of IT studies, strategic organisational practices and human relations are often ignored, which often embrace the concept of technological imperative. IT has historically been used as pre-packaged solutions to resolve identified traditional problems emerging from organisational contexts. In contrast, under digital business strategy, integrable digital technologies enable companies to create innovative digital solutions to traditional problems instead of traditional solutions to traditional problems, as in the case of IT. This generally reveals the importance of the social-technology imperative for the knowledge integration process for digital solutions and, for that matter, digital business strategy deployment in water companies.

To reach theoretical insights in accordance with the first objective, the study reviewed the strategy literature, digital business strategy studies, digital infrastructure studies and feasibility of using an organisational design model to analyse the digital strategic alignment process. After obtaining different insights from the literature and deciding to analyse digital strategic alignment based on organisational design, various research methods were adopted to achieve this objective. This research adopted an abductive case-study research method; the underlying epistemology is interpretative, and the empirical data collection phase consists of a two-stage process: a two-phase review of the literature and a qualitative case-study approach to explore best practices in two unique water companies in Saudi Arabia.

6.2.2 Research Objective Two (RO2):

'To identify the CSFs of digital strategic alignment (new digital organisational design factors) that support sustainable business performance'

Since the focus of this research is on the practical context, it has been essential to explore the state-of-the-practice within digital business strategy-enabled water companies. To achieve this objective, in Chapter 4, the new and emerging factors of organisational design in two water companies were examined. The interviews with executives and middle managers, as well as focus groups with water company experts, explored the experiences of the participants regarding their processes for formulating and implementing the digital business strategy and aligning the strategy with organisational design, focusing specifically on emerging factors of organisational design and associated change needs. The outcome of this was presented in Chapter 4 and discussed in Chapter 5. One of the important lessons learnt from this was the need for a DSAM that would help organisations in dealing with the management of strategic, organisational and digital issues that confront the different water companies that adopt digital business strategies.

As one of the research objectives, the DSAM was developed that includes the 20 CSFs (18 CSFs were explored in this study) for understanding the interrelationships between these factors in and managing stakeholders' interests across their organisational designs. The model was the basis for the analysis of two case studies. The findings of the analysis also provided an overview of issues associated with digital business strategy that can be used to help water companies in addressing the associated challenges.

The emerging CSFs associated with digital business strategy rollout are particularly discussed in Chapter 5. Overall, the research provided some theoretical insights into how digital business strategy uptake affects the factors of organisational design. An important issue that emerged through the analysis of the empirical data reflects how integrated digital solutions-supported unified digital processes emphasise the need for early and continual collaboration and knowledge sharing (mainly organised by digital partnerships management and supported by top management) of all the stakeholders, including customers, digital partners, government agencies and employees, to provide collective agreement from the start towards achieving a shared digital strategic vision and objectives.

6.2.3 Research Objective Three (RO3):

'To develop a digital strategic alignment model (a novel digital organisational design) to help improve sustainable business performance'

Chapters 4 and 5 were intended to address the third research objective. Chapter 2 theoretically reviewed various strategic alignment models that could potentially help analyse digital business strategy in water company contexts. It was important to understand which strategic alignment model best explains the influence and utilisation of digital business strategy in organisational contexts. Accordingly, the Star model of organisational design proposed by Kates and Galbraith (2007) was used as a tool to analyse the digital strategic alignment process across multi-level factors of organisational design in Chapter 4, which best explains the utilisation of digital business strategy and its alignment process in water companies' contexts.

By using Mayring's (2014) content analysis approach that combines the qualitative and quantitative content analysis, and following the back-and-forth iteration to compare the empirical research data with the existing theories as informed by the abductive approach, Chapter 4 presents the findings of the process. The themes explored in cross-case analysis are presented in Section 4.2. A comparative (quantitative) analysis of the identified CSFs for digital strategic alignment in the two companies is presented in Section 4.3. From a quantitative perspective, inferences made regarding the CSFs are counted within the qualitatively defined themes for each case-study company. Accordingly, the research identified 18 CSFs in addition to two existing factors (people and rewards) (in total, 20 CSFs for the DSAM). The CSFs are divided into three groups: strategic, organisational and digital factors. The digital strategic alignment process among the CSFs substantially improves financial, social and environmental performance. This means poor performance in one factor will degrade the performance in other factors, whether in the same group or another. Therefore, sustainable business performance grows out of the digital strategic alignment in which all the factors are created, aligned and interacting harmoniously with one another to enhance sustainable business performance.

In Chapter 5, the DSAM mainly draws on organisational design, IPV and KBV theories, as well as digital business strategy and organisation studies in literature. This model maps influences beyond the boundaries of the case-study companies with a causal link of critical and iterative interactions. It also confirms that the formulation and implementation of digital business strategy are practically intertwined, incrementally evolving in small, iterative change processes, and thus require a simultaneous incremental–comprehensive development approach. While the implementation of digital business strategy projects was digitally governed by the companies' digital systems and contractual obligations, the rationale underlying the selection of digital solutions, its expected value, and its associated organisational changes in the organisations were all co-dependent on negotiations and stakeholders' interests. As researchers continue to investigate digital business strategy benefits and stakeholders continue to encourage its deployment, the DSAM can assist in different ways to unveil deeper understanding of the causal organisational design factors that affect sustainable business performance.

Chapter 5 also discussed how the research approach was designed to ensure the quality and trustworthiness of the research findings. Having focus group discussions with water company experts also helped validate the research achievements and provided feedback for further improvements. The participants verified the rationality of the research findings, added and revised some factors, and ultimately agreed that the CSFs identified in the research are important and relevant to digital business strategy-enabled water companies. Although respondents viewed the CSFs as practicable and achievable, they also provided some recommendations to address some challenges in the process. The feedback and recommendations have improved the research outcomes and helped provide valuable opportunities for further research.

After presenting the above-mentioned processes that form the basis for achieving the objectives of the research, the research's contributions are discussed in the next section.

6.3 Research Contributions

The research contributions are categorised into two main areas: theoretical and practical. These contributions are presented in this section.

6.3.1 Theoretical Contributions

From a strategic point of view, the thesis argues that digital business strategy needs a novel organisational design, which involves different factors from traditional organisational designs. These factors should be dynamically aligned with digital business strategy as a continuous process to improve sustainable business performance. This thesis used the Star model of organisational design proposed by Kates and Galbraith (2007) to explore the new factors of organisational design (i.e. the CSFs) that can make the digital strategic alignment happen within water company contexts. This research is mainly underpinned by the IPV theory proposed by Galbraith (1974), the KBV theory proposed by Grant (1996b), and the view of digital business strategy proposed by Bharadwaj et al. (2013). The theoretical contributions of the study are presented as follows:

1. As explained in Chapter 2, there has been a large number of research findings on digital business strategy and its benefits. This is in response to the stakeholders' interest to use the strategy as a response to the drivers and challenges faced in water contexts. However, this trend has mainly been on digital business strategy and its associated integrated digital technologies. This study contributes to the knowledge by identifying the 20 CSFs for digital strategic alignment that directly/indirectly influence the six criteria and nine metrics of sustainable business performance within water organisations. Eighteen CSFs were explored in this study. Three factors—digital skills and knowledge, change management, and quality management with KPIs—support people and rewards in the existing organisational design literature as they influence organisational design factors to improve performance. The other 15 factors have direct links to the organisational design factors, and direct/indirect links to sustainable business performance. These 15 CSFs can be considered a novel knowledge contribution to elaborate the organisational design theory in the context of digital business strategy and sustainable business performance. Table 6.2 explains the key theoretical contributions of the research, with further links to the literature.

Table 6.2: Key theoretical contributions of the research and links to the literature

<table>
<tr><th></th><th>Contributions (new themes in this research)</th><th>Supporting literature</th><th>Remarks</th></tr>
<tr><td>1</td><td>Shared digital strategic vision</td><td rowspan="2">Li et al. (2021, p. 702) state that ‘digital technology-business strategic alignment refers to the creation of a shared vision between digital technology and business strategies and activities in the firm … the vision reduces the equivocality in the decision-making process, which in turn improves a firm’s effectiveness in responding to environmental changes’. They found that IT business strategic vision facilitates mutual understanding between IT and business managers.
Korachi and Bounabat (2020) refer to the importance of the digital strategic vision and digital strategic objectives in digital strategies.</td><td rowspan="2">- Although their article is underpinned by the IPV, it was not in the context of organisational design theory.
- This study finds that shared digital strategic vision is a CSF for digital strategic alignment, as there is a direct impact of a shared digital strategic vision and objectives on the factors of organisational design, which, in turn, influence sustainable business performance. This is a new contribution to the organisational design literature.
- The study is the first research where shared digital strategic objectives have been conceptualised in the organisational design context for digital business strategy.</td></tr>
<tr><td>2</td><td>Shared digital strategic objectives</td></tr>
<tr><td>3</td><td>Simultaneous incremental–comprehensive development</td><td>Yeow, Soh and Hansen (2018) found that digital business strategy should be treated as a planned and emergent strategy.</td><td>- The current study argues that the digital business strategy should not only be treated as a planned and emergent strategy, but also have a simultaneous incremental–comprehensive development as a strategic approach that considers and aligns changes in organisational design in parallel, which is a novel contribution to the organisational design theory in the context of digital business strategy.</td></tr>
</table>

	Contributions (new themes in this research)	Supporting literature	Remarks
4	Knowledge integration	Herden (2020) found that knowledge integration across organisational factors enhances the results of data analytics, improves the decision-making process, and creates competitive advantage. The field is the logistics and supply chain management.	- Although the article is underpinned by the KBV, it was not in the context of organisational design theory for digital business strategy and was in a different industry and topic.
5	Digital partnerships management	Li et al. (2021) found that digitally transformed organisations are more likely to establish digital technology-enabled external relationships management, which, in turn, enhances their ability to respond to technological turbulence in the markets promptly. Zomer, Neely and Martinez (2020) found that digitally transformed organisations invest heavily in increasing their digital partnerships.	- This study has evidence for a direct impact of digital partnerships management on the organisational design factors in the context of digital business strategy, providing new contributions to the organisational design theory.
6	Top management support	Matt, Hess and Benlian (2015) state that top management support is recognised as being fundamental to the implementation of digital business strategy because it affects the entire company, and its implementation may result in resistance from different areas of the firm. Li et al. (2016) found that the strategic alignment literature suggests that top management support is one of the most critical success factors. Shee et al. (2018) find that top management support can influence the decision to adopt cloud-based technology to maximise supply chain performance, which in turn can influence the firm sustainability. Singh, Klarner and Hess (2020) find that the involvement of top management teams in digital strategy formulation influences the process of strategic change.	- This study has evidence that the level of top management support in developing digital business strategy and making organisational changes could provide a moderating influence on the relationship between organisational design factors and sustainable business performance, which is a new contribution to the organisational design literature.

	Contributions (new themes in this research)	Supporting literature	Remarks
7	Digital governance	Indriasari, Supangkat and Kosala (2020) posit that digital governance mechanisms are related to structures, processes and relational mechanisms for an agile environment in the stage of digital transformation.	- Their study did not use the organisational design. - This study found an impact of digital governance on the organisational design factors in the context of digital business strategy, providing new contributions to the organisational design theory.
8	Agile structures	Liang et al. (2017), in their survey on the relationship between strategic alignment and organisational agility, have supported the emergent and interdependent nature of strategy formulation and implementation in the strategic alignment process. Jones, Gareth and George (2022) recommend that organisations operating in uncertain environments develop agile structures.	- Their study did find that agile (flatter) structures can reduce information uncertainty and speed up decision-making processes. Thus, they have a direct effect on the organisational design factors that, in turn, affect sustainable business performance. This is a new contribution to the organisational design theory in the context of digital business strategy.
9	Shared digital units	Some studies found that shared digital units are a critical factor for implementing a digital strategy (Yeow, Soh & Hansen 2018) or for big data analytics (Galbraith 2014) or for digital governance (Tannou & Westerman 2012).	- This study found evidence that shared digital units influence the organisational design factors that, in turn, affect sustainable business performance, which is a new contribution to the organisational design theory in the context of digital business strategy.
10	Tasks determination and people distribution	Kretschmer and Khashabi (2020) argue that in the stage of digital transformation, digital technologies can generate information related to how to determine tasks and distribute people.	- This study agrees with the literature and adds that digital business strategy requires continuously redetermining of tasks and redistributing of employees at the same pace as the rapid development of integrated digital solutions in a company. This influences the other factors of organisational design that, in turn, influence sustainable business performance.

	Contributions (new themes in this research)	Supporting literature	Remarks
11	Unified, optimised digital processes	Hess et al. (2016); Kamble, Gunasekaran and Gawankar (2018); Ross et al. (2016); Stoffels and Ziemer (2017); Teoh et al. (2022) argue that organisational processes need digitisation, improvement, integration and standardisation to speed up information processing and reduce IPR.	- This study provides empirical evidence for the impact of these factors on both organisational design factors and sustainable business performance in the water industry, which is a new contribution to the organisational design literature.
12	Unified digital flows of information	Weinrich (2017) finds that digital business strategy requires unified digital flows of information in the context of organisational design; this in turn creates alignment between the digital business strategy, processes, people and stakeholder interests (Mushore & Kyobe 2019).	
13	Integrated digital solutions	Li, Dai and Cui (2020) reveal that integrated digital technologies have an impact on economic and environmental performance, using a survey of Chinese manufacturing firms.	
14	Interoperability and compatibility	Howell, Beach and Rezgui (2021); Howell, Rezgui and Beach (2017); Kamunda et al. (2020) find that interoperability and compatibility among multiple digital systems were a potential barrier to integrating digital technologies in water utilities.	
15	Digital centralisation of resources and services	Sklyar et al. (2019) find that the digital centralisation of resources and services is needed to take full advantage of digitalisation in two multinational industry companies.	

2. The thesis also reveals that the planned and emergent nature of digital business strategy is far more complex than most policymakers expect. The digital business strategy process requires a systemic organisational transformation at multiple levels across different domains and multiple stakeholders. Thus, the research suggests that digital business strategy uptake cuts across digital determinism, policy mandates and organisational issues. Indeed, their complementary visions enrich our understanding of the complications in the digital business strategy and its continual alignment process with organisational design. From this theoretical perspective, we can learn that a predetermined digital business strategy may not be successful unless it is formulated and implemented from the viewpoints of the stakeholders within their business ecosystem. Therefore, policymakers are recommended to consider a variety of regulatory policy tools and differentiate them with the different contexts of water companies, and their digital business strategies, rather than universal generalisations.
3. A contribution is also made by identifying the main drivers and challenges that affect digital business strategy and its alignment process with organisational design. These issues were considered in the development of the DSAM for analysing digital business strategy uptake in the case-study companies. However, the organisational dynamics across multi-levels were seen as influential in shaping the utilisation of digital solutions in the case-study companies. Therefore, in some cases, the lack of digital strategic alignment explains the disconnect existing between realities of digital business strategy practices, digital solutions and policy mandates.
4. The study also contributes to knowledge through the analysis of the key findings and their implications to the existing theories (IPV, KBV and organisational design). It describes how the digital business strategy particularly depends on social interactions. Chapter 5 reveals that the formulation and implementation process of digital business strategy is socially constructed and dynamically determined. The design and implementation of integrated digital solutions and organisational changes are also mediated through negotiated actions between multi-level actors. Thus, the outcomes of the process become context-specific.
5. As the analysis chapter revealed that digital business strategy needs to be seen as a deliberately emergent strategy, this reflects the complementary relationship of the IPV and KBV approaches to strategy in this study. This contributes to IPV and

KBV theories by re-emphasising that both approaches to strategy are based on partial understandings of knowledge, information, human nature and the internal dynamics of change. Nevertheless, the partial understanding is not necessarily wrong, but the research objectives entail highlighting their features and deficiencies. According to Carlisle (2002), knowledge is as important as information in organisations, but on its own, it is not sufficient to sustain business performance. While the IPV focuses on rational rather than reflective decision-making processes, rational (deliberate) and reflective communicative (emergent) processes are equally important to achieve sustainable business performance. The contribution here lies in adopting both the IPV and KBV approaches to address this type of shortcoming in each theory.

6.3.2 Practical Contributions

The thesis contributes to the understanding of the digital business strategy process through the perspective of an organisational design model. The practical contributions are presented below:

1. Despite the rapidly evolving research in digital business strategy and associated digital solutions, there is rarely a systemic analysis of digital strategic alignment that considers organisational issues of water companies. This thesis produced insights from the concept of aligned digital organisational design to help clarify digital business strategy requirements. The CSFs of the DSAM were explained and elaborated. This analytical model laid the groundwork for practitioners, policymakers and future researchers who seek to define the digital strategic alignment process. It also helped gain a better understanding of digital business strategy and associated organisational issues from the analytical perspective of digital strategic alignment. Thus, these companies and their stakeholders (e.g. digital partners, competitors and government agencies) can co-develop aligned digital business strategies.
2. The thesis presented a set of conceptual tools for digital business strategy-enabled companies to map their organisational contexts by making use of the analytical model for digital strategic alignment. As presented in Chapter 5, the two case-study companies do not have a clear approach for achieving the digital strategic alignment process. The DSAM enables practitioners, policymakers and future

researchers to understand the key causal dimensions in the process within water company contexts. The developed model can be used as a key tool to prepare for and evaluate the rollout of digital business strategy over time. It also enables them to identify problems within an organisation and seek realignment of strategic visions, objectives and expectations through consensus and compromises among the different stakeholders and multi-organisational and institutional components.

3. One of the main issues that this study seeks to address is to explore how the aspirations of water companies towards digital business strategy-enabled work practices can be met. Currently, the deployment of digital business strategy is not in the mainstream of water practices, and the practicality of the digital business strategy formulation and implementation process is not well understood. Chapter 2 indicates that digital business strategy and associated organisational changes, including sustainable benefits and efficiency gains, are not actually widespread. Therefore, the study provides the water industry with a sense of how digital business strategy is developed and maintained within water companies. The main contribution of this study is that it provides a clear understanding of the development and requirements of digital business strategy in order to align successfully with organisational design.
4. The digital strategic alignment process as presented in this research is designed to stimulate the recognition of digital strategic alignment as a continuous change process and provide support to decision-makers and practitioners by ensuring that they can fully participate in the change process. The integrated formulation and implementation of digital business strategies, as presented in Chapter 4 and discussed in Chapter 5, has largely been ignored by digital business strategy-enabled companies, who rather rely on somewhat separate traditional formulation and implementation processes that befit their organisational needs. However, digital business strategy is not the same as traditional business strategy. Digital business strategy requires simultaneous incremental–comprehensive development of organisational design factors, which include integrated digital solutions, digital processes, agile structures, digital governance, high-level digital skilled people and digital performance-based rewards. Therefore, this study provides water companies wishing to adopt digital business strategy with a sense of awareness of the necessary organisational design factors required in a digital business strategy-enabled work environment.

5. The significance of the study is that it improves managers' understanding of the organisational and contextual issues associated with the digital business strategy process. It provides insight, not only into the planned and emergent nature of digital business strategy, but also allows its reception and development throughout the organisation through knowledge sharing between individuals, cross-functional teams, shared digital units and business units. By legitimatising the stakeholders' experiences through the multi-level digital and organisational arrangements, the study suggests that organisational rationality, financial viability, and social and environmental responsibility, and how organisational components respond to these dimensions, are important factors that need to be considered during the digital strategic alignment process.

6.4 Limitations of the Study

The study started with the aim of exploring the impact of digital business strategy on organisational design in order to identify CSFs of digital strategic alignment in Saudi water company contexts. This was an ambitious aim given the limited theoretical research and previous empirical studies on digital business strategies in the Saudi water sector, particularly from a sustainable business performance perspective.

The research is limited to a small data sample. The participants were selected from two large digital strategy-enabled water organisations in Saudi Arabia. The two case studies provide depth but not breadth. Therefore, the analysis of the digital strategic alignment process was conducted in a very specific organisational context (the Saudi water sector), which has its own challenges and drivers such as economic conditions, socio-cultural changes, environmental pressures, governmental-political-regulatory changes and digital advancement (see Sections 5.2 & 5.3). Although the study's findings have some generalisability to that sector, they are not statistically generalisable to a wider population. They only allow initial conclusions to be drawn. The participants' views may represent neither their companies nor the overall opinions of all digital strategy adopters in Saudi Arabia. However, a counter-argument is that the participants' judgement is shaped by their experiences that are held in high esteem, and thus, their responses are too. Therefore, the final research results are a credible reflection about the experience regarding digital business strategy and its digital strategic alignment process with organisational design. Accordingly, the research offers a generalisation through theoretical abstraction.

Therefore, the findings are relevant to water companies as they present novel analytical insights for digital strategic alignment in digital business strategy-enabled water contexts.

Time and resource constraints are other limitations of the study. An interpretive in-depth case-study approach is time consuming to conduct and complete. In qualitative research, time is a common constraint, especially when it comes to collecting in-depth and synchronous data. One potential weakness of this research is the time to begin and complete data collection. The study was supposed to be conducted within a 3-year period and was delayed by 1 year because of lockdowns and slow responses during the Coronavirus (COVID-19) pandemic. The data collection process was rigorous in 2020. However, the researcher has gone past this difficult phase successfully. The limited time affected the researcher's ability to provide deeper insights into the issues and implications emerging from the case-study companies as a result of digital business strategy use. However, it is emphasised that the access to those companies, and the clarity of internal dynamic changes of each case-study company, are the factors that helped develop further understanding of organisational changes and their implications.

The implications for practice from the adopted qualitative case-study approach are likely to appear much less precise than those influenced by (digital) technological determinism, which is often influenced by quantitative positivist investigation. The ambiguous relationship between theory and practice is further solidified by the inability to generalise from specific case studies to provide solutions and concepts to be put into practice. While the logic of technological determinism in the real world has been rejected (at the theoretical level) throughout the thesis, the nature of determinism for managing technology in practice remains a barrier in transferring the theory to practice. Therefore, further data collection using large-scale surveys can increase the level of description and offer further validation of the research.

Another limitation of the research relates to the rapidly evolving nature of digital business strategy, as it is a relatively new concept and its development is inextricably linked to the rapid advancement of digital technologies. This research, therefore, cannot demonstrate all the CSFs required for digital strategic alignment, as well as benefits and challenges that water companies should consider across time as digital business strategy evolves in the social context where it exists. The next section presents some further research opportunities.

6.5 Future Research Opportunities

In view of the study's limitations, some directions for further research are recommended to address them as follows:

1. Because of the rapidly evolving nature of the digital technologies associated with the concept of a dynamic digital business strategy, a longitudinal study over a period of time is recommended to identify any changes to the digital strategic alignment process. This can improve our understanding of the nature of the digital business strategy and associated integrated digital solutions; thus, the digital organisational design can be further developed to enhance sustainable business performance over the long term.
2. Whereas this study explored the impact of digital business strategy on organisational design based on qualitative research, it has been unable to draw cogent insight into the changes of the HR policies (i.e. hiring, selection and rotation) and reward systems (i.e. salaries, benefits and promotions) following the digital business strategy rollout within the water companies. Therefore, large-scale quantitative research with employees and managers is recommended to explore this specific impact.
3. Another opportunity for future research is to examine the impact of digital business strategy on organisational design factors via quantitative research within digital business strategy-enabled water companies. This could provide a comparison with the conclusions drawn from the findings of the qualitative research, and further validation of the DSAM, which could confirm the statistical generalisation of the relationships between the CSFs identified in this research.
4. Further in-depth qualitative case studies are recommended to examine the validity of the findings in different industries and contexts. This may provide further insights into CSFs that enhance sustainable business performance across contexts.
5. Future research is recommended to examine the speed of technical change (including the trait of re-programmability of digital technologies) and technical change management on organisational design factors.

6.6 Conclusion

Digital business strategy appears to be a useful concept for improving efficiency and productivity in water organisations. However, it has lacked organisational coherence because of the wide gap existing between theory and practice. To date, the use of digital business strategy has mainly focused on integrated digital solutions to meet organisational needs, mostly in large and complex organisations. However, the reality with digital business strategy is that the CSFs necessary for aligned digital organisational design construction are captured from stakeholders' experiences and lessons learned from the different stages of digital business strategy development. In addition, the integrated digital solutions with their unified digital processes have the capability to ensure that the coordinated tasks are designed to provide efficiency gains for end-users. This is often achieved by reducing unnecessary employees and tasks, design and human errors, and implementation time, and improving information quality and flow. Because of these advantages associated with digital business strategy, water companies that do not embrace such solutions run the risk of becoming outdated compared with their competitors. Thus, the complexity of understanding digital business strategy as it changes through different organisational contexts should not be underestimated.

This research has taken an important step towards bridging the knowledge gap between the theoretical knowledge relating to digital business strategy, and the empirical evidence relating to digital business strategy reality in organisational design. Bridging the knowledge gap requires exploring complex relationships among digital business strategy and new and existing organisational design factors in its real context. As a result, the research has succeeded in improving our understanding of the digital business strategy and its alignment requirements with organisational design aiming to enhance sustainable business performance. This thesis addressed the theoretical challenge of accommodating the dualism of both digital and strategic organisational concepts, and allowing for the analysis of their interactive combination in generating the real outcome of the digital strategic alignment process in the real context.

The aim and objectives of the study were achieved through three major investigations: a review of literature and company documents, interviews, and focus groups. The adopted abductive research method depicted convergence links between them (discussed in Chapter 3). After obtaining the literature findings regarding digital business strategy and its alignment approaches with organisational design, including theoretical underpinnings (discussed in Chapters 2 and 3), 31 online interviews with managers were conducted. Having obtained the initial CSFs identified in a first-order analysis (using mind maps), two online focus groups were conducted with water company experts to validate the initial findings. The exploratory investigations assessed the participants' perceptions of digital business strategy, assessed its impact on organisational design factors, and identified the CSFs of digital strategic alignment that influence sustainable business performance. Chapter 4 presented the findings of the exploratory studies.

The adoption of the abductive approach, which links the empirical findings and the theoretical insights, helped develop an analytical model for digital strategic alignment. After development of a solid understanding of the organisational design antecedents that influenced digital business strategy formulation and implementation, further investigations were conducted into how digital business strategy practically changed the traditional organisational design factors across two selected digital business strategy-enabled water companies. This process was analysed through the lenses of the DSAM presented in Chapter 4. Thus, it is clearly evident from the cross-case analyses (Chapter 4) that all the 20 CSFs identified in the analytical framework become crucial to enhance sustainable business performance in water organisations.

Contrary to the dominant understanding of digital business strategy, the study identified that the formulation and implementation of digital business strategy cannot be separated into two phases in practice. Digital business strategy balances between deliberate and emergent approaches, requiring continuous development through small, iterative steps (e.g. introducing new digital technologies, mobile apps or digital services), which in turn requires the simultaneous incremental–comprehensive development of all factors of organisational design. In addition, the top-down of the development process was not followed in practice; the companies create an active environment for knowledge integration both internally and externally in all stages of the digital business strategy development.

The digital solutions embedded in the companies' digital platforms do not operate in isolation. In particular, with the nature of the water sector, different organisations (e.g. digital partners, suppliers or government agencies), with a plethora of visions, objectives and capabilities, integrate their digital resources to form or transform organisational practices. The digital transformation occurs across all factors of organisational design.

The results also indicated that processes associated with digital business strategy development within a context require shared digital strategic vision and objectives, resources, and appropriate policies and systems. The analysis also shows that the interests of internal and external stakeholders influence the organisational design factors, including digital business strategy development. These stakeholders first define their objectives and make decisions on their own business activities with regard to digital business strategy development, in terms of digital technology type, business requirements, and organisational changes in structures, processes and training. At the planning level, compromises are reached by engaging with these different stakeholders to establish an agreement on shared digital strategic vision and objectives of preferred integrated digital solutions and distributed tasks and responsibilities. Simply put, the digital strategic alignment among organisational design factors is subject to compromises and negotiations from the influential stakeholders. Thus, as visions and objectives are eventually shared, the digital technologies are jointly integrated, the digital processes are unified, and the digital resources and services become more centralised (or transformed) and governed by contractual protocols and obligations, which together can enhance sustainable business performance.

The use of the proposed DSAM adds greater substantiation to the phenomenon seen in the case-study organisations, guided by Galbraith’s Star model of organisational design, which links the field of strategy and organisational levels of analysis. Galbraith’s organisational design approach (Kates & Galbraith 2007) allows a vivid depiction of the interrelated organisational design factors (i.e. strategy, structures, processes, people and rewards) in shaping the organisational changes seen. The digital business strategy and the concomitant organisational changes that manifest from the organisations are negotiated, accommodated and aligned into a coherent set of organisational practices, which in turn forms the digital culture of the firms.

In summary, the concept of digital strategic alignment of organisational design captures the complex dynamics, interactions and dependencies between digital business strategy, agile structures, unified digital processes, people’s renewed digital skills and knowledge, rewards, and integrated digital resources and services occurring across different water contexts and allows for shared digital strategic visions and objectives that inform stakeholders' activities. These interactions reflect the emphasis on the idea of collaboration across organisations by activating the role of managing digital partnerships, shared digital units and internal business units, and break functional silos by creating cross-functional teams as digital strategic alignment progresses.

More importantly, the digital organisational design model inspired by the DSAM as presented in this study provides both water managers and policymakers with a sense of awareness of the necessary changes required in a digital business strategy-enabled work environment, especially with the use of quality management with KPIs that provide the opportunity to accurately track the strengths and weaknesses of the factors of organisational design, and improve their performance as poor performance in one factor that will degrade the performance in other factors. Accordingly, sustainable business performance grows out of the digital strategic alignment in which all the factors are created, aligned and interacting harmoniously with one another to enhance sustainable business performance. Thus, this study improves our understanding of the required digital organisational design factors associated with the use of digital business strategy to enhance sustainable business performance in water companies.

References

ACWAPOWER 2021, *MARAFIQ IWPP*, ACWAPOWER, viewed 24.08 2021, <https://acwapower.com/en/projects/marafiq-iwpp/>.

Akter, S, Wamba, SF, Gunasekaran, A, Dubey, R & Childe, SJ 2016, 'How to improve firm performance using big data analytics capability and business strategy alignment?', *International Journal of Production Economics*, vol. 182, pp. 113-31.

Alam, K, Erdiaw-Kwasie, MO, Shahiduzzaman, M & Ryan, B 2018, 'Assessing regional digital competence: Digital futures and strategic planning implications', *Journal of Rural Studies*, vol. 60, pp. 60-9.

Alatoom, M 2019, *Evaluation report: Annual evaluation of "sustainable development and integrated water management" project*, Saudi Arabia.

Alavi, HR 2007, 'Islamic and Christian Axiology (A omparative study)', *Journal of Christian Education*, vol. 50, no. 1, pp. 37-48.

Ambre, JA 2016, 'ASIST Automated Water Billing System', *International Journal of Research in Management & Business Studies*, vol. 3, no. 1, pp. 9-14.

Amit, R & Schoemaker, PJ 1993, 'Strategic assets and organizational rent', *Strategic management journal*, vol. 14, no. 1, pp. 33-46.

Andrews, KR 1971, *The concept of corporate strategy*, Dow Jones-Irwin, Homewood, IL.

Andrews, R, Beynon, MJ & Genc, E 2017, 'Strategy implementation style and public service effectiveness, efficiency, and equity', *Administrative Sciences*, vol. 7, no. 1, pp. 1-19.

Anumba, CJ, Baugh, C & Khalfan, MM 2002, 'Organisational structures to support concurrent engineering in construction', *Industrial management & data systems*, vol. 102, no. 5, pp. 260-70.

Arkhipova, D, Vaia, G, DeLone, W & Braghin, C 2016, *IT governance in the digital era*, Department of Management, Università Ca'Foscari Venezia Working Paper, San Giobbe, Cannaregio.

Arthur, WB 1989, 'Competing technologies, increasing returns, and lock-in by historical events', *The economic journal*, vol. 99, no. 394, pp. 116-31.

Assarroudi, A, Heshmati Nabavi, F, Armat, MR, Ebadi, A & Vaismoradi, M 2018, 'Directed qualitative content analysis: the description and elaboration of its underpinning methods and data analysis process', *Journal of research in nursing*, vol. 23, no. 1, pp. 42-55.

Atalla, TN, Gasim, AA & Hunt, LC 2018, 'Gasoline demand, pricing policy, and social welfare in Saudi Arabia: A quantitative analysis', *Energy Policy*, vol. 114, pp. 123-33.

Atkinson, R 1999, 'Project management: cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria', *International Journal of Project Management*, vol. 17, no. 6, pp. 337-42.

Babbie, ER 2020, *The practice of social research*, 15 edn, Cengage Learning, Inc., United States.

Baker, J, Jones, D, Cao, Q & Song, J 2011, 'Conceptualising the dynamic strategic alignment competency', *Journal of the association for information systems*, vol. 12, no. 4, pp. 299-322.

Balakrishnan, R & Das, S 2020, 'How do firms reorganize to implement digital transformation?', *Strategic Change*, vol. 29, no. 5, pp. 531-41.

Bardach, E 1977, *The implementation game: What happens after a bill becomes a law*, MIT Press, Cambridge.

Barger, MM, Perez, T, Canelas, DA & Linnenbrink-Garcia, L 2018, 'Constructivism and personal epistemology development in undergraduate chemistry students', *Learning and Individual Differences*, vol. 63, pp. 89-101.

Barney, JB 1991, 'Firm resources and sustained competitive advantage', *Journal of management*, vol. 17, no. 1, pp. 99-120.

—— 2001, 'Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view', *Journal of management*, vol. 27, no. 6, pp. 643-50.

Barratt, M, Choi, TY & Li, M 2011, 'Qualitative case studies in operations management: Trends, research outcomes, and future research implications', *Journal of operations management*, vol. 29, no. 4, pp. 329-42.

Barrett, M & Orlikowski, W 2021, 'Scale matters: Doing practice-based studies of contemporary digital phenomena', *MIS quarterly*, vol. 45, no. 1, pp. 467-72.

Baskerville, RL & Wood-Harper, AT 1996, 'A critical perspective on action research as a method for information systems research', *Journal of Information Technology*, vol. 11, no. 3, pp. 235-46.

Baxter, P & Jack, S 2008, 'Qualitative case study methodology: Study design and implementation for novice researchers', *The qualitative report*, vol. 13, no. 4, pp. 544-59.

Beal, CD & Flynn, J 2015, 'Toward the digital water age: Survey and case studies of Australian water utility smart-metering programs', *Utilities Policy*, vol. 32, no. 2015, pp. 29-37.

Bell, E, Bryman, A & Harley, B 2019, *Business research methods*, Fifth edition. edn, Oxford University Press, Oxford, United Kingdom.

Benbasat, I, Goldstein, DK & Mead, M 1987, 'The case research strategy in studies of information systems', *MIS quarterly*, vol. 11, no. 3, pp. 369-86.

Benbya, H & McKelvey, B 2006, 'Using coevolutionary and complexity theories to improve IS alignment: a multi-level approach', *Journal of Information Technology*, vol. 21, no. 4, pp. 284-98.

Benitez, J, Chen, Y, Teo, TS & Ajamieh, A 2018, 'Evolution of the impact of e-business technology on operational competence and firm profitability: A panel data investigation', *Information & Management*, vol. 55, no. 1, pp. 120-30.

Bennis, W 2013, 'Leadership in a digital world: embracing transparency and adaptive capacity', *MIS quarterly*, vol. 37, no. 2, pp. 635-6.

Bergeron, F & Begin, C 1989, 'The use of critical success factors in evaluation of information systems: A case study', *Journal of Management Information Systems*, vol. 5, no. 4, pp. 111-24.

Bergeron, F, Raymond, L & Rivard, S 2001, 'Fit in strategic information technology management research: an empirical comparison of perspectives', *Omega*, vol. 29, no. 2, pp. 125-42.

Berman, S & Dalzell-Payne, P 2018, 'The interaction of strategy and technology in an era of business re-invention', *Strategy & leadership*, vol. 46, no. 1, pp. 10-5.

Bharadwaj, A, El Sawy, O, Pavlou, P & Venkatraman, N 2013, 'Digital business strategy: Toward a next generation of insights', *MIS Quarterly*, vol. 37, no. 2, pp. 471-82.

Black & Veatch Group 2016, *Strategic directions: Water industry report*, Black & Veatch Company, USA.

Blaikie, N 2007, *Approaches to social enquiry: Advancing knowledge*, Polity Press, Cambridge.

Bocken, NM & Geradts, TH 2020, 'Barriers and drivers to sustainable business model innovation: Organization design and dynamic capabilities', *Long range planning*, vol. 53, no. 4, pp. 1-23.

Boell, SK & Cecez-Kecmanovic, D 2015, 'On being 'systematic'in literature reviews in IS', *Journal of Information Technology*, vol. 2015, no. 30, pp. 161-73.

Boiral, O, Henri, JF & Talbot, D 2012, 'Modeling the impacts of corporate commitment on climate change', *Business strategy and the environment*, vol. 21, no. 8, pp. 495-516.

Boland, R, Jr. 1979, 'Control, causality and information system requirements', *Accounting, Organizations and Society*, vol. 4, no. 4, p. 259.

Bonchek, M & France, M 2015, 'The Best Digital Strategists Don't Think in Terms of Either/Or', *Harvard Business Review*, pp. 1-5.

Boniface, O 2022, 'Digital business strategy's optimisation model for differential value creation in the digital age', paper presented to 5th International Conference on Advanced Research in Business, Management & Economics, Rotterdam, Netherlands.

Bonnet, D & Westerman, G 2014, 'We need better managers, not more technocrats', *Harvard Business Review*, pp. 1-3.

Boon, M & Baalen, SV 2019, 'Epistemology for interdisciplinary research–shifting philosophical paradigms of science', *European journal for philosophy of science*, vol. 9, no. 16, pp. 1-28.

Borgia, E 2014, 'The Internet of Things vision: Key features, applications and open issues', *Computer Communications*, vol. 54, pp. 1-31.

Boyd, BK, Takacs Haynes, K, Hitt, MA, Bergh, DD & Ketchen Jr, DJ 2012, 'Contingency hypotheses in strategic management research: Use, disuse, or misuse?', *Journal of management*, vol. 38, no. 1, pp. 278-313.

Boyle, CE 2014, 'Adapting to change: Water utility financial practices in the early twenty-first century', *Journal-American Water Works Association*, vol. 106, no. 1, pp. E1-E9.

Boyle, T, Giurco, D, Mukheibir, P, Liu, A, Moy, C, White, S & Stewart, R 2013, 'Intelligent metering for urban water: A review', *Water*, vol. 5, no. 3, pp. 1052-81.

Boynton, AC & Zmud, RW 1984, 'An assessment of critical success factors', *Sloan management review*, vol. 25, no. 4, pp. 17-27.

Bracker, J 1980, 'The historical development of the strategic management concept', *Academy of Management review*, vol. 5, no. 2, pp. 219-24.

Bradley, J 1993, 'Methodological issues and practices in qualitative research', *The Library Quarterly*, vol. 63, no. 4, pp. 431-49.

Brattebø, H, Alegre, H, Cabrera, E, Marques, R, Hein, A & Cruz, C 2013, *A master framework for UWCS sustainability: TRUST project*, The European Union, Online.

Broussard, M 2018, *Artificial unintelligence: How computers misunderstand the world*, MIT Press, London, the UK.

Brunsson, N, Rasche, A & Seidl, D 2012, 'The dynamics of standardization: Three perspectives on standards in organization studies', *Organization studies*, vol. 33, no. 5-6, pp. 613-32.

Bryman, A 2016, *Social research methods*, Oxford University Press, Oxford

Burg, WD & Singleton, TW 2005, 'Assessing the value of IT: Understanding and measuring the link between IT and strategy', *Information Systems Control Journal*, vol. 3, no. 1, pp. 40-4.

Burgelman, RA 1983, 'Corporate entrepreneurship and strategic management: Insights from a process study', *Management science*, vol. 29, no. 12, pp. 1349-64.

Burton, RM, Lauridsen, J & Obel, B 2002, 'Return on assets loss from situational and contingency misfits', *Management science*, vol. 48, no. 11, pp. 1461-85.

Burton, RM & Obel, B 2004, *Strategic organizational diagnosis and design: The dynamics of fit*, Kluwer Academic Publishers, Dordrecht, Netherlands.

Burton, RM & Obel, B 2018, 'The science of organizational design: Fit between structure and coordination', *Journal of Organization Design*, vol. 7, no. 1, pp. 1-13.

Burton, RM, Obel, B & Håkonsson, DD 2015, *Organizational design: A step-by-step approach*, 3 edn, Cambridge University Press, Cambridge, the UK.

—— 2020, *Organizational design: A step-by-step approach*, 4 edn, Cambridge University Press, Cambridge, the UK.

Caffoor, I 2010, ‘Perspective: A vision of a low-carbon water sector in 2050’, in *Proceedings of the Institution of Civil Engineers-Engineering Sustainability*, vol. 163, pp. 9-14.

Campos, LM, de Melo Heizen, DA, Verdinelli, MA & Miguel, PAC 2015, 'Environmental performance indicators: a study on ISO 14001 certified companies', *Journal of Cleaner Production*, vol. 99, pp. 286-96.

Canonico, P, Schiuma, G, De Nito, E & Mangia, G 2012, 'Control mechanisms and knowledge integration in exploitative project teams: a case study from the coal fired power plant industry', *Journal of Knowledge Management*, vol. 16, no. 4, pp. 538-49.

Cantele, S, Tsalis, TA & Nikolaou, IE 2018, 'A new framework for assessing the sustainability reporting disclosure of water utilities', *Sustainability*, vol. 10, no. 2.

Cao, G, Duan, Y & Cadden, T 2019, 'The link between information processing capability and competitive advantage mediated through decision-making effectiveness', *International Journal of Information Management*, vol. 44, no. 1, pp. 121-31.

Carcary, M, Doherty, E, Conway, G & Crowley, C 2017, 'Transforming to a digital enterprise-An empirical investigation', in *The European Conference on Information Systems Management*, Genova, Italy, pp. 27-36.

Carlisle, Y 2002, 'Strategic thinking and knowledge management', in M Mazzucato (ed.), *A strategy for business: A reader*, SAGE Publications, London, pp. 303-19.

Casey, D & Murphy, K 2009, 'Issues in using methodological triangulation in research', *Nurse researcher*, vol. 16, no. 4.

Catlin, T, Patiath, P & Segev, I 2014, 'Insurance companies' Untapped Digital Opportunity', *Harvard Business Review*, pp. 1-5.

Cegielski, CG, Jones-Farmer, LA, Wu, Y & Hazen, BT 2012, 'Adoption of cloud computing technologies in supply chains: An organizational information processing theory approach', *The international journal of logistics Management*, vol. 23, no. 2, pp. 184-211.

Cha, KJ, Hwang, T & Gregor, S 2015, 'An integrative model of IT-enabled organizational transformation: A multiple case study', *Management Decision*, vol. 53, no. 8, pp. 1755-70.

Chaffee, EE 1985, 'Three models of strategy', *Academy of Management review*, vol. 10, no. 1, pp. 89-98.

Chakravarthy, BS & Lorange, P 1991, *Managing the strategy process: a framework for a multibusiness firm*, Prentice Hall, Englewood Cliffs.

Chan, YE & Reich, BH 2007, 'IT alignment: What have we learned?', *Journal of Information Technology*, vol. 22, no. 4, pp. 297-315.

Chan, YE, Sabherwal, R & Thatcher, JB 2006, 'Antecedents and outcomes of strategic IS alignment: an empirical investigation', *IEEE Transactions on Engineering Management*, vol. 53, no. 1, pp. 27-47.

Chandler, AD 1962, *Strategy and structure*, MIT Press, Cambridge, MA.

—— 1990, *Strategy and structure: Chapters in the history of the industrial enterprise*, vol. 120, MIT press, USA.

Chanias, S 2017, 'Mastering digital transformation: The path of a financial services provider towards a digital transformation strategy', in *Twenty-Fifth European Conference on Information Systems (ECIS)*, Guimarães, Portugal, pp. 1-17.

Chanias, S & Hess, T 2016, 'Understanding digital transformation strategy formation: Insights from Europe's automotive industry', in *the Pacific Asia Conference on Information Systems (PACIS)*, Pacific, p. 296.

Chanias, S, Myers, MD & Hess, T 2019, 'Digital transformation strategy making in pre-digital organizations: The case of a financial services provider', *The Journal of Strategic Information Systems*, vol. 28, no. 1, pp. 17-33.

Charoensuk, S, Wongsurawat, W & Khang, DB 2014, 'Business-IT Alignment: A practical research approach', *The Journal of High Technology Management Research*, vol. 25, no. 2, pp. 132-47.

Chatterji, AK & Toffel, MW 2010, 'How firms respond to being rated', *Strategic management journal*, vol. 31, no. 9, pp. 917-45.

Chen, DQ, Mocker, M, Preston, DS & Teubner, A 2010, 'Information systems strategy: Reconceptualization, measurement, and implications', *MIS quarterly*, vol. 34, no. 2, pp. 233-59.

Chen, JE, Pan, SL & Ouyang, TH 2014, 'Routine reconfiguration in traditional companies’e-commerce strategy implementation: A trajectory perspective', *Information & Management*, vol. 51, no. 2, pp. 270-82.

Chi, M, Lu, X, Zhao, J & Li, Y 2018, 'The impacts of digital business strategy on firm performance: The mediation analysis of e-collaboration capability', *International Journal of Information Systems and Change Management*, vol. 10, no. 2, pp. 123-39.

Childe, SJ 2011, 'Case studies in operations management', *Production Planning & Control*, vol. 22, no. 2, pp. 1-2.

Clarkson, PM, Li, Y, Richardson, GD & Vasvari, FP 2008, 'Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis', *Accounting, Organizations and Society*, vol. 33, no. 4, pp. 303-27.

Coffey, A & Atkinson, P 1996, *Making sense of qualitative data: complementary research strategies*, Sage Publications, Inc, Thousand Oaks, CA.

Cole, R & Aitken, J 2019, 'Selecting suppliers for socially sustainable supply chain management: post-exchange supplier development activities as pre-selection requirements', *Production Planning & Control*, vol. 30, no. 14, pp. 1184-202.

Coltman, T, Tallon, P, Sharma, R & Queiroz, M 2015, 'Strategic IT alignment: Twenty-five years on', *Journal of Information Technology*, vol. 30, no. 2015, pp. 91-100.

Connor, G, McFadden, M & McLean, I 2012, *Organisational design*, CIPD, USA.

Cooper, B & Glaesser, J 2012, 'Qualitative work and the testing and development of theory: Lessons from a study combining cross-case and within-case analysis via Ragin's QCA', in *Forum Qualitative Sozialforschung (FQS)/Forum: Qualitative Social Research*, vol. 13, pp. 1-24.

Creswell, JW 2018, *Research design : Qualitative, quantitative, and mixed methods approaches*, 5 edn, SAGE Publications, Inc., Thousand Oaks, California.

Creswell, JW & Creswell, JD 2018, *Qualitative, quantitative, and mixed methods approaches*, SAGE, Germany.

Cronbach, LJ 1975, 'Beyond the two disciplines of scientific psychology', *American Psychologist*, vol. 30, no. 2, p. 116.

Crotty, M 2020, *The foundations of social research: Meaning and perspective in the research process*, Routledge, London.

CSU 2020, *Generalizability and Transferability*, Colorado State University, viewed 22.5 2020, <https://writing.colostate.edu/guides/guide.cfm?guideid=65>.

Cui, M & Pan, SL 2015, 'Developing focal capabilities for e-commerce adoption: A resource orchestration perspective', *Information & Management*, vol. 52, no. 2, pp. 200-9.

D'Cruz, M, Timbrell, G & Watson, J 2015, 'Strategy in a digital world', in *Australasian Conference on Information Systems*, Australia, pp. 1-13.

da Cruz, NF & Marques, RC 2013, 'A multi-criteria model to determine the sustainability level of water services', *Water Asset Management International*, vol. 9, no. 3, pp. 1-11.

Dainty, A 2008, *Methodological pluralism in construction management research*, One, CiteSeerX, Digital Library

Dalenogare, LS, Benitez, GB, Ayala, NF & Frank, AG 2018, 'The expected contribution of Industry 4.0 technologies for industrial performance', *International Journal of Production Economics*, vol. 204, pp. 383-94.

Daniel, DR 1961, 'Management information crisis', *Harvard Business Review*, vol. 39, no. 5, pp. 111-21.

Davenport, TH, Harris, JG & Cantrell, S 2004, 'Enterprise systems and ongoing process change', *Business process management*, vol. 10, no. 1, pp. 16-26.

Davies, A, Brady, T & Hobday, M 2006, 'Charting a path toward integrated solutions', *MIT Sloan Management Review*, vol. 47, no. 3, p. 39.

De Haes, S & Van Grembergen, W 2009, 'An exploratory study into IT governance implementations and its impact on business/IT alignment', *Information Systems Management*, vol. 26, no. 2, pp. 123-37.

De Sousa, JME 2004, 'Definition and analysis of critical success factors for ERP implementation projects', PhD thesis, Universitat Politècnica de Catalunya.

de Wit, B & Meyer, R 2020, *Strategy: An international perspective*, 7 edn, Cengage Learning, The UK.

Delanty, G & Strydom, P 2003, *Philosophies of social science: The classic and contemporary readings*, Open University Press, Maidenhead.

DeLone, W, Migliorati, D & Vaia, G 2018, 'Digital IT governance', in *CIOs and the digital transformation*, Springer, Switzerland, pp. 205-30.

Denzin, NK & Lincoln, YS 2005, 'Qualitative research', *Denzin, NK y Lincoln YS*, vol. 2.

DeSanctis, G & Poole, MS 1994, 'Capturing the complexity in advanced technology use: Adaptive structuration theory', *Organisation Science*, vol. 5, no. 2, pp. 121-47.

Dey, I 2012, *Grounding grounded theory: Guidelines for qualitative inquiry*, Crane Library at the University of British Columbia, Canada.

Dong, L, Neufeld, D & Higgins, C 2009, 'Top management support of enterprise systems implementations', *Journal of Information Technology*, vol. 24, no. 1, pp. 55-80.

Dosi, G, Nelson, RR & Winter, SG 2000, *The nature and dynamics of organizational capabilities*, Oxford university press, Oxford.

Drago, WA 1997, 'Organisation structure and strategic planning: An empirical examination', *Management Research News*, vol. 20, no. 1, pp. 30-42.

Dremel, C, Wulf, J, Herterich, MM, Waizmann, J-C & Brenner, W 2017, 'How AUDI AG established Big Data Analytics in Its digital transformation', *MIS Quarterly Executive*, vol. 16, no. 2, pp. 81-100.

Drucker, PF 1954, *The Practice of Management*, HarperCollins Publishers Inc, NY, United States.

Drucker, PF 1967, *The effective executive*, Heinemann, London.

Dubey, R, Gunasekaran, A, Childe, SJ, Papadopoulos, T, Luo, Z, Wamba, SF & Roubaud, D 2019, 'Can big data and predictive analytics improve social and environmental sustainability?', *Technological Forecasting and Social Change*, vol. 144, pp. 534-45.

Dubois, A & Araujo, LM 2004, 'Research methods in industrial marketing studies', in *Rethinking marketing: Developing a new understanding of markets*, John Wiley and Sons Ltd, Chichester, pp. 207-28.

Dubois, A & Gadde, L-E 2002, 'Systematic combining: An abductive approach to case research', *Journal of business research*, vol. 55, no. 7, pp. 553-60.

—— 2014, '“Systematic combining”—A decade later', *Journal of business research*, vol. 67, pp. 1277-84.

—— 2017, '“Systematic Combining”: An approach to case research', *Journal of Global Scholars of Marketing Science*, vol. 27, no. 4, pp. 258-69.

Dunleavy, P, Margetts, H, Tinkler, J & Bastow, S 2006, *Digital era governance: IT corporations, the state, and e-government*, Oxford University Press, NY, USA.

Dyllick, T & Hockerts, K 2002, 'Beyond the business case for corporate sustainability', *Business strategy and the environment*, vol. 11, pp. 130-41.

Easterby-Smith, M, Thorpe, R & Jackson, PR 2012, *Management research*, SAGE Publications Inc, London.

Easterby-Smith, M, Lyles, MA & Peteraf, M 2009, 'Dynamic capabilities: Current debates and future directions', *British Journal of Management*, vol. 20, pp. S1-S8.

Ebneyamini, S & Moghadam, MRS 2018, 'Toward developing a framework for conducting case study research', *International journal of qualitative methods*, vol. 17, no. 1, pp. 1-11.

Eisenhardt, KM 1989, 'Building theories from case study research', *Academy of Management review*, vol. 14, no. 4, pp. 532-50.

El Sawy, OA, Kræmmergaard, P, Amsinck, H & Vinther, AL 2016, 'How LEGO built the foundations and enterprise capabilities for digital leadership', *MIS Quarterly Executive*, vol. 15, no. 2, pp. 141-66.

El Sawy, OA, Malhotra, A, Park, Y & Pavlou, PA 2010, 'Research commentary—seeking the configurations of digital ecodynamics: It takes three to tango', *Information systems research*, vol. 21, no. 4, pp. 835-48.

Elkington, J 1998, 'Partnerships from cannibals with forks: The triple bottom line of 21st-century business', *Environmental quality management*, vol. 8, no. 1, pp. 37-51.

—— 1999, *Cannibals with forks: The triple bottom line of the 21st century*, Capstone, Creek.

Elo, S & Kyngäs, H 2008, 'The qualitative content analysis process', *Journal of advanced nursing*, vol. 62, no. 1, pp. 107-15.

Engert, S & Baumgartner, RJ 2016, 'Corporate sustainability strategy–bridging the gap between formulation and implementation', *Journal of Cleaner Production*, vol. 113, pp. 822-34.

Epstein, MJ & Buhovac, AR 2014, *Making sustainability work: Best practices in managing and measuring corporate social, environmental, and economic impacts*, Berrett-Koehler Publishers, San Francisco, USA.

Epstein, MJ & Roy, M-J 2001, 'Sustainability in action: Identifying and measuring the key performance drivers', *Long range planning*, vol. 34, no. 5, pp. 585-604.

Erevelles, S, Fukawa, N & Swayne, L 2016, 'Big Data consumer analytics and the transformation of marketing', *Journal of business research*, vol. 69, no. 2, pp. 897-904.

Erwee, R 2003, 'Integrating diversity management initiatives with strategic human resource management', in R Wiesner & B Millet (eds), *Human Resource Management: Challenges and Future Directions*, John Wiley and Sons Ltd, Australia, pp. 57-71.

Esmail, M, Al-Rejal, A & Mohtar, S 2018, 'An Analysis the Relationship between IT-Business Strategic Alignment and Intangible IT Resources on the Competitive Advantages Sustainability Moderating Effect of IT Personnel Capability', *International Journal of Asian Social Science, Asian Economic and Social Society*, vol. 8, no. 12, pp. 1170-9.

Favaro, K 2016, 'Don't Draft a Digital Strategy Just Because Everyone Else Is', *Harvard Business Review*, pp. 1-4.

Feeny, DF & Willcocks, LP 1998, 'Core IS capabilities for exploiting information technology', *Sloan management review*, vol. 39, no. 3, pp. 9-21.

Fellows, RF & Liu, AM 2015, *Research methods for construction*, John Wiley & Sons, Oxford, United Kingdom.

Fernando, Y, Jabbour, CJC & Wah, W-X 2019, 'Pursuing green growth in technology firms through the connections between environmental innovation and sustainable business performance: does service capability matter?', *Resources, Conservation and Recycling*, vol. 141, pp. 8-20.

Feroz, AK, Zo, H & Chiravuri, A 2021, 'Digital transformation and environmental sustainability: A review and research agenda', *Sustainability*, vol. 13, no. 3, pp. 1-20.

Fetterman, DM 2019, *Ethnography: Step-by-step*, vol. 17, SAGE Publications, California.

Fleming, N 2008, 'Understanding ‘what’s really going on’as a basis for transforming thinking, action and our cities', in *Enviro 08 Australasia’s Environmental & Sustainability Conference & Exhibition*, Melbourne, Australia, pp. 1-9.

Floridi, L 2018, 'Soft ethics and the governance of the digital', *Philosophy & Technology*, vol. 31, no. 1, pp. 1-8.

Foster, S, Hawking, P & Stein, A 2004, 'Change management: the forgotten critical success factor in enterprise wide system implementations', in *Australasian ACIS Proceedings*, Hobart, pp. 1-11.

Freeman, RE 1994, 'The politics of stakeholder theory: Some future directions', *Business ethics quarterly*, vol. 4, no. 4, pp. 409-21.

Friedman, M 1970, 'A theoretical framework for monetary analysis', *journal of Political Economy*, vol. 78, no. 2, pp. 193-238.

Gable, GG 1994, 'Integrating case study and survey research methods: An example in information systems', *European journal of information systems*, vol. 3, no. 2, pp. 112-26.

Galbraith, JR 1973, *Designing complex organizations*, Addison-Wesley Longman Publishing Co., Inc., Boston, MAUnited States.

—— 1974, 'Organization design: An information processing view', *Interfaces*, vol. 4, no. 3, pp. 28-36.

—— 1977, *Organization design*, Addison Wesley Publishing Company, Boston.

—— 2000, *Designing the global corporation*, John Wiley & Sons, MA, USA.

—— 2011, *The star model*, Galbraith Management Consultants, , Colorado, USA.

—— 2014, 'Organizational design challenges resulting from big data', *Journal of Organization Design*, vol. 3, no. 1, pp. 2-13.

Galbraith, JR, Downey, D & Kates, A 2002, *Designing dynamic organizations: A hands-on guide for leaders at all levels*, AMACOM Books, New York, USA.

Galliers, R 1992, *Information systems research: Issues, methods and practical guidelines*, Blackwell Scientific Publications, The UK.

—— 2011, 'Further developments in information systems strategizing: unpacking the concept', in *The Oxford Handbook of Information Systems: Critical Perspectives and New Directions.*, Oxford University Press, Oxford, pp. 329-45.

Gambardella, A, Khashabi, P & Panico, C 2020, 'Managing autonomy in industrial R&D: A project-level investigation', *Organization Science, forthcoming*, vol. 31, no. 1, pp. 165-81.

Geels, FW & Schot, J 2007, 'Typology of sociotechnical transition pathways', *Research Policy*, vol. 36, no. 3, pp. 399-417.

Gerow, JE, Grover, V & Thatcher, J 2015, 'Six types of IT-business strategic alignment: an investigation of the constructs and their measurement', *European journal of information systems*, vol. 24, no. 5, pp. 465-91.

Gerow, JE, Grover, V, Thatcher, JB & Roth, PL 2014, 'Looking toward the future of IT-business strategic alignment through the past: A meta-analysis', *MIS quarterly*, vol. 38, no. 4, pp. 1059-85.

Geyler, S, Kerber, H, Lux, A, Hedrich, M, Beck, J, Möller, K, Selvakumar, G, Eller, M, Tocha, C & Sonnenburg, A 2018, 'Ensuring sustainable development for the German water sector: setting the stage for the risk-based sustainability management system (RSS)', *Urban Water Journal*, vol. 15, no. 6, pp. 518-25.

Giddens, A 1984, *The constitution of society: Outline of the theory of structuration*, University of California Press, Berkley.

Gimpel, H, Hosseini, S, Huber, R, Probst, L, Röglinger, M & Faisst, U 2018, 'Structuring digital transformation: A framework of action fields and its application at ZEISS', *Journal of Information Technology Theory and Application*, vol. 19, no. 1, pp. 31-54.

Gioia, DA, Corley, KG & Hamilton, AL 2013, 'Seeking qualitative rigor in inductive research: Notes on the Gioia methodology', *Organizational research methods*, vol. 16, no. 1, pp. 15-31.

Glaser , BG & Strauss, AL 2017, *Discovery of grounded theory: Strategies for qualitative research*, Routledge, New York, United States.

Glaser, BG, Strauss, AL & Strutzel, E 1968, 'The discovery of grounded theory; strategies for qualitative research', *Nursing research*, vol. 17, no. 4, p. 364.

Gläser, J & Laudel, G 2006, *Experteninterviews Und Qualitative Inhaltsanalyse Als Instrumente Rekonstruierender Untersuchungen*, Verlag für Sozialwissenschaften, Wiesbaden, Germany.

Goering, PN & Streiner, DL 1996, 'Reconcilable differences: The marriage of qualitative and quantitative methods', *The Canadian Journal of Psychiatry*, vol. 41, no. 8, pp. 491-7.

Gong, C & Ribiere, V 2021, 'Developing a unified definition of digital transformation', *Technovation*, vol. 102, pp. 1-17.

Goold, M & Quinn, JJ 1990, 'The paradox of strategic controls', *Strategic management journal*, vol. 11, no. 1, pp. 43-57.

Granados, N & Gupta, A 2013, 'Transparency strategy: Competing with information in a digital world', *MIS quarterly*, vol. 37, no. 2, pp. 637-41.

Grant, RM 1991, 'The resource-based theory of competitive advantage: implications for strategy formulation', *California Management Review*, vol. 33, no. 3, pp. 114-35.

—— 1996a, 'Prospering in dynamically-competitive environments: Organizational capability as knowledge integration', *Organization science*, vol. 7, no. 4, pp. 375-87.

—— 1996b, 'Toward a knowledge-based theory of the firm', *Strategic management journal*, vol. 17, no. S2, pp. 109-22.

—— 2016, *Contemporary strategy analysis*, 9th ed. edn, Wiley, The UK.

—— 2018, 'Knowledge management theories', in M Augier & DJ Teece (eds), *The palgrave encyclopedia of strategic management*, Palgrave Macmillan, Basingstoke, United Kingdom, DOI 10.1057/978-1-349-94848-2_492-1.

Gray, P 2006, *Manager's guide to making decisions about information systems*, John Wiley & Sons Incorporated, New Jersey.

Greenwood, DJ & Levin, M 2007, *Introduction to action research: Social research for social change*, 2 edn, SAGE Publications, Inc., Thousand Oaks, California

Gregory, RW, Kaganer, E, Henfridsson, O & Ruch, TJ 2018, 'IT Consumerization and the Transformation of IT Governance', *MIS quarterly*, vol. 42, no. 4, pp. 1225-53.

Grover, V & Kohli, R 2013, 'Revealing your hand: caveats in implementing digital business strategy', *MIS quarterly*, vol. 37, no. 2, pp. 655-62.

Guba, EG 1981, 'Criteria for assessing the trustworthiness of naturalistic inquiries', *Ectj*, vol. 29, no. 2, pp. 75-91.

Guba, EG & Lincoln, YS 1994, 'Competing paradigms in qualitative research', in *Handbook of qualitative research*, Sage, London, vol. 2, pp. 105-17.

Gutierrez, A, Orozco, J & Serrano, A 2009, 'Factors affecting IT and business alignment: a comparative study in SMEs and large organisations', *Journal of Enterprise Information Management*, vol. 22, no. 1/2, pp. 197-211.

GWI 2020, *Public Water Agency of the Year*, Global Water Intelligence, viewed 31.05 2021.

Haddaway, A 2013, *Trending technology: The growing benefits of web- and cloud-based customer service*, WaterWorld, viewed 31.05 2020, <https://www.waterworld.com/technologies/article/16190788/trending-technology-the-growing-benefits-of-web-and-cloudbased-customer-service>.

Haffke, I, Kalgovas, BJ & Benlian, A 2016, 'The role of the CIO and the CDO in an organization's digital transformation', in *Thirty Seventh International Conference on Information Systems*, Dublin, pp. 1-20.

Håkonsson, DD, Burton, RM, Obel, B & Lauridsen, JT 2012, 'Strategy implementation requires the right executive style: Evidence from Danish SMEs', *Long range planning*, vol. 45, no. 2-3, pp. 182-208.

Hambrick, DC & Cannella, JAA 1989, 'Strategy implementation as substance and selling', *Academy of management perspectives*, vol. 3, no. 4, pp. 278-85.

Hamel, G & Prahalad, CK 1985, 'Do you really have a global strategy?', *The International Executive*, vol. 27, no. 3, pp. 13-4.

Hansen, R & Sia, SK 2015, 'Hummel's digital transformation toward omnichannel retailing: Key lessons learned', *MIS Quarterly Executive*, vol. 14, no. 2, pp. 51-66.

Haque, U 2015, *Your digital strategy shouldn't be about attention* Harvard Business Publishing, Boston.

Harbor Research 2009, *Financial benefits of interoperability*, GridWise, Boulder, USA.

Hatzakis, T, Lycett, M, Macredie, RD & Martin, VA 2005, 'Towards the development of a social capital approach to evaluating change management interventions', *European journal of information systems*, vol. 14, no. 1, pp. 60-74.

Hauser, A, Foret, N, Combellack, S, Coome, J, Lopez, Q, Hernandez, E, Kharkar, SM, Rasekh, A, Remy, M & Damour, N 2016, 'Communication in smart water networks', in M Koenig (ed.), *Smart Water Networks Forum* pp. 1-9.

Hauser, A, Hild, S & Roedler, F 2013, 'Communication systems in the smart water grid', in *SWAN 2013: 3rd Annual Smart Water Networks Conference*, London, UK.

Hauser, A & Roedler, F 2015, 'Interoperability: the key for smart water management', *Water Science and Technology: Water Supply*, vol. 15, no. 1, pp. 207-14.

Haußmann, C, Dwivedi, YK, Venkitachalam, K & Williams, MD 2012, 'A summary and review of Galbraith's organizational information processing theory', in *Information Systems Theory*, Springer, Wales, UK, pp. 71-93.

Hawn, O & Ioannou, I 2016, 'Mind the gap: The interplay between external and internal actions in the case of corporate social responsibility', *Strategic management journal*, vol. 37, no. 13, pp. 2569-88.

Hax, AC & Majluf, NS 1988, 'The concept of strategy and the strategy formation process', *Interfaces*, vol. 18, no. 3, pp. 99-109.

Henderson, JC & Venkatraman, N 1993, 'Strategic alignment: Leveraging information technology for transforming organizations', *IBM systems journal*, vol. 38, no. 1, pp. 472-84.

—— 1999, 'Strategic alignment: Leveraging information technology for transforming organizations', *IBM systems journal*, vol. 38, no. 2.3, pp. 472-84.

Henfridsson, O & Lind, M 2014, 'Information systems strategizing, organizational sub-communities, and the emergence of a sustainability strategy', *The Journal of Strategic Information Systems*, vol. 23, no. 1, pp. 11-28.

Herden, TT 2020, 'Explaining the competitive advantage generated from analytics with the knowledge-based view: the example of logistics and supply chain management', *Business Research*, vol. 13, no. 1, pp. 163-214.

Herriott, RE & Firestone, WA 1983, 'Multisite qualitative policy research: Optimizing description and generalizability', *Educational researcher*, vol. 12, no. 2, pp. 14-9.

Hess, T, Matt, C, Benlian, A & Wiesböck, F 2016, 'Options for formulating a digital transformation strategy', *MIS Quarterly Executive*, vol. 15, no. 2, pp. 123-39.

Hibberd, FJ 2010, 'Situational realism, critical realism, causation and the charge of positivism', *History of the Human Sciences*, vol. 23, no. 4, pp. 37-51.

Hill, CW, Jones, GR & Schilling, MA 2016, *Strategic managementt theory: An integrated approach*, 9 edn, Cengage Learning, Canda.

Hinings, B, Gegenhuber, T & Greenwood, R 2018, 'Digital innovation and transformation: An institutional perspective', *Information and Organization*, vol. 28, no. 1, pp. 52-61.

Hirschheim, R, Klein, HK & Lyytinen, K 1995, *Information systems development and data modeling: Conceptual and philosophical foundations*, Cambridge University Press, Cambridge, United Kingdom.

Hofer, BK 2001, 'Personal epistemology research: Implications for learning and teaching', *Educational psychology review*, vol. 13, no. 4, pp. 353-83.

Hofer, CW 1973, 'Some preliminary research on patterns of strategic behavior', in *Academy of Management Proceedings*, Briarcliff Manor, NY 10510, vol. 1973, pp. 46-54.

Hofer, CW & Schendel, D 1978, *Strategy formulation: Analytical concepts*, West Publishing, St. Paul, Minnesota.

Holgeid, KK, Krogstie, J, Stray, V & Thompson, M 2019, 'Strategizing for successful IT projects in the digital Era', paper presented to International Research Workshop on IT Project Management, San Francisco, USA, <http://hdl.handle.net/10871/35871>.

Holotiuk, F & Beimborn, D 2017, 'Critical success factors of digital business strategy', in *Proceedings der 13. Internationalen Tagung Wirtschaftsinformatik* St. Gallen, Switzerland pp. 991-1005.

Holsti, OR 1969, *Content analysis for the social sciences*, Addison Wesley, London.

Hooley, G, Cox, T, Shipley, D, Fahy, J, Beracs, J & Kolos, K 1996, 'Foreign direct investment in Hungary: Resource acquisition and domestic competitive advantage', *Journal of International Business Studies*, vol. 27, no. 4, pp. 683-709.

Hoopes, DG, Madsen, TL & Walker, G 2003, 'Guest editors' introduction to the special issue: why is there a resource-based view? Toward a theory of competitive heterogeneity', *Strategic management journal*, vol. 24, no. 10, pp. 889-902.

Horlach, B, Drews, P & Schirmer, I 2016, 'Bimodal IT: Business-IT alignment in the age of digital transformation', in *Multikonferenz Wirtschaftsinformatik (MKWI)*, Thuringia, Germany, pp. 1417-28.

Horlach, B, Drews, P, Schirmer, I & Böhmann, T 2017, 'Increasing the agility of IT delivery: five types of bimodal IT organization', in *Proceedings of the 50th Hawaii International Conference on System Sciences*, Hawaii.

Horlacher, A 2016, 'Co-creating value-The dyadic CDO-CIO relationship during the digital transformation', in *Twenty-Fourth European Conference on Information Systems* İstanbul, Turkey, pp. 1-12.

Hossieni, S, Dehkordi, G & Aghapour, H 2012, 'Insights into case study: A discussion on forgotten aspects of case research', *International Journal of Scientific and Research Publications*, vol. 2, no. 3, pp. 1-6.

Houghton, C, Casey, D, Shaw, D & Murphy, K 2013, 'Rigour in qualitative case-study research', *Nurse researcher*, vol. 20, no. 4.

Hourneaux Jr, F, da Silva Gabriel, ML & Gallardo-Vázquez, DA 2018, 'Triple bottom line and sustainable performance measurement in industrial companies', *Revista de Gestão*, vol. 25, no. 4, pp. 413-29.

Howell, S, Beach, T & Rezgui, Y 2021, 'Robust requirements gathering for ontologies in smart water systems', *Requirements Engineering*, vol. 26, no. 1, pp. 97-114.

Howell, S, Rezgui, Y & Beach, T 2017, 'Integrating building and urban semantics to empower smart water solutions', *Automation in Construction*, vol. 81, no. 1, pp. 434-48.

Hrebiniak, LG & Joyce, WF 1984, *Implementing strategy*, Macmillan, New York.

Huang, J, Henfridsson, O, Liu, MJ & Newell, S 2017, 'Growing on steroids: Rapidly scaling the user base of digital ventures through digital innovaton', *MIS quarterly*, vol. 41, no. 1, pp. 301-14.

Hussey, DE 1998, *Strategic management: from theory to implementation*, Fourth edn, Butterworth-Heinemann, Oxford.

Hyder, AS & Eriksson, LT 2005, 'Success is not enough: The spectacular rise and fall of a strategic alliance between two multinationals', *Industrial marketing management*, vol. 34, no. 8, pp. 783-96.

IBM 1980, *A management system for the information business*, IBM, White Plains, New York.

IEC 61850 2013, 'Communication networks and systems in substations, International Electrotechnical Commission', *IEC*, vol. 61850, no. 2.

Indriasari, E, Supangkat, SH & Kosala, R 2020, 'Digital Transformation: IT governance In the agile environment a study case of Indonesia high regulated company', *International journal of scientific & technology research*, vol. 9, no. 4, pp. 1557-62.

Ivanov, D, Dolgui, A & Sokolov, B 2019, 'The impact of digital technology and Industry 4.0 on the ripple effect and supply chain risk analytics', *International Journal of Production Research*, vol. 57, no. 3, pp. 829-46.

Jaques, E 1990, 'In praise of hierarchy', *Harvard Business Review*.

Järvensivu, T & Törnroos, J-Å 2010, 'Case study research with moderate constructionism: Conceptualization and practical illustration', *Industrial marketing management*, vol. 39, no. 1, pp. 100-8.

Jick, TD 1979, 'Mixing qualitative and quantitative methods: Triangulation in action', *Administrative science quarterly*, vol. 24, no. 4, pp. 602-11.

Johns, G & Saks, A 2014, *Organisational behaviour*, Pearson, Toronto, Canada.

Johnsen, RE & Ford, D 2006, 'Interaction capability development of smaller suppliers in relationships with larger customers', *Industrial marketing management*, vol. 35, no. 8, pp. 1002-15.

Johnson, G, Whittington, R, Scholes, K, Angwin, D & Regner, P 2014, *Exploring strategy: text and cases*, 10 edn, Pearson Education Limited, London.

Jones, G & George, J 2022, *Contemporary management*, 12 edn, McGraw-Hill, NY, USA.

Jones, G & Kramar, R 2010, 'CSR and the building of leadership capability', *Journal of Global Responsibility*, vol. 1, no. 2, pp. 250-9.

Junior, JAG, Busso, CM, Gobbo, SCO & Carreão, H 2018, 'Making the links among environmental protection, process safety, and industry 4.0', *Process Safety and Environmental Protection*, vol. 117, pp. 372-82.

Kahre, C, Hoffmann, D & Ahlemann, F 2017, 'Beyond business-IT alignment-digital business strategies as a paradigmatic shift: a review and research agenda', in *the 50th Hawaii International Conference on System Sciences*, Hawaii, pp. 4706-15.

Kamble, SS, Gunasekaran, A & Gawankar, SA 2018, 'Sustainable Industry 4.0 framework: A systematic literature review identifying the current trends and future perspectives', *Process Safety and Environmental Protection*, vol. 117, pp. 408-25.

Kamunda, A, Renukappa, S, Suresh, S & Jallow, H 2020, 'BIM in the water industry: Addressing challenges to improve the project delivery process', *Engineering, Construction and Architectural Management*, pp. 0969-9988.

Kane, GC 2017, *Digital maturity, not digital transformation*, MIT sloan management review, viewed 17.08 2020, <https://sloanreview.mit.edu/article/digital-maturity-not-digital-transformation/>.

Kane, GC, Palmer, D, Nguyen-Phillips, A, Kiron, D & Buckley, N 2017, 'Achieving digital maturity', *MIT Sloan Management Review*, vol. 59, no. 1, pp. 1-31.

Kane, GC, Palmer, D, Phillips, AN, Kiron, D & Buckley, N 2016, 'Aligning the organization for its digital future', *MIT Sloan Management Review*, vol. 58, no. 1, pp. 1-27.

Kang, D & Santhanam, R 2003, 'A longitudinal field study of training practices in a collaborative application environment', *Journal of Management Information Systems*, vol. 20, no. 3, pp. 257-81.

Karlsson, S & Wåhlin, F 2017, 'Digital Strategies and Strategic Alignment', Master thesis, Lund University.

Karpovsky, A & Galliers, RD 2015, 'Aligning in practice: From current cases to a new agenda', *Journal of Information Technology*, vol. 30, no. 2, pp. 136-60.

Kates, A & Galbraith, JR 2007, *Designing your organization: Using the Star model to solve 5 critical design challenges*, John Wiley & Sons, San Francisco, USA.

Kayaga, S, Kingdom, W & Jalakam, A 2018, 'Organisational design for improved performance of urban water utilities in developing countries', *Utilities Policy*, vol. 50, pp. 49-59.

Kaynak, H 2003, 'The relationship between total quality management practices and their effects on firm performance', *Journal of operations management*, vol. 21, no. 4, pp. 405-35.

Kearns, GS & Sabherwal, R 2006, 'Strategic alignment between business and information technology: A knowledge-based view of behaviors, outcome, and consequences', *Journal of Management Information Systems*, vol. 23, no. 3, pp. 129-62.

Ketokivi, M & Choi, T 2014, 'Renaissance of case research as a scientific method', *Journal of operations management*, vol. 32, no. 5, pp. 232-40.

King, BL 2008, 'Strategizing at leading venture capital firms: of planning, opportunism and deliberate emergence', *Long range planning*, vol. 41, no. 3, pp. 345-66.

Klein, R & Rai, A 2009, 'Interfirm strategic information flows in logistics supply chain relationships', *MIS quarterly*, vol. 33, no. 4, pp. 735-62.

Knights, D 1995, 'Refocusing the case study: The politics of research and researching politics in IT management', *Technology Studies*, vol. 2, no. 2, pp. 230-84.

Knorr-Cetina, K & Cicourel, AV 2015, *Advances in social theory and methodology: Toward an integration of micro-and macro-sociologies*, Routledge, NY, USA.

Koh, SL, Demirbag, M, Bayraktar, E, Tatoglu, E & Zaim, S 2007, 'The impact of supply chain management practices on performance of SMEs', *Industrial Management & Data Systems*, vol. 107, no. 1, pp. 103-24.

Konopik, J, Jahn, C, Schuster, T, Hoßbach, N & Pflaum, A 2022, 'Mastering the digital transformation through organizational capabilities: A conceptual framework', *Digital Business*, vol. 2, no. 2022, pp. 1-13.

Korachi, Z & Bounabat, B 2020, 'General approach for formulating a digital transformation strategy', *Journal of Computer Science*, vol. 16, no. 4, pp. 493-507.

Kotler, P 2001, *Marketing management: The millennium edition*, 10 edn, vol. 199, Prentice-Hall, Inc, New Jersey

Kretschmer, T & Khashabi, P 2020, 'Digital transformation and organization design: An integrated approach', *California Management Review*, vol. 62, no. 4, pp. 86-104.

Krippendorff, K 2018, *Content analysis: An introduction to its methodology*, Sage publications, CA, Beverly Hills.

Krueger, RA 2014, *Focus groups: A practical guide for applied research*, Sage publications, Thousand Oaks, CA.

Kuhn, TS 2012, *The structure of scientific revolutions*, University of Chicago Press, Chicago, USA.

Kurti, I, Barolli, E & Sevrani, K 2013, 'Critical success factors for business-IT alignment: A review of current research', *Romanian Economic and Business Review*, vol. 8, no. 3, p. 79.

Lakhal, La, Pasin, F & Limam, M 2006, 'Quality management practices and their impact on performance', *International Journal of Quality & Reliability Management*, vol. 23, no. 6, pp. 625-46.

Lansley, P, Sadler, P & Webb, T 1974, 'Organisation structure, management style and company performance', *The International Journal of Management Science*, vol. 2, no. 4, pp. 467-85.

Lederer, AL & Mendelow, AL 1988, 'Convincing top management of the strategic potential of information systems', *MIS quarterly*, vol. 12, no. 4, pp. 525-34.

Lee, B & Saunders, MN 2017, *Conducting case study research for business and management students*, SAGE Publications Inc, London.

Lee, B & Saunders, MN 2019, 'Case study research in business and management', in P Atkinson, S Delamont, A Cernat, JW Sakshaug & MD Williams (eds), *Research Methods Foundations*, SAGE Online, pp. 1-8.

Leifer, R & Mills, PK 1996, 'An information processing approach for deciding upon control strategies and reducing control loss in emerging organizations', *Journal of management*, vol. 22, no. 1, pp. 113-37.

Leininger, M 1994, 'Critical issues in qualitative research methods', in JM Morse (ed.), *Critical Issues in Qualitative Research Methods*, sage Publications, Thousand Oaks CA.

Leonard-Barton, D 1995, *Wellsprings of knowledge: Building and sustaining the sources of innovation*, Harvard Business School Press, Boston.

Lewis, GA 2013, 'Role of standards in cloud-computing interoperability', in *2013 46th Hawaii international conference on system sciences*, pp. 1652-61.

Lewis, I 1999, *Arguments with ethnography: Comparative approaches to history, politics, and religion*, Berg Publishers, London, UK.

Li, H, Wu, Y, Cao, D & Wang, Y 2021, 'Organizational mindfulness towards digital transformation as a prerequisite of information processing capability to achieve market agility', *Journal of Business Research*, vol. 122, no. 1, pp. 700-12.

Li, L, Su, F, Zhang, W & Mao, JY 2018, 'Digital transformation by SME entrepreneurs: A capability perspective', *Information Systems Journal*, vol. 28, no. 6, pp. 1129-57.

Li, W, Liu, K, Belitski, M, Ghobadian, A & O'Regan, N 2016, 'e-Leadership through strategic alignment: An empirical study of small-and medium-sized enterprises in the digital age', *Journal of Information Technology*, vol. 31, no. 2, pp. 185-206.

Li, Y, Dai, J & Cui, L 2020, 'The impact of digital technologies on economic and environmental performance in the context of industry 4.0: A moderated mediation model', *International Journal of Production Economics*, vol. 229, no. 1, pp. 1-13.

Liang, H, Wang, N, Xue, Y & Ge, S 2017, 'Unraveling the alignment paradox: how does business—IT alignment shape organizational agility?', *Information systems research*, vol. 28, no. 4, pp. 863-79.

Liboni, LB, Liboni, LH & Cezarino, LO 2018, 'Electric utility 4.0: Trends and challenges towards process safety and environmental protection', *Process Safety and Environmental Protection*, vol. 117, pp. 593-605.

Lima, PFdA, Marcelino-Sadaba, S & Verbano, C 2021, 'Successful implementation of project risk management in small and medium enterprises: A cross-case analysis', *International Journal of Managing Projects in Business*, vol. 14, no. 4, pp. 1023-45.

Lincoln, YS 1995, 'Emerging criteria for quality in qualitative and interpretive research', *Qualitative inquiry*, vol. 1, no. 3, pp. 275-89.

Lincoln, YS & Guba, EG 1985, *Naturalistic inquiry*, vol. 75, Sage.

—— 2016, *The constructivist credo*, Taylor & Francis, The UK.

Liu, A, Giurco, D, Mukheibir, P, Mohr, S, Watkins, G & White, S 2017, 'Online water-use feedback: household user interest, savings and implications', *Urban Water Journal*, vol. 14, no. 9, pp. 900-7.

Liu, A & Mukheibir, P 2018, 'Digital metering feedback and changes in water consumption – A review', *Resources, Conservation and Recycling*, vol. 134, pp. 136-48.

Llamzon, RB, Tan, FTC & Carter, L 2022, 'Toward an information systems alignment framework in the wake of exogenous shocks: Insights from a literature review', *International Journal of Information Management*, vol. 63, pp. 1-13.

Locke, EA, Shaw, KN, Saari, LM & Latham, GP 1981, 'Goal setting and task performance: 1969–1980', *Psychological bulletin*, vol. 90, no. 1, p. 125.

Luftman, J 2000, 'Assessing business-IT alignment maturity', *Association for Information Systems*, vol. 4, no. 14, pp. 1-51.

—— 2003, 'Assessing IT/business alignment', *Information Systems Management*, vol. 20, no. 4, pp. 9-15.

—— 2004, 'Assessing business-IT allignment maturity', in WV Grembergen (ed.), *Strategies for information technology governance*, IGI Global, USA, pp. 99-128.

Luftman, J & Kempaiah, R 2007, 'An update on business-IT alignment:" A line" has been drawn', *MIS Quarterly Executive*, vol. 6, no. 3, pp. 165-77.

Luftman, J, Lyytinen, K & Zvi, Tb 2017, 'Enhancing the measurement of information technology (IT) business alignment and its influence on company performance', *Journal of Information Technology*, vol. 32, no. 1, pp. 26-46.

Luftman, J, Papp, R & Brier, T 1999, 'Enablers and inhibitors of business-IT alignment', *Communications of the Association for information Systems*, vol. 1, no. 11, pp. 1-33.

Maes, R, Rijsenbrij, D, Truijens, O & Goedvolk, H 2000, *Redefining business-IT alignment through a unified framework*, Universiteit Van Amsterdam/Cap Gemini White Paper, Amsterdam.

Mani, D, Barua, A & Whinston, A 2010, 'An empirical analysis of the impact of information capabilities design on business process outsourcing performance', *MIS quarterly*, vol. 34, no. 1, pp. 39-62.

Manyika, J, Chui, M, Bughin, J, Dobbs, R, Bisson, P & Marrs, A 2013, *Disruptive technologies: Advances that will transform life, business, and the global economy*, vol. 180, McKinsey Global Institute San Francisco, CA.

Marabelli, M & Galliers, RD 2017, 'A reflection on information systems strategizing: the role of power and everyday practices', *Information Systems Journal*, vol. 27, no. 3, pp. 347-66.

Marafiq 2021, *Corporate*, 2021, viewed 31.05 2021, <https://www.marafiq.com.sa/en/59-profile/1/49>.

Markus, ML 2004, 'Technochange management: using IT to drive organizational change', *Journal of Information Technology*, vol. 19, no. 1, pp. 4-20.

Markus, ML & Loebbecke, C 2013, 'Commoditized digital processes and business community platforms: New opportunities and challenges for digital business strategies', *MIS quarterly*, vol. 37, no. 2, pp. 649-53.

Markus, ML & Robey, D 1988, 'Information technology and organizational change: Causal structure in theory and research', *Management science*, vol. 34, no. 5, pp. 583-98.

Marques, RC, da Cruz, NF & Pires, J 2015, 'Measuring the sustainability of urban water services', *Environmental Science & Policy*, vol. 54, pp. 142-51.

Martin, JN & Davidz, HL 2007, 'Systems engineering case study development', in *5th Annual Conference on Systems Engineering Research*, Hoboken, NJ, pp. 1-22.

Martin, MW & Sell, J 1979, 'The role of the experiment in the social sciences', *The Sociological Quarterly*, vol. 20, no. 4, pp. 581-90.

Matt, C, Hess, T & Benlian, A 2015, 'Digital transformation strategies', *Business & Information Systems Engineering*, vol. 57, no. 5, pp. 339-43.

Mayring, P 2014, *Qualitative content analysis: Theoretical foundation, basic procedures and software solution*, Erstveröffentlichung, viewed 09.01 2020, <https://nbn-resolving.org/urn:nbn:de:0168-ssoar-395173>.

McAdam, R, Miller, K & McSorley, C 2019, 'Towards a contingency theory perspective of quality management in enabling strategic alignment', *International Journal of Production Economics*, vol. 207, pp. 195-209.

McEvoy, P & Richards, D 2006, 'A critical realist rationale for using a combination of quantitative and qualitative methods', *Journal of research in nursing*, vol. 11, no. 1, pp. 66-78.

McIlwaine, SJ & Ouda, OK 2020, 'Drivers and challenges to water tariff reform in Saudi Arabia', *International Journal of Water Resources Development*, pp. 1-17.

MCIT 2021, *Saudi Arabia receives global award for unremitting efforts In advancing digital-related legislative infrastructure*, MCIT, viewed 11.09 2021, <https://www.mcit.gov.sa/en/news/saudi-arabia-receives-global-award-unremitting-efforts-advancing-digital-related-legislative>.

Melville, N & Ramirez, R 2008, 'Information technology innovation diffusion: an information requirements paradigm', *Information Systems Journal*, vol. 18, no. 3, pp. 247-73.

Messina, M 2018, 'Designing the New Digital Innovation Environment', in *CIOs and the Digital Transformation*, Springer, Cham, Switzerland, pp. 147-80.

MEWA 2020, *National Water Strategy*, Ministry of Environment Water & Agriculture, viewed 30.05 2021, <https://www.mewa.gov.sa/en/Ministry/Agencies/TheWaterAgency/Topics/Pages/Strategy.aspx>.

Mintzberg, H 1978, 'Patterns in strategy formation', *Management science*, vol. 24, no. 9, pp. 934-48.

—— 1979, 'An emerging strategy of" direct" research', *Administrative science quarterly*, vol. 24, no. 4, pp. 582-9.

Mintzberg, H, Ahlstrand, B & Lampel, J 1998, *Strategy Safari: A guided tour through the wilds of strategic mangament*, The free Press, New York.

Mintzberg, H & Lampel, J 1999, 'Reflecting on the strategy process', *Sloan management review*, vol. 40, no. 3, pp. 21-30.

Mintzberg, H & Waters, JA 1985, 'Of strategies, deliberate and emergent', *Strategic management journal*, vol. 6, no. 3, pp. 257-72.

Mishra, SP & Mohanty, B 2020, 'Approaches to strategy formulations: A content analysis of definitions of strategy', *Journal of Management & Organization*, pp. 1-28.

Mithas, S, Agarwal, R & Courtney, H 2012, 'Digital business strategies and the duality of IT', *IT professional*, vol. 14, no. 5, pp. 2-4.

Mithas, S & Lucas, HC 2010, 'What is your digital business strategy?', *IEEE Computer Society*, vol. 12, no. 6, pp. 4-6.

Mithas, S, Tafti, A & Mitchell, W 2013, 'How a firm's competitive environment and digital strategic posture influence digital business strategy', *MIS quarterly*, vol. 37, no. 2, pp. 511-36.

Moncrieff, J 1999, 'Is strategy making a difference?', *Long range planning*, vol. 32, no. 2, pp. 273-6.

Monks, I, Stewart, RA, Sahin, O & Keller, R 2019, 'Revealing unreported benefits of digital water metering: Literature review and expert opinions', *Water*, vol. 11, no. 4, pp. 1-32.

Montalvo Arango, I, Izquierdo Sebastián, J, Campbell, EO & Pérez García, R 2014, 'Cloud-based decision making in water distribution systems', *Procedia Engineering*, vol. 89, pp. 488-94.

Moore, MH 1995, *Creating public value: Strategic management in government*, Harvard university press, Boston, USA.

Morgan, J 2005, 'An alternative argument for transcendental realism based on an immanent critique of Kant', *Journal of Critical Realism*, vol. 4, no. 2, pp. 435-60.

Morote, Á-F & Hernández-Hernández, M 2018, 'Unauthorised domestic water consumption in the City of Alicante (Spain): A consideration of its causes and urban distribution (2005–2017)', *Water*, vol. 10, no. 7, pp. 1-18.

Morton, MS 1991, *Corporation of the 1990s: Information technology and organizational transformation*, Oxford University Press, Inc., London.

Moser, A & Korstjens, I 2018, 'Series: Practical guidance to qualitative research. Part 3: Sampling, data collection and analysis', *European Journal of General Practice*, vol. 24, no. 1, pp. 9-18.

Moser, R, Kuklinski, CPJ-W & Srivastava, M 2017, 'Information processing fit in the context of emerging markets: An analysis of foreign SBUs in China', *Journal of Business Research*, vol. 70, pp. 234-47.

Mounce, SR 2020, 'Data science trends and opportunities for smart water utilities', in *The handbook of environmental chemistry*, Springer, Berlin, Heidelberg.

Mueller, GP & Hersperger, AM 2015, 'Implementing comprehensive plans: Indicators for a task-sheet based performance evaluation process', *Journal of Environmental Planning and Management*, vol. 58, no. 11, pp. 2056-81.

Mumford, E 2006, 'The story of socio-technical design: Reflections on its successes, failures and potential', *Information Systems Journal*, vol. 16, no. 4, pp. 317-42.

Murray, P 2000, 'Designing for business benefits from knowledge management', in C Despres & D Chauvel (eds), *Knowledge Horizons*, Elsevier, USA, pp. 171-94.

Mushore, R & Kyobe, M 2019, 'Optimizing the business value of digital transformation by aligning technology with strategy, work practices and stakeholder interests', in *2019 IEEE 10th Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON)*, pp. 0403-8.

Nadkarni, S & Prügl, R 2021, 'Digital transformation: a review, synthesis and opportunities for future research', *Management Review Quarterly*, vol. 71, pp. 233–341.

Nast, C 2018, *Industrial IoT: How connected things are changing manufacturing*, Wired, viewed 10.10 2020, <https://www.wired.com/wiredinsider/2018/07/industrial-iot-how-connected-things-are-changing-manufacturing/#:~:text=Industrial%20IoT%3A%20How%20Connected%20Things%20Are%20Changing%20Manufacturing,-Robert%20Schmid%2C%20Chief&text=The%20Industrial%20Internet%20of%20Things,artificial%20intelligence%20and%20predictive%20analytics.>.

Nathan, ML 2010, 'Lighting tomorrow with today: Towards a (strategic) sustainability revolution', *International Journal of Sustainable Strategic Management*, vol. 2, no. 1, pp. 29-40.

NDU 2021, *National Digital Transformation Report*, National Digital Transformation Unit, KSA, <https://ndu.gov.sa/en/>.

New, S 2010, 'The transparent supply chain', *Harvard Business Review*, vol. 88, pp. 1-5.

Nicholas, JM 1994, 'Concurrent engineering: overcoming obstacles to teamwork', *Production and Inventory Management Journal*, vol. 35, no. 3, pp. 18-22.

Nonaka, I & Takeuchi, H 1995, *The knowledge-creating company: How Japanese companies create the dynamics of innovation*, Oxford University Press, Oxford.

Nordin, F 2006, 'Identifying intraorganisational and interorganisational alliance conflicts—A longitudinal study of an alliance pilot project in the high technology industry', *Industrial marketing management*, vol. 35, no. 2, pp. 116-27.

Nwankpa, JK & Roumani, Y 2016, 'IT capability and digital transformation: A firm performance perspective', in *Thirty Seventh International Conference on Information Systems*, Dublin, pp. 1-16.

NWC's CEO, La-M 2012, 'Opportunities in the water and wastewater sector (NWC transformation journey)', paper presented to Japanese-Saudi Business Forum, Tokyo, Japan.

NWC 2021a, *News*, NWC, viewed 09.11 2021, <https://www.nwc.com.sa/English/OurCompany/MediaCenter/NewsandEvents/News/Pages/default.aspx>.

—— 2021b, *NWC*, NWC, viewed 09.11 2021, <https://www.nwc.com.sa/English/OurCompany/MediaCenter/NewsandEvents/News/Pages/default.aspx>.

Okhuysen, GA & Eisenhardt, KM 2002, 'Integrating knowledge in groups: How formal interventions enable flexibility', *Organization science*, vol. 13, no. 4, pp. 370-86.

OmniSci 2021, *Interoperability*, viewed 10.06 2021, <https://www.omnisci.com/technical-glossary/interoperability>.

OMS-Group 2022, *Open metering system*, OMS-Group, viewed 25.03 2022, <https://oms-group.org/en/oms-group>.

Orlikowski, WJ 2010, 'The sociomateriality of organisational life: considering technology in management research', *Cambridge journal of economics*, vol. 34, no. 1, pp. 125-41.

Orlikowski, WJ & Baroudi, JJ 1991, 'Studying information technology in organizations: Research approaches and assumptions', *Information systems research*, vol. 2, no. 1, pp. 1-28.

Oxford Business Group 2021, *Public investment and private sector activity support Saudi Arabia's energy and water capacity*, Oxford Business Group, viewed 04.09 2021, <https://oxfordbusinessgroup.com/overview/new-dynamism-public-investment-and-private-sector-activity-support-energy-and-water-capacity-and>.

Pandey, SK & Rainey, HG 2006, 'Public managers' perceptions of organizational goal ambiguity: Analyzing alternative models', *International Public Management Journal*, vol. 9, no. 2, pp. 85-112.

Paré, G, Trudel, M-C, Jaana, M & Kitsiou, S 2015, 'Synthesizing information systems knowledge: A typology of literature reviews', *Information & Management*, vol. 52, no. 2, pp. 183-99.

Park, Y & Mithas, S 2020, 'Organized complexity of digital business Strategy: A configurational perspective', *MIS quarterly*, vol. 44, no. 1, pp. 85-127.

Park, Y, Oh, J & Yu, H 2017, 'RecTime: Real-Time recommender system for online broadcasting', *Information Sciences*, vol. 409, no. 1, pp. 1-16.

Patton, MQ 2002, *Qualitative research and evaluation methods*, 3 edn, SAGE Publications, Thousand Oaks, CA, USA.

Pavlou, PA & El Sawy, OA 2010, 'The “third hand”: IT-enabled competitive advantage in turbulence through improvisational capabilities', *Information systems research*, vol. 21, no. 3, pp. 443-71.

Pedroso, CB, Tate, WL, da Silva, AL & Carpinetti, LCR 2021, 'Supplier development adoption: A conceptual model for triple bottom line (TBL) outcomes', *Journal of Cleaner Production*, vol. 314, pp. 1-18.

Peirce, CS 1903, *"Pragmatism as the logic of abduction". The essential Peirce: selected philosophical writings*, vol. 2, Indiana University Press, USA.

Peteraf, M 1993, 'The cornerstones of competitive advantage: a resource-based view', *Strategic management journal*, vol. 14, no. 3, pp. 179-91.

Pettigrew, AM 1990, 'Longitudinal field research on change: Theory and practice', *Organization science*, vol. 1, no. 3, pp. 267-92.

Piekkari, R, Plakoyiannaki, E & Welch, C 2010, '‘Good’case research in industrial marketing: Insights from research practice', *Industrial Marketing Management*, vol. 39, no. 1, pp. 109-17.

Poch, M, Garrido-Baserba, M, Corominas, L, Perelló-Moragues, A, Monclús, H, Cermerón-Romero, M, Melitas, N, Jiang, SC & Rosso, D 2020, 'When the fourth water and digital revolution encountered COVID-19', *Science of the Total Environment*, vol. 744, pp. 1-8.

Pollock, N & Williams, R 2010, 'The business of expectations: How promissory organizations shape technology and innovation', *Social Studies of Science*, vol. 40, no. 4, pp. 525-48.

Ponce Romero, JM, Hallett, SH & Jude, S 2017, 'Leveraging big data tools and technologies: addressing the challenges of the water quality sector', *Sustainability*, vol. 9, no. 12, pp. 2-19.

Porras, JI & Robertson, PJ 1992, 'Organisational development: Theory, practice, and research', in MD Dunnette & LM Hough (eds), *Handbook of industrial and organizational psychology*, Consulting Psychologists Press, Palo Alto, CA, pp. 719–822.

Porter , ME 1980, *Competitive strategy: techniques for analyzing industries and competitors*, Free Press, New York.

Porter, ME 1985, *Competitive advantage: creating and sustaining superior performance*, Free Press, New York.

Porter , ME 1996, 'What is strategy?', *Harvard Business Review*, vol. 74, no. 6, pp. 61-78.

Porter , ME & Heppelmann, JE 2014, 'How smart, connected products are transforming competition', *Harvard Business Review*, vol. 92, no. 11, pp. 64-88.

Premkumar, G, Ramamurthy, K & Saunders, CS 2005, 'Information processing view of organizations: an exploratory examination of fit in the context of interorganizational relationships', *Journal of Management Information Systems*, vol. 22, no. 1, pp. 257-94.

Preston, DS & Karahanna, E 2009, 'Antecedents of IS strategic alignment: a nomological network', *Information systems research*, vol. 20, no. 2, pp. 159-79.

Prieto, VC & de Carvalho, MM 2018, 'Can internal strategic alignment influence performance? An empirical research applying structural equation modelling', *Academia Revista Latinoamericana de Administración*, vol. 31, no. 3, pp. 585-604

Putnam, LL 1983, 'The interpretive perspective: An alternative to functionalism', in L Putnam & ME Pacanowsky (eds), *Communication and organizations: An interpretive approach*, Sage Press, Beverly Hills, CA, pp. 31-54.

Quinn, JB 1978, 'Strategic change: "logical incrementalism"', *Sloan Management Review*, vol. 20, no. 1, pp. 7-21.

Quintens, L & Matthyssens, P 2010, 'Involving the process dimensions of time in case-based research', *Industrial marketing management*, vol. 39, no. 1, pp. 91-9.

Rahman, SA, Taghizadeh, SK, Ramayah, T & Alam, MMD 2017, 'Technology acceptance among micro-entrepreneurs in marginalized social strata: The case of social innovation in Bangladesh', *Technological Forecasting and Social Change*, vol. 118, pp. 236-45.

Rahrovani, Y 2020, 'Platform drifting: When work digitalization hijacks its spirit', *The Journal of Strategic Information Systems*, vol. 29, no. 2020, pp. 1-26.

Rai, A, Pavlou, PA, Im, G & Du, S 2012, 'Interfirm IT capability profiles and communications for cocreating relational value: Evidence from the logistics industry', *MIS quarterly*, vol. 36, no. 1, pp. 233-62.

Raj, M & Seamans, R 2019, 'Primer on artificial intelligence and robotics', *Journal of Organization Design*, vol. 8, no. 11, pp. 1-14.

Rajagopalan, N & Rasheed, AM 1995, 'Incremental models of policy formulation and non-incremental changes: Critical review and synthesis 1', *British Journal of Management*, vol. 6, no. 4, pp. 289-302.

Ramanathan, R, Philpott, E, Duan, Y & Cao, G 2017, 'Adoption of business analytics and impact on performance: a qualitative study in retail', *Production Planning & Control*, vol. 28, no. 11-12, pp. 985-98.

Rapoport, RN 1970, 'Three dilemmas in action research: With special reference to the Tavistock experience', *Human relations*, vol. 23, no. 6, pp. 499-513.

Reed-Scott, J 1999, *Preserving research collections: A collaboration between librarians and scholars*, Association of Research Libraries, Washington, USA.

Reich, BH & Benbasat, I 1996, 'Measuring the linkage between business and information technology objectives', *MIS quarterly*, vol. 20, no. 1, pp. 55-81.

—— 2000, 'Factors that influence the social dimension of alignment between business and information technology objectives', *MIS quarterly*, vol. 24, no. 1, pp. 81-113.

Rex, L, Green, J, Dixon, C, Barbara, S & Group, CD 1998, 'Critical Issues: What Counts When Context Counts?: The Uncommon "Common" Language of Literacy Research', *Journal of Literacy Research*, vol. 30, no. 3, pp. 405-33.

Rigby, DK 2014, 'Digital-physical mashups', *Harvard Business Review*, vol. 92, no. 9, pp. 84-92.

Riley, CM & Rosanske, TW 1996, *Development and validation of analytical methods*, vol. 3, Elsevier, Oxford.

Roberts, N & Grover, V 2012, 'Leveraging information technology infrastructure to facilitate a firm's customer agility and competitive activity: An empirical investigation', *Journal of Management Information Systems*, vol. 28, no. 4, pp. 231-70.

Robson, C 2011, *Real world research: a resource for users of social research methods in applied settings*, 3 edn, John Wiley & Sons Ltd., Chichester.

Rockart, JF 1979, 'Chief executives define their own data needs', *Harvard Business Review*, vol. 57, no. 2, pp. 81-93.

Rockart, JF & Morton, MS 1984, 'Implications of changes in information technology for corporate strategy', *Interfaces*, vol. 14, no. 1, pp. 84-95.

Ross, JW, Beath, CM & Sebastian, I 2015, 'Why Nordstrom's digital strategy works (and yours probably doesn't)', *Harvard Business Review*, pp. 1-4.

Ross, JW, Sebastian, I, Beath, C, Mocker, M, Moloney, K & Fonstad, N 2016, 'Designing and executing digital strategies', in *Thirty Seventh International Conference on Information Systems*, Dublin, pp. 1-17.

Rowe, F & Markus, ML 2018, 'Taking on sacred cows: Openness, fair critique, and retaining value when revising classics', *European journal of information systems*, vol. 27, no. 6, pp. 623-8.

Saeed, S, Bamarouf, YA, Ramayah, T & Iqbal, SZ 2016, *Design solutions for user-centric information systems*, IGI Global, PA, USA.

Salzmann, O, Ionescu-Somers, A & Steger, U 2005, 'The business case for corporate sustainability:: literature review and research options', *European Management Journal*, vol. 23, no. 1, pp. 27-36.

Saraf, N, Langdon, CS & Gosain, S 2007, 'IS application capabilities and relational value in interfirm partnerships', *Information systems research*, vol. 18, no. 3, pp. 320-39.

Saunders, M, Lewis, P & Thornhill, A 2019, *Research methods for business students*, Pearson Education Limited, England.

Schniederjans, DG & Hales, DN 2016, 'Cloud computing and its impact on economic and environmental performance: A transaction cost economics perspective', *Decision Support Systems*, vol. 86, pp. 73-82.

Schultz, B, Keiner, M & Schmid, WA 2003, 'Measuring quality in cantonal guiding planning in Switzerland', *Built Environment*, vol. 29, no. 4, pp. 327-35.

Schultz, W, Javey, S & Sorokina, A 2018, 'Smart water meters and data analytics decrease wasted water due to leaks', *Journal-American Water Works Association*, vol. 110, no. 11, pp. E24-E30.

Schwandt, TA, Lincoln, YS & Guba, EG 2007, 'Judging interpretations: But is it rigorous? Trustworthiness and authenticity in naturalistic evaluation', *New directions for evaluation*, vol. 114, no. 1, pp. 11-25.

Seawright, J & Gerring, J 2008, 'Case selection techniques in case study research: A menu of qualitative and quantitative options', *Political research quarterly*, vol. 61, no. 2, pp. 294-308.

Sepehri, P, Mousavi, S, Khajehnejad, S, Madani, F & Moeindarbari, G 2011, 'Designing a proper organizational chart for a project-oriented company through studying its conceptual and structural dimensions', in *The 3rd International Conference on Information and Financial Engineering*, Singapore, vol. 12, pp. 222-7.

Shah, SK & Corley, KG 2006, 'Building better theory by bridging the quantitative–qualitative divide', *Journal of management studies*, vol. 43, no. 8, pp. 1821-35.

Shao, Z 2019, 'Interaction effect of strategic leadership behaviors and organizational culture on IS-Business strategic alignment and enterprise systems assimilation', *International Journal of Information Management*, vol. 44, pp. 96-108.

Shee, H, Miah, SJ, Fairfield, L & Pujawan, N 2018, 'The impact of cloud-enabled process integration on supply chain performance and firm sustainability: The moderating role of top management', *Supply Chain Management: An International Journal*, vol. 23, no. 6, pp. 500-17.

Shivakumar, SK 2018, *Complete guide to digital project management*, Springer, India.

Sia, SK, Soh, C & Weill, P 2016, 'How DBS Bank Pursued a Digital Business Strategy', *MIS Quarterly Executive*, vol. 15, no. 2, pp. 105-21.

Simons, R 2005, *Levers of organization design: How managers use accountability systems for greater performance and commitment*, Harvard Business Press, Boston, United States.

Singh, A, Klarner, P & Hess, T 2020, 'How do chief digital officers pursue digital transformation activities? The role of organization design parameters', *Long range planning*, vol. 53, pp. 1-14.

Sklyar, A, Kowalkowski, C, Tronvoll, B & Sörhammar, D 2019, 'Organizing for digital servitization: A service ecosystem perspective', *Journal of business research*, vol. 104, pp. 450-60.

Slevin, E & Sines, D 1999, 'Enhancing the truthfulness, consistency and transferability of a qualitative study: utilising a manifold of approaches', *Nurse Researcher (through 2013)*, vol. 7, no. 2, pp. 79-97.

Smaczny, T 2001, 'Is an alignment between business and information technology the appropriate paradigm to manage IT in today's organisations?', *Management Decision*, vol. 39, no. 10, pp. 797-802.

Soluk, J & Kammerlander, N 2021, 'Digital transformation in family-owned Mittelstand firms: A dynamic capabilities perspective', *European Journal of Information Systems*, vol. 30, no. 6, pp. 676-711.

Sood, K, Jain, A & Kaul, S 2017, 'Cloud Computing and its issues', *International Journal of Advanced Research in Computer Science*, vol. 8, no. 3.

Sousa, R & Voss, CA 2002, 'Quality management re-visited: a reflective review and agenda for future research', *Journal of operations management*, vol. 20, no. 1, pp. 91-109.

Spender, JC 1996, 'Making knowledge the basis of a dynamic theory of the firm', *Strategic management journal*, vol. 17, no. S2, pp. 45-62.

Spens, KM & Kovács, G 2006, 'A content analysis of research approaches in logistics research', *International Journal of Physical Distribution & Logistics Management*, vol. 36, no. 5, pp. 374-90

Srinivasan, R & Swink, M 2018, 'An investigation of visibility and flexibility as complements to supply chain analytics: An organisational information processing theory perspective', *Production and Operations Management*, vol. 27, no. 10, pp. 1849-67.

Steensen, EF 2014, 'Five types of organizational strategy', *Scandinavian Journal of Management*, vol. 30, no. 3, pp. 266-81.

Stephens, M 2015, 'Changing student nurses values, attitudes, and behaviours: a meta ethnography of enrichment activities', *Journal of Nursing and Care*, vol. 5, no. 1, pp. 1-12.

Stewart, RA, Nguyen, K, Beal, C, Zhang, H, Sahin, O, Bertone, E, Vieira, AS, Castelletti, A, Cominola, A & Giuliani, M 2018, 'Integrated intelligent water-energy metering systems and informatics: Visioning a digital multi-utility service provider', *Environmental Modelling & Software*, vol. 105, pp. 94-117.

Stewart, RA, Willis, R, Giurco, D, Panuwatwanich, K & Capati, G 2010, 'Web-based knowledge management system: linking smart metering to the future of urban water planning', *Australian Planner*, vol. 47, no. 2, pp. 66-74.

Stoffels, M & Ziemer, C 2017, 'Digitalization in the process industries-evidence from the German water industry', *Journal of Business Chemistry*, vol. 14, no. 3, pp. 94-105.

Sturdy, A & Grey, C 2003, 'Beneath and beyond organizational change management: Exploring alternatives', *Organization*, vol. 10, no. 4, pp. 651-62.

Suddaby, R 2006, 'From the editors: What grounded theory is not', *The Academy of Management Journal*, vol. 49, no. 4, pp. 633-42.

Suri, H 2013, 'Epistemological pluralism in research synthesis methods', *International journal of qualitative studies in education*, vol. 26, no. 7, pp. 889-911.

Sutherland, E 2020, 'The fourth industrial revolution–the case of South Africa', *Politikon*, vol. 47, no. 2, pp. 233-52.

Svahn, F, Mathiassen, L & Lindgren, R 2017, 'Embracing digital innovation in incumbent firms: How Volvo Cars managed competing concerns', *MIS quarterly*, vol. 41, no. 1, pp. 239-53.

Tallon, PP & Pinsonneault, A 2011, 'Competing perspectives on the link between strategic information technology alignment and organizational agility: insights from a mediation model', *Mis Quarterly*, vol. 30, no. 2, pp. 463-86.

Tan, W-G, Cater-Steel, A, Toleman, M & Seaniger, R 2007, 'Implementing centralised IT service management: drawing lessons from the public sector', in *The 18th Australasian Conference on Information Systems*, Toowoomba, Australia.

Tanner, K 2018, 'Survey research', in *Research methods: Information, systems, and contexts*, 2 edn, Elsevier Ltd., Cambridge, The UK, pp. 159-90.

Tannou, M & Westerman, G 2012, *Governance: a central component of successful digital transformation*.

Tashakkori, A, Johnson, RB & Teddlie, C 2020, *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*, Sage publications, Thousand Oaks, CA.

Taylor-Powell, E & Renne, M 2003, *Analyzing qualitative data*, University of Wisconsin, viewed 08.06 2020, <https://www.betterevaluation.org/en/resources/guides/analyzing_qualitative_data>.

Teece, DJ 2007, 'Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance', *Strategic management journal*, vol. 28, no. 13, pp. 1319-50.

Teece, DJ, Pisano, G & Shuen, A 1997, 'Dynamic capabilities and strategic management', *Strategic management journal*, vol. 18, no. 7, pp. 509-33.

Temido, J, Sousa, J & Malheiro, R 2014, 'SCADA and Smart Metering systems in water companies. A perspective based on the value creation analysis', *Procedia Engineering*, vol. 70, pp. 1629-38.

Teoh, MF, Ahmad, NH, Abdul-Halim, H & Ramayah, T 2022, 'Is digital business model innovation the silver bullet for SMEs competitiveness in digital era? Evidence from a developing nation', *Vision*, pp. 1-16.

Teubner, RA & Stockhinger, J 2020, 'Literature review: Understanding information systems strategy in the digital age', *The Journal of Strategic Information Systems*, vol. 29, pp. 1-28.

Thompson, JD 1967, *Organizations in action*, McGraw-Hill, New York, USA.

Thompson, MC 2018, 'Saudi Arabia: Civil society and natural resource management', in O I. (ed.), *Public Brainpower*, Palgrave Macmillan, Cham, pp. 291-309.

Timmermans, S & Tavory, I 2012, 'Theory construction in qualitative research: From grounded theory to abductive analysis', *American Sociological Association*, vol. 30, no. 3, pp. 167-86.

Tiseo, I 2022, Global water industry, Statista, viewed 20.07 2022.

Tiwana, A 2002, *The knowledge management toolkit: practical techniques for building a knowledge management system with cdrom*, Prentice Hall PTR, Upper Saddle River, USA.

Tobin, GA & Begley, CM 2004, 'Methodological rigour within a qualitative framework', *Journal of advanced nursing*, vol. 48, no. 4, pp. 388-96.

Trading Economics 2021, *Saudi Arabia - Economic Indicators*, Trading Economics,, viewed 04.09 2021, <https://tradingeconomics.com/saudi-arabia/indicators>.

Trienekens, JJ, Kusters, RJ & Cuenca, L 2014, 'Measuring business-IT alignment, framework development and case study results', in MJ Escalona, G Aragón, H Linger, M Lang, C Barry & C Schneider (eds), *Information System Development*, Springer, Switzerland pp. 1-16.

Tuamsuk, K & Subramaniam, M 2017, 'The current state and influential factors in the development of digital literacy in Thailand's higher education', *Information and Learning Science*, vol. 118, no. 5/6, pp. 235-51.

Tushman, ML & Nadler, DA 1978, 'Information processing as an integrating concept in organizational design', *Academy of Management review*, vol. 3, no. 3, pp. 613-24.

Ukko, J, Nasiri, M, Saunila, M & Rantala, T 2019, 'Sustainability strategy as a moderator in the relationship between digital business strategy and financial performance', *Journal of Cleaner Production*, vol. 236, p. 117626.

Urquhart, C 2001, 'An encounter with grounded theory: Tackling the practical and philosophical issues', in *Qualitative research in IS: Issues and trends*, IGI Global, Queensland, Australia, pp. 104-40.

U.S.-Saudi Business Council 2021, *Water in Saudi Arabia: Desalination, wastewater, and privatization*, U.S.-Saudi Arabian Business Council, viewed 03.09 2021, <https://ussaudi.org/water-in-saudi-arabia-desalination-wastewater-and-privatization/>.

Utilities 2018, *SAP To Support Marafiq Digital Transformation*, ITP Media Group, viewed 31.05 2021, <https://www.utilities-me.com/news/12265-sap-to-support-marafiq-digital-transformation>.

Vafamehr, A & Khodayar, ME 2018, 'Energy-aware cloud computing', *The Electricity Journal*, vol. 31, no. 2, pp. 40-9.

Valentine, E & Stewart, G 2015, 'Enterprise business technology governance: Three competencies to build board digital leadership capability', in *48th Hawaii International Conference on System Sciences*, pp. 4513-22.

Valerdi, R & Davidz, HL 2009, 'Empirical research in systems engineering: Challenges and opportunities of a new frontier', *Systems Engineering*, vol. 12, no. 2, pp. 169-81.

Van de Ven, AH & Poole, MS 2005, 'Alternative approaches for studying organizational change', *Organization studies*, vol. 26, no. 9, pp. 1377-404.

van de Wetering, R, Mikalef, P & Pateli, A 2018, 'Strategic alignment between IT flexibility and dynamic capabilities: An empirical investigation', *International Journal of IT/Business Alignment and Governance*, vol. 9, no. 1, pp. 1-20.

Van Maanen, J, Sørensen, JB & Mitchell, TR 2007, 'The interplay between theory and method', *Academy of Management review*, vol. 32, no. 4, pp. 1145-54.

Verhoef, PC, Broekhuizen, T, Bart, Y, Bhattacharya, A, Dong, JQ, Fabian, N & Haenlein, M 2021, 'Digital transformation: A multidisciplinary reflection and research agenda', *Journal of Business Research*, vol. 122, pp. 889-901.

Verschuren, P 2003, 'Case study as a research strategy: Some ambiguities and opportunities', *International Journal of Social Research Methodology*, vol. 6, no. 2, pp. 121-39.

Vickers, MH 1999, 'Information technology development methodologies: Towards a non-positivist, developmental paradigm', *The Journal of Management Development*, vol. 18, no. 3, pp. 255-72.

Vinaja, R 2019, *Aligning IT and business: Fostering organizational performance, employees' commitment and quality of management methods*, Springer, Switzerland, 3030115623.

Vision 2030 2021, *NTP*, Vision 2030, viewed 11.09 2021.

Walker, W & Keenan, T 2018, 'Maintaining digital collections with declining resources, fewer staff', *Digital Library Perspectives*, vol. 34, no. 2, pp. 91-100.

Walraven, P, van de Wetering, R, Helms, R, Versendaal, J & Caniëls, MC 2018, 'Co-evolutionary IS-Alignment: A Complex Adaptive Systems Perspective', in *The 12th Mediterranean Conference on Information Systems (MCIS)*, Corfu, Greece, pp. 1-27.

Walsham, G 1993, *Interpreting information systems in organizations*, vol. 19, Wiley, Ann Arbor, United States.

—— 1995, 'Interpretive case studies in IS research: nature and method', *European journal of information systems*, vol. 4, no. 2, pp. 74-81.

Wamba, SF, Gunasekaran, A, Akter, S, Ren, SJ-f, Dubey, R & Childe, SJ 2017, 'Big data analytics and firm performance: Effects of dynamic capabilities', *Journal of business research*, vol. 70, pp. 356-65.

Wang, ET 2003, 'Effect of the fit between information processing requirements and capacity on organizational performance', *International Journal of Information Management*, vol. 23, no. 3, pp. 239-47.

Warner, KS & Wäger, M 2019, 'Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal', *Long range planning*, vol. 52, no. 3, pp. 326-49.

Weber, RP 1990, *Basic content analysis*, Sage Publications, Newbury Park, CA.

Webster, J & Watson, RT 2002, 'Analyzing the past to prepare for the future: Writing a literature review', *MIS quarterly*, vol. 26, no. 2, pp. xiii-xxiii.

Weick, KE 1969, *The social psychology of organizing*, 1 edn, Journal of Family Business Strategy, Addison-Wesley, NY, USA.

—— 1979, *The social psychology of organizing*, 2 edn, Addison-Wesley, New York, USA.

Weick, KE & Quinn, RE 1999, 'Organizational change and development', *Annual review of psychology*, vol. 50, no. 1, pp. 361-86.

Weill, P & Broadbent, M 1998, *Leveraging the new infrastructure: how market leaders capitalize on information technology*, Harvard Business Press, Boston, USA.

Weinrich, T 2017, 'Reviewing organizational design components for digital business strategy', in *The 30th bled e-conference: digital transformation – from connecting things to transforming our live (BLED Proceedings)*, Slovenia, vol. 5, pp. 651-68.

Welchman, L 2015, *Managing chaos: Digital governance by design*, Rosenfeld Media, NY, USA.

Wernerfelt, B 1984, 'A resource-based view of the firm', *Strategic management journal*, vol. 5, no. 2, pp. 171-80.

Wheeldon, J 2010, 'Mapping mixed methods research: Methods, measures, and meaning', *Journal of Mixed Methods Research*, vol. 4, no. 2, pp. 87-102.

Wheeldon, J & Ahlberg, M 2019, 'Mind maps in qualitative research', in *Handbook of research methods in health social sciences*, Springer Nature Singapore Pte Ltd., pp. 1113-29.

Whitehead, TL 2005, *Basic classical ethnographic research methods*, Cultural ecology of health and change, Maryland, USA.

Whiting, M & Sines, D 2012, 'Mind maps: establishing 'trustworthiness' in qualitative research', *Nurse researcher*, vol. 20, no. 1, pp. 21-7.

Wijen, F & Chiroleu-Assouline, M 2019, 'Controversy over voluntary environmental standards: A socioeconomic analysis of the Marine Stewardship Council', *Organization & Environment*, vol. 32, no. 2, pp. 98-124.

Wildemuth, BM 2017, *Applications of social research methods to questions in information and library science*, 2 edn, Libraries Unlimited, Santa Barbara, California, via nlebk (EBSCOhost), <http://wallaby.vu.edu.au:2048/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1421319&site=ehost-live>.

Williamson, K & Johanson, G 2018, *Research methods: Information, systems, and contexts*, 2 edn, Elsevier Ltd., Cambridge, The UK.

Williamson, OE 1985, *The economic institutions of capitalism : firms, markets, relational contracting*, Free Press, New York.

Winby, S & Mohrman, SA 2018, 'Digital sociotechnical system design', *The Journal of Applied Behavioral Science*, vol. 54, no. 4, pp. 399-423.

Winkler, J, Kuklinski, CPJ-W & Moser, R 2015, 'Decision making in emerging markets: The Delphi approach's contribution to coping with uncertainty and equivocality', *Journal of Business Research*, vol. 68, no. 5, pp. 1118-26.

Wolfswinkel, JF, Furtmueller, E & Wilderom, CP 2013, 'Using grounded theory as a method for rigorously reviewing literature', *European journal of information systems*, vol. 22, no. 1, pp. 45-55.

Wucherer, K 2006, 'Business partnering—A driving force for innovation', *Industrial marketing management*, vol. 35, no. 1, pp. 91-102.

Wunderlich, N 2018, 'Exterminate?-who influences IT alignment and digital Business Strategy', in *Twenty-Sixth European Conference on Information Systems ECIS*, Portsmouth,UK, pp. 1-18.

Yayla, AA & Hu, Q 2009, 'Antecedents and drivers of IT-business strategic alignment: Empirical validation of a theoretical model', in *The 17th European Conference on Information Systems (2009)*.

—— 2012, 'The impact of IT-business strategic alignment on firm performance in a developing country setting: exploring moderating roles of environmental uncertainty and strategic orientation', *European journal of information systems*, vol. 21, no. 4, pp. 373-87.

Yazan, B 2015, 'Three approaches to case study methods in education: Yin, Merriam, and Stake', *The qualitative report*, vol. 20, no. 2, pp. 134-52.

Yeow, A, Soh, C & Hansen, R 2018, 'Aligning with new digital strategy: A dynamic capabilities approach', *The Journal of Strategic Information Systems*, vol. 27, no. 1, pp. 43-58.

Yin, RK 2014, *Case study research: Design and methods*, 5 edn, Sage, Thousand Oaks, United States.

—— 2017, *Case study research and applications: Design and methods*, 6 edn, SAGE Publications Ltd., Los Angeles, USA.

Yoo, Y 2010, 'Computing in everyday life: A call for research on experiential computing', *MIS quarterly*, vol. 34, no. 2, pp. 213-31.

Yoo, Y, Lyytinen, KJ, Boland, RJ & Berente, N 2010, *The next wave of digital innovation: Opportunities and challenges: A report on the research workshop'Digital Challenges in Innovation Research'*, National Science Foundation, USA.

YU, J, Subramanian, N, Ning, K & Edwards, D 2015, 'Product delivery service provider selection and customer satisfaction in the era of internet of things: A Chinese e-retailers' perspective', *International Journal of Production Economics*, vol. 159, pp. 104-16.

Zack, MH 1999, 'Developing a knowledge strategy', *California Management Review*, vol. 41, no. 3, pp. 125-45.

—— 2007, 'The role of decision support systems in an indeterminate world', *Decision Support Systems*, vol. 43, no. 4, pp. 1664-74.

Zahn, E 1979, *Strategische Planung zur Steuerung der langfristigen Unternehmensentwicklung (Strategic Planning in the Co-ordination of Long-term Organizational Development)*, Duncker & Humblot, Berlin.

Zaoui, F & Souissi, N 2020, 'Roadmap for digital transformation: A literature review', in *Procedia Computer Science*, Leuven, Belgium, vol. 175, pp. 621-8.

Zhang, M, Chen, H, Lyytinen, K & Li, X 2019, 'A co-evolutionary perspective on business and IT alignment: A review and research agenda', in *The 52nd Hawaii International Conference on System Sciences*, Hawaii, USA, pp. 6229-38.

Zhang, Y & Wildemuth, BM 2009, 'Qualitative analysis of content', *Applications of social research methods to questions in information and library science*, vol. 308, p. 319.

Zhao, X, Liu, L, Qi, S, Teng, Y, Li, J & Qian, W 2018, 'Agile convolutional neural network for pulmonary nodule classification using CT images', *International Journal of Computer Assisted Radiology and Surgery*, vol. 13, no. 4, pp. 585-95.

Zomer, T, Neely, A & Martinez, V 2020, 'Digital transforming capability and performance: A microfoundational perspective', *International Journal of Operations & Production Management*, pp. 1-44.

Zuboff, S 1988, *In the age of the smart machine: The future of work and power*, Basic Books, New York.

Appendices

Appendix A. Ethics Approval

» Application ID: HRE20-126
» Chief Investigator: DR HIMANSHU SHEE
» Other Investigators:
» Application Title: Critical Success Factors for Digital Strategic Alignment in Saudi Water Companies
» Form Version: 13-07

The application has been accepted and deemed to meet the requirements of the National Health and Medical Research Council (NHMRC) 'National Statement on Ethical Conduct in Human Research (2007)' by the Victoria University Human Research Ethics Committee. Approval has been granted for two (2) years from the approval date; 02/11/2020.

Continued approval of this research project by the Victoria University Human Research Ethics Committee (VUHREC) is conditional upon the provision of a report within 12 months of the above approval date or upon the completion of the project (if earlier). A report proforma may be downloaded from the Office for Research website at: http://research.vu.edu.au/hrec.php.

Please note that the Human Research Ethics Committee must be informed of the following: any changes to the approved research protocol, project timelines, any serious events or adverse and/or unforeseen events that may affect continued ethical acceptability of the project. In these unlikely events, researchers must immediately cease all data collection until the Committee has approved the changes. Researchers are also reminded of the need to notify the approving HREC of changes to personnel in research projects via a request for a minor amendment. It should also be noted that it is the Chief Investigators' responsibility to ensure the research project is conducted in line with the recommendations outlined in the National Health and Medical Research Council (NHMRC) 'National Statement on Ethical Conduct in Human Research (2007).'

On behalf of the Committee, I wish you all the best for the conduct of the project.

Secretary, Human Research Ethics Committee
Phone: 9919 4781 or 9919 4461
Email: researchethics@vu.edu.au

Appendix B. Information sheet

VICTORIA UNIVERSITY
MELBOURNE AUSTRALIA

INFORMATION TO PARTICIPANTS INVOLVED IN RESEARCH (Interviews)

You are invited to participate

You are invited to participate in a research project entitled [**Critical Success Factors for Digital Strategic Alignment in Saudi Water Companies**].

This project is being conducted by a student researcher **Khalid Nasser Dehaish** as part of a PhD study at Victoria University (VU) under the supervision of Associate Professor Himanshu Shee from VU Business School.

Project explanation

The emergence of new digital technologies pushed incumbent companies to use theses digital technologies to improve their business performance. However, the digital transformation requires a change in their strategies. Any change in strategy requires a change of the organisational design elements (i.e. structure, processes, people, and rewards). Thus, it is still a fundamental challenge for many water companies to formulate and implement corresponding digital strategies and transform their existing organisational designs for the digital age. Therefore, the study involves conducting online interviews for obtaining information from the company managers, and digital projects managers from the company' digital partners (who provide digital technologies to the company) in order to explore the impact of digital strategy on the elements of organisational design. This research aims to identify the success factors needed for digital alignment between the firm's digital strategy and organisational design elements that enhances sustainable business performance.

What will I be asked to do?

Participants will be interviewed online using Zoom. The interview will be recorded using digital recorder. The participation is voluntary basis and themed around your views about the company's digital strategy, and how the company attempted to align its organisational design with its digital strategy. The interviews will focus on the success factors and barriers of the digital strategy process, and how the firm's sustainable business performance has been affected by the mis/ alignment. The interviews are anticipated to take between 60 to 90 minutes.

The researcher will ask participants to provide (as much as possible) some company documents (non-confidential information) that relate to their role in the company, for example, published strategic plans, digital projects, annual reports, training programs, presentations, structures and processes.

What will I gain from participating?

Participants may not gain anything from participating and there are no direct benefits to participants. However, they will contribute to greater understanding about the current issues in misalignment between digital strategies and organisational design. The findings are anticipated to assist water utilities managers in developing more comprehensive action plans for achieving the digital alignment, and for translating this digital alignment into enhanced sustainable business performance.

How will the information I give be used?

The company will be provided with a summary of the thesis. The summary will not identify any names, persons, organisations or business. The information will be analysed and may be included in a PhD thesis, publications reports, presented at conferences and published in journals. The participants will not be identified in any of the publications.

What are the potential risks of participating in this project?

The risks will be minimal. If participants feel uncomfortable with any question, they have the right not to answer. The report will be compiled in a general sense than identifying anyone by name. It will not identify any names, persons, organisations

V.1/2013 1 of 4

or business. Any identifying information collected during the interview will be de-identified. All electronically collected data will be stored on the Victoria University research storage during and after completion of the project with a password. Any notes taken during interviews will be kept securely in sealed envelopes by the researcher. The names of participating people will be removed through coding system. Only the researchers listed on this information sheet will have access to the data. The data will not be re-used for any future studies. All raw data will be disposed of five years after the research study has been completed.

How will this project be conducted?

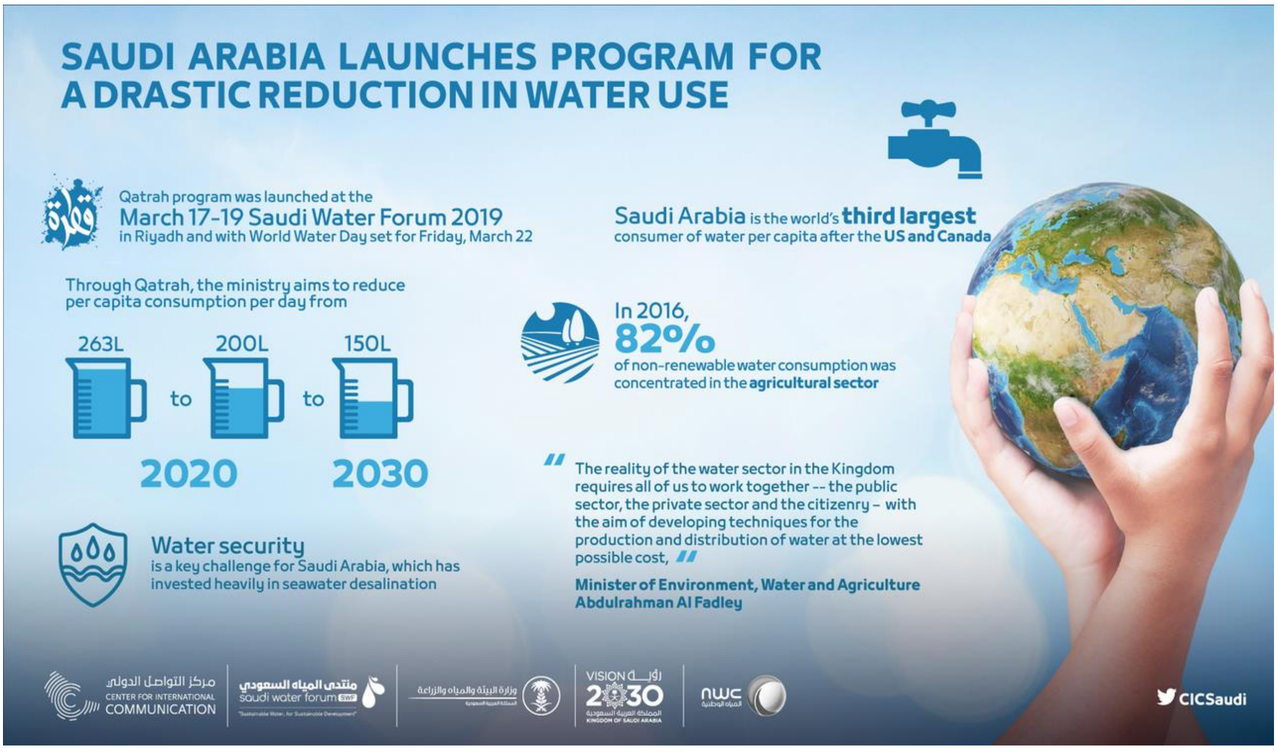
The research has been approved by Victoria University's Ethics Committee and participation is voluntary. The student researcher will contact the company's HR manager to provide a list of managers' names (from both the company and its digital partners) and their contact addresses. Then, the student researcher will contact the potential participants by phone and email to ask their voluntary participation in the research. Respondents will be given an information sheet and an informed consent form to read detailing this information at least one week before the interview date. All respondents will be informed of their rights and asked to sign the informed consent form at least one day before the interview and send the signed consent form as email attachment to the student researcher. During the interview, there are no right or wrong answers. Participants can withdraw from this study at any time and that this withdrawal will not jeopardise them in any way. Participants may request that no data arising from their participation is used. No personal information will be collected from participants during this research.

Who is conducting the study?

Student Researcher:	Khalid Dehaish	Victoria University Business School
Email	khalid.dehaish@live.vu.edu.au	
Course:	PhD	
Chief Investigator:	Dr Himanshu Shee	
	himanshu.shee@vu.edu.au	
Co-Supervisor:	Dr Tharaka deVass	
	tharaka.devass@vu.edu.au	

Any queries about your participation in this project may be directed to the Chief Investigator listed above.
If you have any queries or complaints about the way you have been treated, you may contact the Ethics Secretary, Victoria University Human Research Ethics Committee, Office for Research, Victoria University, PO Box 14428, Melbourne, VIC, 8001, email researchethics@vu.edu.au or phone (03) 9919 4781 or 4461.

Appendix C. Awards



Appendix D: Quality certificates

Certificate SA18/10097, continued

National Water Company

ISO/IEC 27001:2013

Issue 2

Detailed scope

The Management of Information security in NWC corporate IT department handles customer application, enterprise applications, technical support, network & security, operation & maintenance & IT Governance. This in accordance to the statement of applicability Version. 1.3, dated 08/07/2018.

Additional facilities

TCBU – Wadi Waj – Al Mathnah District, 4802,
Taif, 26511 - 8818, Saudi Arabia

MCBU – Makkah, Awali, Ibrahim Juffali Street,
Makkah, 24372, Saudi Arabia

JCBU – Prince Sultan Street, Jeddah, Saudi Arabia

RCBU – Exit 17, Riyadh Outlet Mall, Eastern Ring Road,
Riyadh, 14262, Saudi Arabia

UKAS MANAGEMENT SYSTEMS

0005

Certificate SA18/10097

The management system of

National Water Company

King Fahd Road, Olaya, P.O Box 676,
Riyadh, 11421, Saudi Arabia

has been assessed and certified as meeting the requirements of

ISO/IEC 27001:2013

For the following activities

The scope of registration appears on page 2 of this certificate.

This certificate is valid from 21 April 2019 until 19 December 2021
and remains valid subject to satisfactory surveillance audits.
Recertification audit due a minimum of 60 days before the expiration date.
Issue 2. Certified since 19 December 2018

This is a multi-site certification.
Additional site details are listed on the subsequent page.

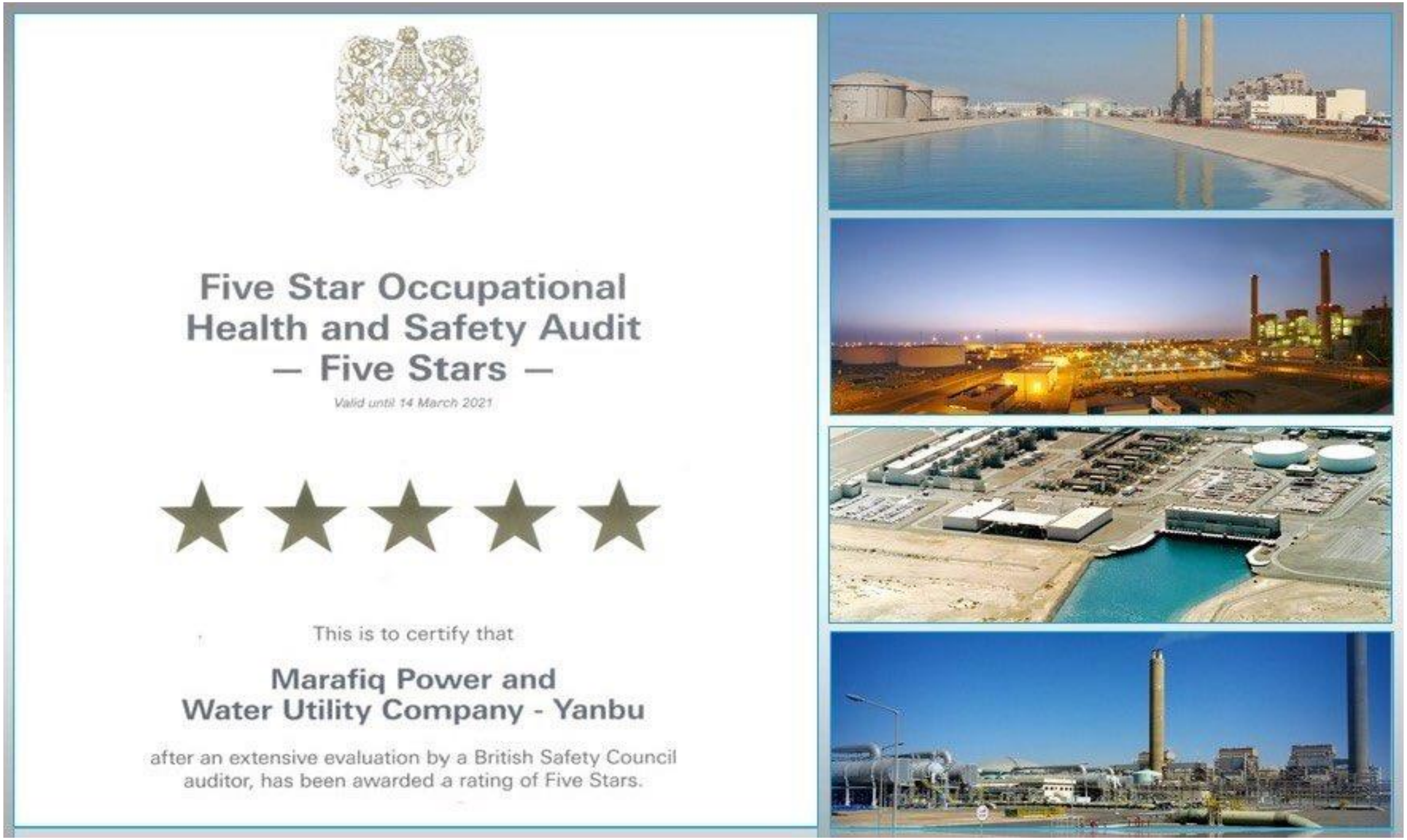
Authorised by

UKAS MANAGEMENT SYSTEMS
0005

SGS United Kingdom Ltd
Rossmore Business Park Ellesmere Port Cheshire CH65 3EN UK
t +44 (0)151 350-6666 f +44 (0)151 350-6600 www.sgs.com

HC SGS 27001 2013 0818 M2


WORLD QUALITY DAY 2020
CQI | IRCA
proud supporter
intertek
Total Quality. Assured.
CERTIFICATE
OF REGISTRATION
This is to certify that the management system of:
Power & Water Utility Co. for Jubail & Yanbu (MARAFIQ)
Main Site: Road#118, 2nd Industrial Support Industries, P.O. Box 11133, Jubail Industrial City, Jubail 31961, Kingdom of Saudi Arabia
Additional Site: Power & Water Utility Co. for Jubail & Yanbu (MARAFIQ), Yanbu, Saudi Arabia, Customer Service Building, Jeddah-Yanbu Al Bahar Road, P.O. Box30464, Yanbu Industrial City, Kingdom of Saudi Arabia
has been registered by Intertek as conforming to the requirements of:
ISO 9001:2015
The management system is applicable to:
Jubail: Produce, distribute and supply Water (Potable, Seawater for cooling and reclaimed water); Provide wastewater treatment services (Sanitary & Industrial) to the customers in the industrial city of Jubail. Part purchase, process and supply potable water to meet the additional demand in Jubail; Trade water & power and account for fuel supply to JWAP (Marafiq IWPP) by Tawreed (an off taker - a fully owned subsidiary of Marafiq) in Jubail
Certificate Number:
QMS 140456-04
Initial Certification Date:
09 March 2018
Date of Certification Decision:
09 March 2018
Issuing Date:
09 March 2018
Valid Until:
28 January 2021
UKAS
Calin Moldovean
President, Business Assurance
Intertek Certification Limited, 10A Victory Park, Victory Road, Derby DE24 8ZF, United Kingdom
Intertek Certification Limited is a UKAS accredited body under schedule of accreditation no. 014.
مــرافــق
MARAFIQ



Five Star Occupational Health and Safety Audit
— Five Stars —

Valid until 14 March 2021

★★★★★

This is to certify that

Marafiq Power and Water Utility Company - Yanbu

after an extensive evaluation by a British Safety Council auditor, has been awarded a rating of Five Stars.

Marafiq | مرافق
@MarafiqOfficial

At Marafiq, we take our impact on environment very seriously, and we are proud for being certified to ISO 14001:2015 Environment Management System. #WorldStandardDay2020 #Marafiq

Appendix E: Interview questions

Dimension	Main question	Research sub questions	Sub questions
Introduction: Personal background	What is your **job**? For how long you have been working for the company? What are the **work responsibilities** do you cover?		
Digital business Strategy	Now that you have told me what your job is about, could we please move to how **the concept of digital strategy** was realised in the company?	Formulation	1. How do you **formulate** digital strategy? What policies, procedures or instruments guide the formulation of the digital strategy?
			2. Who **participates** in the formulation of the digital strategy?
			3. How do you apply **digitalisation** in strategy formulation to achieve the company's strategic objectives?
			4. How your digital strategy' **objectives** are linked to **sustainable business performance**?
		Implementation	5. How do you **implement** your digital strategy? What plans, procedures, or instruments guide the implementation of the digital strategy?
			6. Who **participates** in the implementation of the digital strategy?
			7. How are the **strategic decisions shared and communicated internally**?
			8. What **formal guidelines** or **measures** does the company have to achieve **sustainable business performance**? How do they help implement the digital strategy?

Organisational Design	Now that I have some knowledge on your digital strategy, could we please move further to **the impact of the digital strategy** on **organisational design** factors (i.e., structures, processes, rewards, people, digital technology)?	Structure	9. How does the company's digital strategy affect organisational **structures**?
			10. How does the impact of the digital strategy on organisational structures (Q9 answer) relate to the company's **sustainable performance**?
		Processes	11. How does the company's digital strategy affect organisational **processes**?
			12. How does the impact of the digital strategy on organisational processes (Q11 answer) relate to the company's **sustainable performance**?
			13. Could you briefly describe the **digital flow of information within and across** the company? How to improve it?
		People	14. How does the company's digital strategy affect **stakeholders (i.e. employees, managers, customers, and external partners**? And its relation to **sustainable business performance?**
			15. Under digital strategy, what kind of transformation in **human resource polices** is needed to achieve **sustainable business performance**?
		Rewards	16. How does the company's digital strategy affect **rewards systems?** And its relation to **sustainable business performance?**
		Digital Technology	17. How does the company's digital strategy affect the **digital infrastructure**? And its relation to **sustainable business performance?**
			18. What are the best practices in implementing a **flexible digital infrastructure** that enables **quick modification** in support of the company's digital strategy? 19. What are the best practices in implementing **a digital infrastructure** that allows for the **seamless integration** of technologies, processes and services within and across the company?

Digital alignment	Now, let us move to the **digital strategic alignment** between digital strategy and organisational design.	20. What are the most **important factors** that contribute to **the success of the digital alignment** between digital strategy and organisational design factors?
		21. What are the main **challenges** that must be addressed to improve the **digital alignment** between digital strategy and organisational design factors?
Conclusion	To conclude, I would like to discuss the relevance of **digital alignment for the future** of the water industry?	22. What other **new concepts, instruments, or comments,** which we have not discussed that may help achieve the digital alignment? How can they help enhance **sustainable business performance** in water utilities?

Appendix F: Category (CSFs) frequencies for each company (NWC and Marafiq)

NWC

	Themes/factors	1NI	2NI	3NI	4NI	5NI	6NI	7NI	8NI	9NI	10NI	11NI	12NI	13NI	14NI	15NI	16NI	17NI	18NI	19NI	1Nf	2Nf	3Nf	4Nf	Number of Occurrences in Documents	Number of Occurrences in Persons & Documents	% of All Codings	Number of Persons & Documents	% of All Persons & Documents
1	A shared digital strategic vision	1	1			1		2							1	1	1				1	2		1	2	14	1%	11	45.8%
2	Shared digital strategic objectives	4	8	1	16	14	1	2	1		2	6	3	2	11	4		2	4	9	2	1		1	7	101	7%	21	88%
3	Top management support	1	1	1		2		2			1		1			1				1	2	1	3	1	1	19	1%	14	58%
4	Knowledge integration	7	13	3	7	10	5	3	2	1	2	8	6	3	3	4	4	1	1	4	8	3	8	3	5	114	8%	24	100%
5	Simultaneous, incremental-comprehensive development	4	5	1	5	10		2		2	3	1		3	2	3	2	4	6	2	2	5	2	4		68	5%	20	83%
6	Digital partnerships management	3	10	1	2	1	1	1	1	3	5	2		2	7	4	3	8			2				4	60	4%	18	75%
7	Quality management & KPIs	8	4	2	6	9	4	6	5	1	3	4	4	5	9	4	1	3		6	1				10	95	7%	20	83%
8	Change management	3	2	2	3	3	9	1	5		14		2	3		4	6	1	12	9	1	4	3	1	9	97	7%	21	88%
9	Digital governance	1	12	4	1	4	1			1	4		1	1	1		5		2		5	1	5	1	3	53	4%	18	75%
10	Agile structures	2	6	1	3	11			1	1			1	2	3	4	5	1		6	6	1	3	2	4	63	5%	19	79%
11	Shared digital units	2	8	5	3	7	2	6	3	7	1			1		4	5	2	2	3	5	1			2	69	5%	19	79%
12	Task Determination	1		2	6		6	1				5	4	2	1		4	1	6	2	3	2	3	1	3	53	4%	18	75%
13	Unified, optimised digital processes	24	21	4	17	9	21	8	9	4	9	8	10	14	7	12	11	4	4	8	2	3	2	1	2	214	16%	24	100%
14	Unified digital flows of information (within-in out-out in).	3	1	2	2	4	3	1	1	2	2	1	1	2	1	2	1	1	4	2	5	2	3	2	3	51	4%	24	100%
15	Renewed digital skills and knowledge	3	6	1	4	5		3	3	1	5	1	2	2	5	4	3	3	2	1	1	3	1	3	2	64	5%	23	96%
16	Integrated digital solutions	3	5	6	5	3	2	1	1	1	4	4	4	1	4	3	7	2	2		4	4	2		5	73	5%	22	92%
17	Interoperability & Compatibility	1	2	5	7	4	4	2	2	2	2	3	4	3	1	7	3	8		1	2	4	2	2	4	75	6%	23	96%
18	Digital centralisation (resources& services)	6	4			3	4	2		6	2	4	5	9		4	5	1	2	2	1		1		7	68	5%	18	75%
																										1351	100%	24	

Marafiq

	Themes/factors	1MI	2MI	3MI	4MI	5MI	6MI	7MI	8MI	9MI	10MI	11MI	12MI	1Mf	2Mf	3Mf	4Mf	Number of Occurrences in Documents	Number of Occurrences in Persons & Documents	% of All Codings	Number of Persons & Documents	% of All Persons & Documents
1	A shared digital strategic vision	4				2		2	1			1	5	1	2	1	1	2	22	2%	11	64.7%
2	Shared digital strategic objectives	5	3	1	14	3	5	2	8	4	11	20	14					7	97	10%	13	76%
3	Top management support	1	2			1		1	4			1	1	2	4	2	1	2	22	2%	12	71%
4	Knowledge integration	2	4	3	3	2	1	2	4	12	1	3	3	4	2	3	1	7	57	6%	17	100%
5	Simultaneous incremental development and implementation	3	1	4		3	4	4	1	4	3	5	3	3	6	1	1	7	53	6%	16	94%
6	Digital partnerships management	5	2		3	4	4	1	8	9	3	5	4	3	1	1	1	4	58	6%	16	94%
7	Quality management & KPIs	4	1	3	11	1		1	5	5	11	4	5					4	55	6%	12	71%
8	Change management	7	5	5	7	12	2		4	8		9	4	3	5	1	1	5	78	8%	15	88%
9	Digital governance				4	3					1	1						4	13	1%	5	29%
10	Agile Structures	2	1	1	3	1		3		1	1	2	1		1			7	24	3%	12	71%
11	Shared digital units	1	3	3	2	3	1	7	2	3	2	2						2	31	3%	12	71%
12	Task Determination	5	2	1		7	2	3	8	5	3	4	5	4	3	4	1		57	6%	15	88%
13	Unified, optimised digital processes	12	7		5	10	4	3	7	3	4	10	8	1	2	1	1	4	82	9%	16	94%
14	Unified digital flows of information (within-in out-out in).	9	2		4	5	4	5	3	5	2	9	1	1		1	1	2	54	6%	15	88%
15	Renewed digital skills and knowledge	4	2	9	2	8	3	2	4	8	1	2	2	3	2	3	1	1	57	6%	17	100%
16	Integrated digital solutions	7	4	3	6	7	6	6	5	7	2	8	7	1	3	4	2	4	82	9%	17	100%
17	Interoperability & Compatibility	7		1	4	2	3	2	6	2	1	4	5	2	2	2	2	4	49	5%	16	94%
18	Digital centralisation (resources& services)	7	5		4	1	1	10	3	2		5	2			1	1	7	49	5%	13	76%
																			940	100%	17	