A framework for operationalising Information Technology strategies in organisations

by

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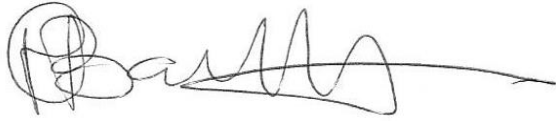
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DECLARATION

I, **Nomathamsanqa Rachel Batyashe**, here declare that the contents of this thesis represent my own unaided work, and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

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ABSTRACT

Information Technology (IT) has become a significant part of our day-to-day lives, particularly for businesses, including government activities. IT is a vital and pervasive instrument for any organisation's existence, competitiveness and sustainability. But with its pervasiveness comes the need for organisations to continuously advance and improve their businesses. Hence, organisations constantly strive to improve and grow their businesses through innovative means. This is where IT departments play a pivotal role to enable and support innovations within organisations. However, the use of IT brings its own complexities. These complexities, and the sheer importance of IT, require an IT strategy.

Many organisations try to operationalise their IT strategies with the aim of realising their organisational goals and objectives. However, if only some human actors adopt, implement and operationalise the strategy, the realisation of goals and objectives may be hindered. Organisations constantly develop and implement IT strategies, often unaware of the challenges that hamper the operationalisation of the IT strategy.

This study is aware of research conducted concerning IT, including IT strategy and implementation and operationalisation of IT strategy. Hence, literature pertaining to these concepts are presented. Two underpinning theories structuration theory and diffusion of innovations were employed as lenses to guide the data analysis and interpretation of the findings.

Qualitative research was undertaken with the aim of developing a framework to be adopted by organisations to operationalise their IT strategy. Data was collected from two cases, one in the private and the other in the public sector, employing semi-structured interviews. In this study, Broad Spectrum is referred to as case #1 and Triumph Technologies, case #2. From these two cases, 13 and 16 people at the point of saturation were interviewed at Broad Spectrum and Triumph Technologies, respectively.

From the analysis, six factors were determined to influence the operationalisation of the IT strategy in Broad Spectrum (BS): problematisation; business and IT alignment; technological solutions; governance; power relationships; and skills and development. And from Triumph Technologies, the six factors identified were hierarchical consciousness; technology solutions; network of people; training and skill-set; exclusivity vs inclusivity; and language differentiation.

The findings from cases #1 and #2 were mapped. Based on the mapping, the factors were grouped into four main components: 1) business vision; 2) skill and knowledge; 3) control and management; and 4) interactive schemes. Findings from the analysis were interpreted by following the interpretivist approach, based on which a framework (Operationalisation of IT Strategy Framework) was developed.

The framework, Operationalisation of IT Strategy Framework (OITSF) comprised of seven main components: collaboration, heterogeneity of actors, strategic and operational intent, diverse organisational culture, technology advancement, macro and micro levels, and operational architecture.

The research recommends various factors influencing and constituting operationalisation of IT strategy in organisations. Organisations in both the public and private sectors should attend to these factors, addressing and rectifying them as early as possible when operationalising their IT strategies.

ACKNOWLEDGEMENTS

DEDICATION

I dedicate this work to my late parents, Mxolisi Malcolm and Nonceba Elizabeth Batyashe, for their unconditional love. May their beautiful souls continue to rest in eternal peace.

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GLOSSARY

BOD:	Board of Directors
BS:	Broad Spectrum, pseudonym for case #1 of the study
CBG:	Carrier Business Group, a division at Triumph Technologies
CEO:	Chief Executive Officer
CIO:	Chief Information Officer
CoBG:	Consumer Business Group, a division at Triumph Technologies
CTO:	Chief Technology Officer
CPM:	Capital Projects Management, a division at Broad Spectrum
DOI:	Diffusion of Innovations
EBG:	Enterprise Business Group, a division at Triumph Technologies
EMEA:	Europe, Middle East and Africa
ExCo:	Executive Committee
ICT:	Information, Communication Technology
IS:	Information Systems
IT:	Information Technology
ITS:	IT Strategy
NOC:	Network Operations Centre, a division at Broad Spectrum
OITSF:	Operationalisation of IT strategy Framework
PC:	Personal Computer
SHEQ:	Safety, Health, Environment and Quality
ST:	Structuration Theory
TT:	Triumph Technologies, pseudonym for case #2 of the study

CHAPTER ONE
RESEARCH INTRODUCTION

1.1 Introduction

Information Technology (IT) has become an important part of our daily lives, especially for businesses, including government activities. IT is a vital instrument for any organisation's survival and sustainability. Wixley and Everingham (2010) state that in most organisations, IT has become a pervasive and integral part of the business, instrumental to supporting, sustaining, growing and transforming business. With this in mind, organisations continuously strive to grow their businesses through innovative ways. Along the same line of argument, Grant (2010) contends that irrespective of the industry, competitors across the globe are proving that organisations need to be efficient and innovative to sustain a competitive advantage.

Thus, IT divisions are necessary to enable and support innovations in organisations. However, the deployment and use of IT in organisation has never been straightforward or as easy as sometimes proclaimed. Christensen (2013) argues that developing technology is generally viewed as a variable and erratic undertaking. It is often complex to both individuals and organisations at large, with complexities attributable to both human and technology factors. Cresswell and Sheikh (2013) emphasise that interrelated factors – technical, social, and organisational – make implementation of information technologies extremely complex.

Based on the complexities as well as the essentiality of IT to countless organisations, a clear strategy is therefore necessary for fulfilling business needs and requirements over time. Peppard and Ward (2016) assert that whether or not an organisation intends to strive for any competitive advantage, IS/IT will still require a strategy to manage it, if only to circumvent being disadvantaged by the conduct of others. Accordingly, Iyamu (2015b) affirms that IT enables organisations to implement strategies and to realise objectives.

The development of an IT strategy by itself does not fulfil an organisation's needs and requirements. With the rapid development of information technologies and fast changing nature of businesses, considerable obstacles are encountered when developing impressive strategies and waiting for these to be in operation (Watson, 2007). It does require clear and intelligent strategy to be operationalised through practice, diffused throughout the organisation, using available structures. Kort and Gharbi (2011) define *structure* as rules and resources,

while Batyashe and Iyamu (2016) refer to *innovation diffusion* as a process that moves technological concepts, objects or methods, new or old ideas, from inception to use.

Hence, many organisations attempt to operationalise the IT strategies to realise their organisational goals and objectives. However, this has not been easy; instead, some organisations develop IT strategy year-in and year-out. Also, if only some human actors adopt, implement and operationalise the strategy, realising the goals and objectives may be hampered. Therefore, organisations constantly develop and implement IT strategies, unaware of the numerous challenges hindering the operationalisation of the IT strategy.

In the mainstream of events, IT strategies are often poorly developed, escalating the challenge of implementation (Almalki, Alfleit & Zafar, 2017). Occasionally good IT strategies are developed but poorly implemented. Peppard and Ward (2016) report that IT studies have been conducted on post-implementation experiences; however, these do not necessarily link back to the IT strategy. Consequently, there is a gap regarding IT strategy operationalisation.

1.2 Problem statement

The rapid changes in business and technological environments compel many organisations to adopt strategies in response to the ever-changing business needs and new opportunities. The objectives are often to increase their capability to escalate competitive and sustainable in line with the organisational vision and strategic intent. Thus, many organisations develop strategies. Some authors argue, though, that most strategic initiatives remain on paper, and are only as good as the paper they are written on (Richardson, 2008; Birshan & Kar, 2012; Nuntamanop, Kauranen & Igel, 2013).

To sustain a competitive advantage, organisations far too often spend time developing and implementing new strategies and revisiting existing strategies. Yeh, Lee and Pai (2012) suggest that organisations that have a well-planned IT strategy can increase their overall competitiveness by integrating corporate strategy and implementing IT effectively. According to Iyamu and Roode (2010), in a highly global competitive climate, organisations are increasingly dependent on IT strategies to increase their competitiveness, or merely even to survive. But implementation does not necessarily equate to operationalisation. Each component of the IT strategy needs to be operationalised for the strategy to fulfil the aims and achieve the objectives of the organisation.

Hitherto, little is known about the factors that influence IT strategy operationalisation. Numerous studies (Gottschalk, 1999; Wynn, 2008; Bartenschlager, 2011; Yeh et al., 2012; Grant, 2016) focus primarily on the implementation of IT strategy. Grant (2010) suggests that the factors that influence the operationalisation of strategies are either unknown or ignored. The present research problem was formulated on this premise.

1.3   Research problem

Many organisations rely on IT strategy for sustainability and competitiveness, thereby making IT strategy critical. However, some organisations find it difficult to operationalise their IT strategy or at least some part of the strategy. This is attributed to challenges and factors such as complexities, integration and lack of cohesion, which manifest from inadequate human interaction and dysfunctionality of processes. Some organisations are unable to detect or identify these challenges and factors.

As a result, they embark on yearly (year-in year-out) development of IT strategy. Many problems and challenges of yearly development of IT strategy include the fact that it hampers an organisation's productivity, it affects competitiveness, it hinders sustainability and ultimately it becomes cost prohibitive.

To address these challenges, some organisations undertake to examine the factors which influence operationalisation of the IT strategy. These activities, however, have failed to help matters; instead, they have increased the complexities, impacting detrimentally on the value that organisations strive to derive from IT investments, from the agility of IT to responding to organisational needs in the ever-changing business environment, and time to market. This could be attributed to the fact that current IT strategy is not completely implemented or is diffused before another around of development is embarked upon in the following year. Therefore, the problem is that the IT strategy is implemented but not operationalised. The next section focuses on the literature reviewed in this study.

1.4   Research questions

Drawn from the statement of the research problem is the main research question: How can IT strategy be operationalised in organisations? The two sub-questions of the research are as follows:

i.   What factors influence operationalisation of IT strategy in an organisation?

ii.   What constitutes the operationalisation of IT strategy in an organisation?

1.5   Aim and objectives of the research

The aim of this study was to propose a solution in the form of framework that can be used for operationalising IT strategy in organisations. Based on the aim, objectives were formulated as presented below:

i.   To identify the factors that influence operationalisation of IT strategy in an organisation; and

ii.   To examine what constitutes operationalisation of IT strategy in an organisation.

1.6   Literature review

This section presents an introductory review of literature conducted for this study. A more comprehensive review of literature is presented in Chapter 2. The focus areas include Information Technology (IT), IT strategy, and IT implementation and operationalising. A review of existing literature was also conducted on various associated theories – structuration theory and diffusion of innovations – that underpin the study.

1.6.1   Information technology

Information Technology (IT) is a mechanism employed by individuals, organisations and governments to conduct their day-to-day activities. IT deals with computing, including hardware, software, telecommunications and normally anything involved in the diffusion of information or the systems that enable communication. According to Gehrman (2012), IT is a group of information resources, users and management, as well as the IT infrastructure and all other information systems of an organisation. Concurring, Kumar (2014) suggests IT encompasses an extensive collection of hardware and software solutions that enable organisations to collect, arrange and analyse the data that assists in realising their objectives.

IT plays a vital role in today's ever-changing global environment. While IT solutions continue to increase the efficiency and effectiveness of business operations and communications, businesses will continue to depend on IT to succeed. IT is everywhere, an essential part of business; hence, it plays a vital role in supporting, sustaining and growing businesses (Wixley & Everingham, 2010). Thus, Nolan (2012) considers that the role of IT in organisations has changed from support and alignment of business strategies, into a vital component of business strategies. With the high relevance of IT, Nolan (2012) further states that IT leaders, in

understanding the forces that are changing the world, must develop strategies to address the requirements of a fast-changing business environment.

1.6.2   Information technology strategy

IT strategy is a detailed plan by IT management, developed to direct the organisation towards achieving its goals and objectives, using technologies. Gartner (2018:1) defines IT strategy as a "discipline that defines how IT will be used to help businesses win in their chosen business context". For most organisations, whether IT is a core or non-core function, the development and implementing of IT strategies to meet business objectives is vital. To meet the business objectives, an IT strategy would address gaps identified by several business units or divisions of the organisation (High, 2014). Furthermore, High (2014) suggests that an IT strategy is not a completely different plan, it is an IT interpretation of where it will focus to help organisations transform.

Clearly, IT is not merely a support function. It has become embedded in the systems and processes of many organisations. Hence, an IT strategy aims to create a plan that manages IT investments. Accordingly, Yen, Lee and Pai (2012) assert IT strategy aims to create a medium to long-term plan for introducing information systems and to manage related IT investments. Some studies indicate that while organisations develop comprehensive IT strategy plans, they are unable to implement them successfully, thereby leading to poor overall organisational performance (Pérez Estébanez, Urquía Grande & Muñoz Colomina, 2010; Bartenschlager, 2011; Peppard & Ward, 2016).

It is much simpler to reflect on a good strategy than to implement it; thus, the interest in implementing strategies, in practice, has intensified, primarily because good strategies are not necessarily implemented successfully (Bartenschlager, 2011). Lee and Puranam (2015) articulate a different view, stating that inadequately implementing a strategy may not be bad in an environment where strategies themselves may often be flaw; incorrect implementation may be a valuable source of bottom-up consideration for better strategies. As a result, even after more than a decade of research in the disciplines of Information Technology strategy, implementation and operationalisation are not fully understood.

According to Arvidsson, Holmström and Lyytinen (2014), a critical challenge within IT strategic implementation is that little has been investigated in terms of how to successfully implement strategic change linked to the use of it. Despite the interest and the vital role of implementing the strategy, most strategy implementations fail. One challenge organisations experience is

that of putting an implementation team in place to execute and operationalise the IT strategy (Bartenschlager, 2011).

Hence, Bartenschlager (2011) emphasises that as a result of the prominent deficiency, a conclusion can be drawn verifying a lack of expertise in implementing strategies in organisations. It is apparent that on one hand the implementation of IT strategy does not happen by default, and on the other hand, after the strategy is implemented, the operationalisation is normally left to happen by itself. A comprehensive, coherent IT strategy and implementation plan alone does not guarantee the success of IT. Peppard and Ward (2016) are of the view that a sustainable, strategic approach to support every aspect of IT is inclusive in the IT strategy. Thus, it is critical to operationalise this strategy in fulfilling the objectives.

1.6.3   Implementation and operationalising

Once an IT strategy has been developed, an implementation plan is created. Implementation is the execution of such a plan. *Implementation* is defined as the use of plans to accept, incorporate and confirm interests and change practices and patterns within specific settings (Schillinger, 2010).

As a result, post-*implementation*, then, refers to putting the IT strategy into use, or operationalising it. *Operationalisation* is defined in social sciences as "the process through which (abstract) concepts are translated into (measurable) variables" (Harvey, 2012:1). Jonker and Pennink (2010:51) state operationalisation is "the process of changing a theoretical construct into a concept that can be 'seen' in the empirical reality".

Operationalisation involves more than implementing an IT strategy, it involves getting the organisation to behave and operate in a way that is aligned with the target future. According to Ismail et al. (2009) *operationalisation* is the process necessitating the creation of an operational definition that will allow a concept or construct to be uniformly understood and used by all concerned parties. In the process of operationalisation, the parties encourage and operationalise the strategic concepts and involve them in day-to-day management (Larsen, 2014). In the context of this study, *operationalisation* of IT strategy refers to post-implementation, meaning putting an IT strategy into practice.

The need to deliver heightened business value and streamlined processes through IT is greater than ever before. Thus, organisations put emphasis on IT strategy and

operationalisation thereof to continually enable and support their processes and activities (Iyamu, 2012). Moreover, operationalising IT strategy often assists an organisation to change in a more informed and systematic way, thereby managing challenges such as IT ineffectiveness, an IT approach that is vague or uncertain, business and IT plans that are not aligned, IT being reactive as opposed to proactive and inconsistency of IT practises with best practices. Wang (2014) states the greatest benefits of IT strategy seem to be realised when IT investment is linked with other aligned investments and strategies, and all new business processes seem to be important in realising the maximum benefit of IT.

The challenges that are involved in operationalising IT strategy vary from one organisation to the other. For instance, Mair et al. (2012), conducting a study on e-health strategy, are of the view that the implementation and entrenchment of new technologies of any kind are complex processes of change at both micro and meso levels. Operationalisation is influenced at IT strategy development and implementation by many factors, both technical and non-technical, which enable and simultaneously constrain the operationalisation of the IT strategy.

1.6.4 Underpinning theories

In order to achieve the aim of the study, which is to propose a solution for operationalising the IT strategy in organisations, two socio-technical theories – structuration theory (ST) and diffusion of innovation (DOI) – were selected to underpin the study. Although other theories, such as actor network theory (Callon, 1986), activity theory (Kaptelinin & Nardi, 2006), contingency theory (Donaldson, 2001), and technology acceptance model (Davies, 1989) have been increasingly applied in IT studies over recent decades, ST and DOI were deemed the most suitable for this study.

Iyamu (2015a) acknowledges that various socio-technical theories have been employed by different researchers in a broad range of studies in the Information System (IS) discipline to underpin studies. Centred on the objectives of this study, none of these theories was suitable. The socio-technical theories selected to underpin this study are structuration theory (ST) and diffusion of innovations (DOI). Structuration theory was used as a guide to analyse the objectives of the study, whereas diffusion of innovations was employed as a lens to interpret and discuss the findings of the two cases researched.

These theories have been widely used in the field of IS research in recent years. Therefore, the theories were selected on the bases of their focus as discussed in the following subsections.

1.6.4.1 Structuration theory

Structuration theory (ST) stems from sociology, aiming to shape the development of social phenomena. According to Halperin and Backhouse (2007), the use of ST in IS studies has escalated in the last three decades. Concomitantly, Pozzebon and Pinsonneault (2005) assert that various scholars have emphasised the value of structuration theory as a lens to study different IS areas, seeking to intensify its relevance for empirical studies. Likewise, numerous researchers in the IS discipline use ST to gain better understanding of the development, deployment and application of IT (Veenstra, Melin & Axelsson, 2014).

ST is used as a lens to obtain deeper understanding of the phenomenon being studied. Pozzebon and Pinsonneault (2005) argue that ST is a valuable theory for a rich understanding of management, organisation and related subjects of inquiry. Structuration theory, is of the view that human actions are enabled and constrained by structures, contends that relationships between human actors and society are of central concern. Giddens (1984) regards structure as rules and resources repeatedly involved in social reproduction. In structuration theory, rules and resources do not exist independently of human action, but as part of material entities.

The theory posits that human actions directly condition or are conditioned by organisational processes in social contexts (Iyamu & Roode, 2010). Giddens (1984) infers that structure and interaction are a mutually constitutive duality. The duality of structure of ST was employed in this study. According to Iyamu (2015a) the duality of structure, presented in Figure 1 below, consists of three main dimensions, namely structure, modality and interaction, which explain that the social system is managed by a need for importance (significance), an importance of authority (domination) and rights and obligations (legitimation).

These dimensions are linked to interaction through modalities. Agents are producing structures through modalities (Kort & Gharbi, 2011). Duality of structure offers three modalities, including interpretive schemes, facilities and norms, respectively. Giddens (1984) presents three interactions: communication, power and sanction.
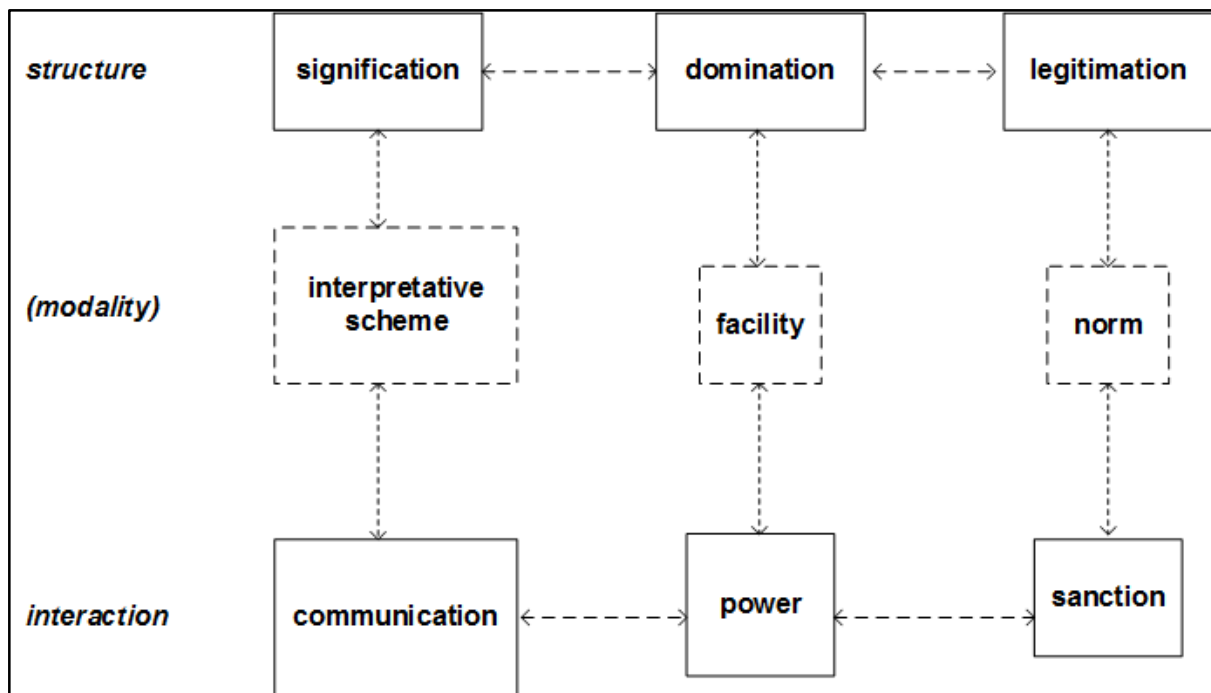
Figure 1.1: Duality of structure (Source: Giddens, 1984:29)

Duality of structure is defined as the repeated relation between human and structures, whereas structures shape human actions, and in turn, form the structure (Iyamu, 2015a). Thus, in this study, ST was applied to focus on the interaction and relationships that happen among technical and non-technical agents. The theory of structuration does not focus on how technologies are diffused, such as the operationalisation of IT strategy in an environment. As a result, the theory of DOI was selected to understand how innovation takes place, and how those innovations are diffused within an organisation.

1.6.4.2   Diffusion of Innovations

The diffusion of innovations theory focuses on how innovations are diffused in and across organisations over time. Diffusion of innovations (DOI) provides a perspective of inventing new ideas, diffusing and adopting or rejecting these ideas, leading to certain consequences which trigger social change (Rogers, 2003). Rogers (2003) describes *diffusion* as a kind of social change, the process by which change happens in the structure and function of a social system. Rogers also defines *innovation* as any object, idea, technology or practice that is new (Rogers, 1995).

In his book *Diffusion of Innovations,* Rogers (2003), describing diffusion as the processes and factors that influence the adoption of new innovations, sees innovations as being communicated through certain channels over time and within a particular social system.

Individuals are seen to possess different degrees of willingness to adopt innovations; thus, it is generally observed that the portion of the population adopting an innovation is distributed over time (Rogers, 1995).
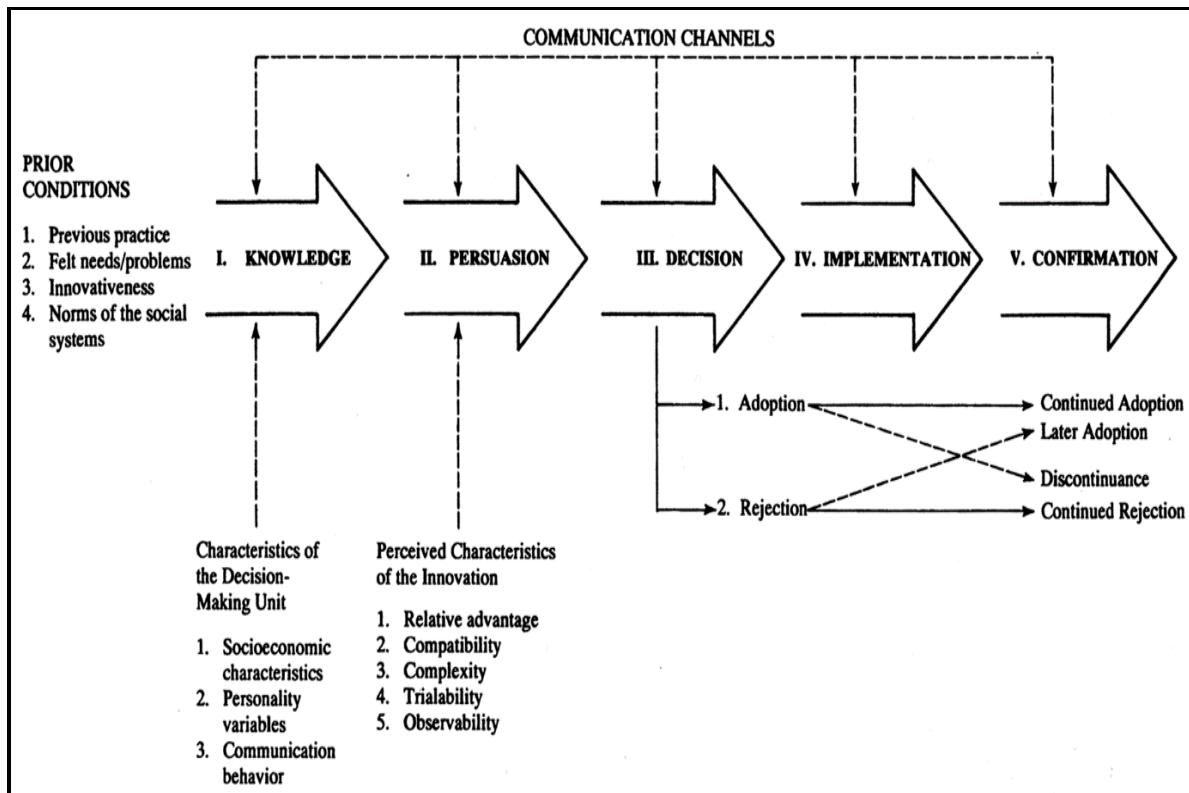
Figure 1.2: Innovation-decision process (Source: Rogers, 2003:171)

Diffusion of innovations consists of four main elements: (1) an innovation (2) is communicated through certain (3) channels (4) over time among the members of a social system (Rogers, 2003). The time element referencing the innovation-decision process, depicted in Figure 1.2, was used to analyse the data collected, focusing on finding whether to use technology and process to support the operationalisation of IT strategy. The innovation-decision process describes the process through which an individual moves from initial knowledge of an innovation, to the forming of an attitude toward the innovation, to a decision to adopt or reject, to implementation and use the new idea, and finally to a confirmation of this decision (Rogers, 2003).

The process an organisation undertakes to assess the steps in deciding to adopt or reject an innovation has been studied by many scholars (Bingley & Burgess, 2009; Tatnall, 2009; Rana et al., 2012; Zhang et al., 2015) across the IS discipline using the DOI theory. Nemutanzhela and Iyamu (2015) assert that the DOI theory has been applied extensively, predominantly as a lens in Information Systems (IS) studies to analyse data. Concurring, Zhang et al. (2015)

conducted an electronic health study positing that Rogers' innovations diffusion theory is one of the most popular theories for studying adoption of information technologies (IT) and understanding how IT innovations spread within and between communities.

As far back as 2006, Sahin (2006) state that the DOI theory has been employed by various scholars such as Blankenship (1998); Carter (1998); Jacobsen (1998); Medlin (2001); Surendra (2001); Zakaria (2001); Isleem (2003); Less (2003); and in educational technology-related studies. Al-Jabri and Sohail (2012), conducting a study in the banking industry, assessed the factors affecting mobile banking adoption using the DOI as an underpinning theory.

1.7   Research design and methodology

Based on the aim and objectives as presented above, exploratory research is followed. Research employs a design and methodology to achieve its intent and objectives. With this in mind, this section discusses the research philosophy and paradigms, research approach, methods, research design, data collection techniques and data analysis employed in this study.

1.7.1   Research philosophy

Research *philosophy* is described as abstract ideas and beliefs informing a study. Different studies apply different research philosophies based on the objectives of each study. Epistemologies and ontologies are some of the philosophies employed in research.

Epistemology has to do with creating acceptable knowledge in an area of research. According to Wynn and Williams (2012), *epistemology* concerns the assessment of knowledge and justification of belief, and *ontology* denotes assumptions about the nature of reality. The epistemological paradigms include positivism, critical realism and interpretivism.

In positivism studies, researchers are independent from the study: there is no requirement for human interest, and thus an objective reality exists. According to Reddy (2011), positivists accept reality as unchanged and that which can be observed and defined from an objective view, not interfering with the phenomena being studied.

Critical realism is an alternative to positivism and interpretivism paradigms, weighing parts of both to provide new approaches to create knowledge. In particular, critical realists recognise

the role of biased knowledge of social actors in a certain setting and the existence of unbiased structures that constrain and enable these actors to pursue certain actions in a given situation (Wynn & Williams, 2012).

Concerning interpretive methods, Walsham (2006) departs from the view that our knowledge of reality is objective, suggesting that the sphere of human action is about the meaning human actors in society give to it. The interpretive paradigm aims to understand the subjective meanings of individuals in a studied field (Goldkuhl, 2012). Therefore, researchers of this paradigm are realistic as they relate to real-world situations which evolve naturally; generally, these researchers manage to be discreet, conscientious and flexible (Tuli, 2011). Ordinarily, interpretivists do not "start with a theory as with post-positivist they rather generate or inductively develop a theory of patterns of meanings throughout the research process" (Creswell, 2014:8).

This study followed the interpretivism paradigm. Tuli (2011) considers interpretivist constructivist an academic paradigm primarily for qualitative research, as it perceives the world as structured, interpreted and experienced by people in their dealings with each other and with wider social systems. Considering this study's intent to explore the factors that influence the operationalising of IT strategy in an organisational setting, and develop a framework based on the interpretation of the participants' subjective views of their experiences in their own environments, the interpretivism paradigm is deemed appropriate. Based on the objectives as stated above, this study employs the interpretivism approach to explore participants' subjective views of their experience in their own environments.

1.7.2 Research approach

The two traditional research approaches for social science are deductive and inductive. However, some research employs a third approach, abductive (DePoy & Gitlin, 2015).

With a deductive approach, prior acceptance of the truth exists, thereby emphasising the testing of a theory. DePoy and Gitlin (2015) indicate that a deductive approach comprises moving from a general principle of understanding a certain case to a basis of a theory and its ideas; consequently, hypotheses are developed and formally tested. As a result, the deductive approach begins with a theory, or hypothesis, and tests the hypothesis.

In the inductive approach, no prior acceptance of the truth exists; hence, the focus is on developing a theory. The inductive approach expands from specific cases to a broader

generalisation about the phenomenon studied (Eriksson & Kovalainen, 2015). Therefore, the inductive approach develops a theory emerging from the analysis of the collected data.

The abductive approach, however, concentrates on an iterative process of inductive approach, a process involving the formulation of new theories and ideas, moving from the normal description and meaning given by individuals to categories and concepts that develop the base of an understanding or an explanation of the phenomenon under study (DePoy & Gitlin, 2015; Eriksson & Kovalainen, 2015).

As the aim of this study was to propose a solution useful to operationalise IT strategy in organisations, qualitative data was collected following the inductive approach, though there are no set rules with regard to the research methods associated to these approaches. In most cases, the use of the inductive approach is related to qualitative methods of data collection and data analysis, whereas the deductive approach is associated with quantitative methods (Gabriel, 2016).

1.7.3   Research method

According to Leedy and Ormond (2014), *research methodology* is the approach the scholar selects in carrying out the research. The three most common methods researchers normally apply in conducting research are quantitative, qualitative and mixed methods (Walliman, 2017). Quantitative methods generate numerical data, thereby quantifying the problem. The qualitative method, however, creates textual data, and the mixed method involves both numerical and textual data.

1.7.3.1   Quantitative method

Quantitative method, according to Bryman (2012), is a research method emphasises quantification in the collection and analysis of data and involves a deductive approach. Also, the emphasis is on testing theories. The role of quantitative research methods is to maximise objectivity, replicability and generalisability of findings, with the general interest aimed at prediction (Harwell, 2011).

1.7.3.2   Qualitative method

By contrast, *qualitative research methods* assist researchers to understand people and the social and cultural contexts within which they live. Bryman (2012) describes the qualitative method as a research method that accentuates words and text rather than quantification in

data collection, and analysis that mainly emphasises an inductive approach and weighs on the generation of theories.

1.7.3.3 Mixed methods

Harwell (2011) defines *mixed methods* research as mixtures or combinations of quantitative and qualitative research techniques, methods, approaches, concepts or language in the same study. Similarly, Venkatesh, Brown and Bala (2013) refer to mixed methods as a combination of quantitative and qualitative research methods into a single study.

Based on the above descriptions, the decision to select any of the three research methods hinges on the research question, the purpose and the context. Having insufficient understanding of what may constitute the operationalisation of IT strategy in organisations and the associated factors, this exploratory study focuses on determining the phenomena that constitute IT strategy operationalisation. Hence, qualitative methods, it was determined, would be more appropriate than quantitative methods.

This study, therefore, employs qualitative research methods to examine the factors influencing the operationalisation of IT strategy. Qualitative researchers study things in their natural environments, with the aim of making sense or interpreting phenomena in terms of the meaning people give to them (Denzin & Lincoln, 2011). Through direct engagement with participants, using the qualitative method allows the researcher to explore why things happen the way they do in operationalising IT strategy in an organisation. Creswell (2013) suggests conducting qualitative research to explore the contexts or settings in which participants in a study address a complex problem or issue.

1.7.4 Research design

The research design is employed to achieve the objectives of the study. Many different research designs can be applied when conducting research. Williams (2011) suggests that research designs – such as case study, grounded theory and ethnography – can be applied when conducting qualitative research.

1.7.4.1 Case study

A *case study* is a research technique that enables an in-depth exploration of a real-life phenomenon in its natural setting (Yin, 2013). Wahyuni (2012) explains that research should preferably employ multiple case studies to facilitate comparisons between the studied

practices of the observed phenomena. Therefore, as the researcher obtains a comprehensive perspective of these practices, the case study approach allows for generalising.

Studying two or more cases to compare, build theory or for the purpose of generalisations is called a multiple or collective case studies (Leedy & Ormrod, 2014). Hyett, Kenny and Dickson-Swift (2014) assert that case study research has a level of flexibility compared to other qualitative research design techniques such as grounded theory or phenomenology.

1.7.4.2 Grounded theory

Grounded theory is applied to phenomena that are not well understood. According to Charmaz (2014), grounded theory methods consist of methodical, but flexible, guiding principles for collecting data to create theories from the data gathered. Grounded theory refers to an iterative process of going back and forth between data and analysis; the researcher continually revises and revisits the data on an evolving basis for analysis (Charmaz, 2014 & Lee, 2012).

Therefore, its main aim is to create new, contextualized theories directly from data (Lee, 2012). Lee (2012) maintains that a shortcoming of grounded theory is that it is a lengthy, repetitive process involving multiple iterations of data collection, rather time consuming and labour intensive.

1.7.4.3 Ethnography

According to Creswell (2014), *ethnography* is a qualitative method in which researchers study a cultural group as a collective in a natural setting over an extended time, mainly by gathering observational and interview data. Ethnography research design focuses on examining the day-to-day behaviour of people in a particular group with the intention of understanding the cultural norms, values, beliefs, social structures and other patterns (Leedy & Ormrod, 2014).

Charmaz (2014) postulates that the aim of an ethnographer is to acquire 'insider' understanding of the researched world of the group by participating and observing in the setting, community or social world as a member. The main criticism of ethnography researchers, however, is that they uncritically adopt participants' viewpoints and engage in prolonged unfocused activities in the field setting (Charmaz, 2014).

Based on the aforementioned, this study intends to employ multiple cases from the perspective of the case study, primarily because this allows for the study of cases from a real-life

perspective or setting (Yin, 2013). Therefore, the case study design was applied in this study, enabling the researcher to obtain a comprehensive view from different organisations concerning how IT strategy was operationalised.

Two cases were selected, one from the public sector and the other from the private sector. These two sectors are diverse in nature, based on their foci and service offerings. However, both still do need to operationalise their IT strategies. The similarities as well as their diversities made it interesting and appropriate to examine the factors influencing the operationalising of their respective IT strategies.

1.7.5 Data collection techniques

Two data collection techniques – interviews and documentation – were employed. Schultze and Avital (2011) assert the purpose of qualitative interviewing is to express and clarify individuals' real-world life as they live it, feel it, experience it and make sense of accomplishments. According to Rabionet (2011), the interview technique in qualitative study is a prevailing and adaptable instrument that reveals the opinions of people signifying their personal experiences.

Furthermore, interviewing differentiates itself from other data collection techniques in that the researcher directly engages participants in a conversation to produce detailed circumstantial, cyclical and dependable accounts of participants' outer and inner worlds, their understandings and their methods of inference (Schultze & Avital, 2011).

1.7.5.1 Interview technique

Qu and Dumay (2011) argue that research interviews, one of the primary data collection methods of qualitative research, have been used extensively in ethnographic research and field studies. Interviews afford the researcher a valuable opportunity to learn about the spheres of others. In addition, interviews enable the interviewer to follow up and probe responses, motives and feelings. Another benefit of interviews is the recording of nonverbal communications, facial expressions and gestures that tend to enrich the qualitative aspects of the data (Qu & Dumay, 2011).

There are three types of interviews in social research: structured, semi-structured and unstructured interviews. Structured interviews are verbally managed questionnaires in which a list of predetermined questions is solicited, with little or no deviation and with no scope for

follow-up questions to responses that support further explanation (Pathak & Intratat, 2012). By their very nature, structured interviews only allow for limited participant responses and are, therefore, of little use if 'depth' is required.

To the contrary, unstructured interviews do not reflect any predetermined interview questions and are performed with little or no structure. Such an interview may simply start with an opening question and will primarily progress base on the initial response. According to Leedy and Ormrod (2014), unstructured interviews are advantageous in that they are more flexible and more likely to produce information that the researcher had not planned to request. With no predetermined interview questions, unstructured interviews elicit different information from different participants. But these can be difficult to manage in comparing the responses of various participants (Leedy & Ormrod, 2014).

Semi-structured interviews consist of several key questions that seek to define the areas to be explored, but also allow the interviewer or interviewee to deviate to pursue an idea or response in more detail (Rabionet, 2011). This interview format is used most frequently in IS, as it provides participants with some guidance on what to talk about, which many find helpful. The flexibility of this approach, particularly compared to structured interviews, also allows for the elaboration on information that is important to participants but may not have previously been regarded as pertinent by the research team (Rabionet, 2011).

In order for the study to explore an individual's experience concerning the operationalisation of IT strategy, semi-structured interviews were used to address the research questions. In addition, an interview guide was provided to the participants. According to Galletta (2013), semi-structured interviews include both open-ended and more theoretically focused questions, eliciting data from the experience of participants and data driven by prevailing concepts in the particular discipline within which the research is conducted. Thus, semi-structured interviews present an understanding into an individual's experience, enabling the researcher to explore a participant's narrative and views of the phenomenon (Galletta, 2013).

Semi-structured questions were used as a guide, affording the interviewer the flexibility of continuously probing the interviewee if clarity was sought from some questions. In addition, semi-structured interviews enabled the researcher to narrow down the areas with regard to IT strategy operationalisation that the research wanted to ask the participants. Participants were from various levels within the organisational structure, from both the business and IT divisions. Participants were selected based on knowledge and work experience, including business and

IT executives, IT managers, IT project managers and IT specialists. The number of interviews differed, depending on the size of the organisation and the point at which saturation was reached.

1.7.5.2 Documentation

The primary source of documentation for this study was organisational documents, such as corporate plans, IT strategy documents, IT strategy implementation plans and various other documents related to the study requested from the organisations. Bryman (2012) refers to *documentation* as materials that can be read, that have not been generated particularly for the purpose of social research and are related to the social researcher's problems and issues preserved to form part of the analysis. Iyamu (2014) states that the advantage of documentation is that it may provide useful information that participants may have partially or even totally forgotten. Thus, documentation complements the data from interviews.

Bryman and Bell (2011) reference various types of documents such as personal documents, public documents, organisational documents, mass media outputs, visual documents and virtual documents. These researchers refer to written personal documents that include diaries and letters, as well as visual forms such as photographs. Public documents are derived from inquiry or legal enquires; organisational documents such as company policies, internal memoranda, and annual reports; mass media refers to newspaper articles; and virtual output such as the internet (Bryman & Bell, 2011).

1.7.6 Data analysis

Data analysis is a mechanism employed to analyse the data collected from the selected cases. Data analysis was done in units, on a case-by-case basis, using structuration theory and diffusion of innovation as lenses.

1.7.6.1 Units of analysis

Units of analysis are the main entity being analysed in a study. According to Iyamu (2011), a unit of analysis approach allows data to be analysed on unit-by-unit basis. The two organisations in this study are the main units, as shown in Table 1.1. In each of the units, there are sub-units, including both technical and non-technical agents.

Table 1.1: Units of analysis

Main Units	Sub-Units	
Broad Spectrum (Case #1)	Technical (IT)	IT Managers
		Technologists
	Non-Technical (Business)	Business Managers
		Business Analysts and Business Users
Triumph Technologies (Case #2)	Technical (IT)	IT Managers
		Technologists
	Non-Technical (Business)	Business Managers
		Business Analysts and Business Users

The analysis based on units assisted the researcher to examine the factors that influence the operationalisation of IT strategy. The data analysis based on the units was guided by lenses of two socio-technical theories. The results from the two case studies were combined to give deeper understanding to how IT strategy is operationalised in organisations, and to make a case for generalisation. According to Pilot and Beck (2010:1452), "the end product of qualitative analysis is a generalization, regardless of the language used to describe it".

1.7.6.2 Analysis through lenses

Two socio-technical theories – structuration theory (ST) by Giddens (1994) and diffusion of innovations (DOI) by Rogers (1995, 2003) – were employed as lenses in the analysis of data at macro and micro levels. Structuration theory, through the duality of structure, focused on how the conscious or unconscious decisions of agents enable and at the same time constrain the operationalisation of the IT strategy in organisations. Therefore, the objectives of the study were analysed through the duality of structure from the perspective of the structuration theory.

The theory of structuration does not focus on how technologies are diffused, however, such as operationalisation of IT strategy in an environment. Also, structuration theory does not provide an examination of the process involved through which people adopt or reject an innovation.

The theory of diffusion of innovations through from the viewpoint of the innovation-decision process concentrated on the interpretation and discussions of findings from the two organisations. DOI was chosen to examine how innovation takes place, and how those innovations are diffused within an organisation. The innovation-decision process from the perspective of diffusion of innovations was used to examine the process of communication among actors concerning how innovation is diffused. The innovation-decision process was

employed to understand how the IT strategy was operationalised, from awareness through to confirming use in the daily operations of the organisation.

These two socio-technical theories employed in this study highlight their importance and complementary usefulness.

1.8 Delineation of the research

While this study could have been conducted globally, the aim was to focus only on organisations in South Africa. This phenomenon appears prevalent in organisations in South Africa. In addition, the study focused on how IT strategy is operationalisation, excluding the development of IT strategy.

1.9 Significance of the research

The factors that influence the operationalisation of IT strategy have not been systematically contextualised. Thus, this study's significance is three-fold:

i.   *Theoretical perspective:* numerous studies have been conducted with respect to the development and implementation of IT strategy. Hitherto little is known about the factors that influence IT strategy operationalisation. Therefore, this study seeks to contribute to the academic body of knowledge, increasing existing literature.

ii.   *Methodological perspective:* employing two socio-technical theories as lenses to analyse the data brings a fresh perspective to how operationalising IT strategy has been studied.

iii. *Practical perspective:* the study will assist managers to comprehend, at organisational levels, the factors influencing operationalisation of an IT strategy. Decision makers and managers would benefit from understanding the factors influencing operationalisation of IT strategy, as this will assist organisations to adopt a pro-active approach in rectifying challenges within organisations.

1.10 Ethical considerations

It is imperative to consider ethics when conducting a scholarly study. *Ethics* encompasses methods, procedures or perspectives guiding researchers in terms of behaviour when analysing complex problems and issues.

The aim of ethics in research is to ensure that no one is mistreated or suffers harmful consequences from any research activities. Ethical principles can and should direct ongoing research issues arising from qualitative research in order to meet the objectives of the research, as well as to uphold the rights of all research participants (Leedy & Ormrod, 2014). Interviews, similar to other data collection techniques, must adhere to ethical standards. The personal, conversational nature of interviews compels the researcher to consider strict adherence to ethical principles.

The nature of the study was communicated to all participants and formal consent was obtained. All participants were given a choice of whether to participate or not. Consequently, participation was voluntary: choosing not to participant had no negative consequences for the participants. In addition, interviewees were at liberty to decline to answer certain questions at any point.

Confidentiality and anonymity were assured to maintain adherence to research principles and to uphold participants' rights and values. As a result, information disclosed was treated confidentially, as a commitment was made not to disclose participant identities; hence, pseudo codes were assigned during data analysis. Furthermore, participants were allowed to withdraw from the study at any time without been disadvantaged in any way.

Walsingham (2010) emphasises that when doing research on human subjects, the researcher should follow a distinct code of ethics. There should be guidelines that decide simple considerations covering fairness, honesty, openness of intent, disclosure of methods, the purpose for which the study is executed and respect for the integrity of the individual. This research was carried out in line with the university's (CPUT) research code of ethics.

1.11 Structure of the thesis

This thesis was structured into seven chapters, with Figure 1.3 below depicting this structure. A brief explanation follows the figure below:
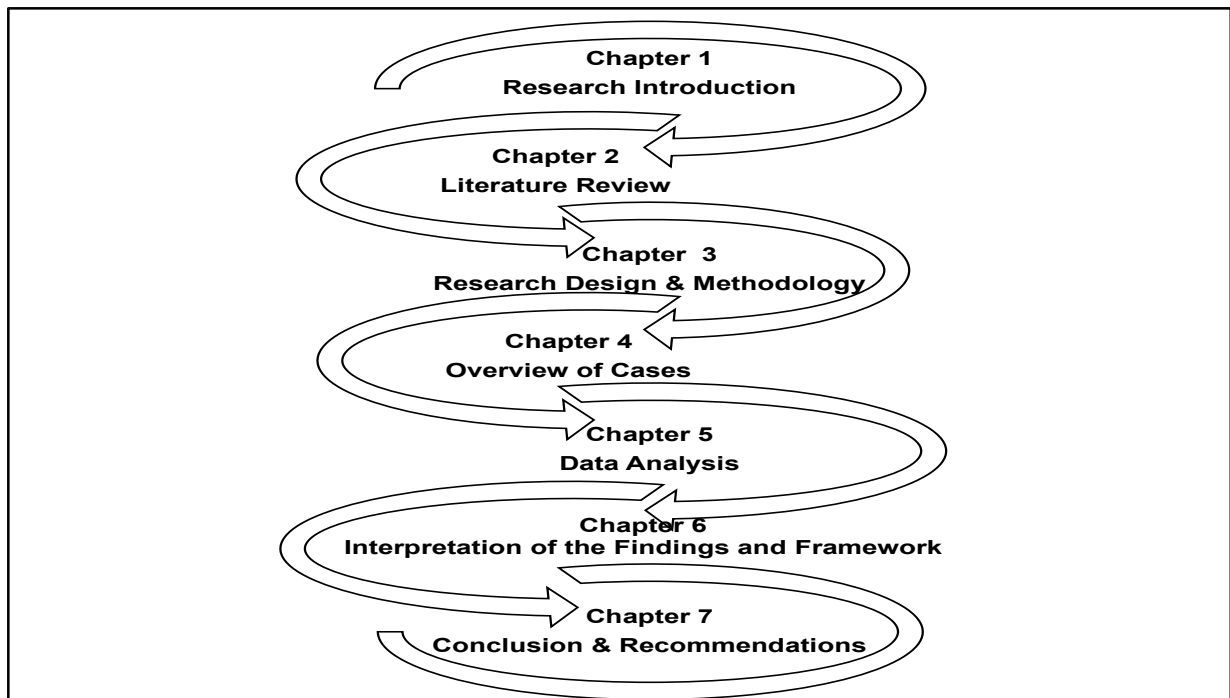
Figure 1.3: Thesis structure

Chapter 1 is the introductory chapter of the study. The research problem, questions and objectives of the study are presented. In addition, a summary of the literature that was reviewed, research methodology and underpinning theories employed in the study were discussed.

Chapter 2 focuses on the literature reviewed, including the underpinning theories in detail.

Chapter 3 covers the research methodology including research philosophies and paradigms, research approaches and research methods, as well as the data collection techniques and data analysis approach.

Chapter 4 provides details about the cases that were studied, including a synopsis of the background, service offerings and organisational structures.

Chapter 5 concentrates on data analysis through the lenses of an underpinning theory, structuration theory.

Chapter 6 presents the interpretation of the findings obtained from the data analysis from the perspective of innovation-decision process. Based on the aim of the study, the framework to operationalise the IT strategy is also presented in this chapter.

Lastly, **Chapter 7** concludes the study and evaluates whether the objectives of this study have been achieved. In addition, potential areas for further research are discussed.

1.12 Summary

Information technology is a vital organ for any organisation's survival and sustainability. IT is intended to enable organisations to implement strategies and realise objectives. Thus, IT is an enabler and transformer of organisations. Operationalising an IT strategy as an integral part of the day-to-day management of an organisation remains a challenge.

This chapter outlines the study the researcher undertaken. The statement of research problem has been articulated. Emanating from the research problem are the research questions, and the aim and objectives of the research.

The aim of this study is to develop a framework for the operationalising of IT strategy in organisations. In addition, a summary of research design and methodology was presented. This is an exploratory study; therefore, an interpretive paradigm was employed. The qualitative research method was selected as a result the inductive approach is employed.

Data collection techniques such as interviews, in particular semi-structured interviews and documentation, were employed in this study. Data analysis was conducted through the lenses of two socio-technical theories, structuration theory and diffusion of innovations, respective seminal works of Giddens (1994) and Rogers (1995, 2003).

In addition, the significance of the study to the body of knowledge and profession was presented. Every research undertakes to consider certain ethical conducts. This has been outlined in accordance with the university's research code of ethics. Finally, the structure of the thesis was outlined to provide an overview of the chapters proposed for the study.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of literature, focusing on the key areas related to this study, including Information Technology (IT), Information Technology strategy, implementation and operationalisation, and the underpinning theories, structuration theory and diffusion of innovations theory.

The chapter is divided into six main sections. The first section discusses IT and its various uses. Sections two and three cover IT strategy, and implementation and operationalisation of an IT strategy, placing these concepts into perspective within the context of the study. This is followed by the underpinning theories, structuration theory (ST) and diffusion of innovations (DOI). The section that follows covers the application of the theories from information systems research perspective. The chapter then concludes with a summary.

2.2 Information Technology

Primarily, information technology (IT) solutions are deployed to provide an organisation with computing, information and communication resources, in achieving its goals and objectives (de Lange, 2015). Kumar (2014) views IT as encompassing a broad range of hardware and software solutions enabling organisations to collect, store and analyse data assisting them to realise their objectives. Similarly, Oláh et al. (2018) argue that IT is to some extent the use of computers, storage, networks and other electronic devices, infrastructure and processes to create, process, store, secure and exchange any forms of electronic data.

IT solutions are constantly confronted with growing requirements from organisational users for attributes that include access from anywhere and everywhere, digital environments, ample file storage and retrieval, and simple user interfaces into IT systems (Ahuj & Gallupe, 2015). Owing to the importance of IT in organisations, IT is more than just tools. Lee, Thomas and Baskerville (2015) describe IT as a combination or network of technologies, processes and people that define a social setting. As far back as 2001, Orlikowski and Iacono (2001:122) view IT as "the infrastructure that supports its development and use, and the social relations and processes that make up the terrain in which people use it". Similarly, Onn and Sorooshian (2013) regard IT as hardware, software, networks and telecommunication competencies and abilities given to people and processes in organisations to provide data, information and knowledge. Teubner

(2013) states that information technologies are socio-technical systems organised through communication connecting business information needs, users and the technology in use.

The main components of IT solutions include hardware, software and network, and the use of processes by people to actualise the solutions (Taiwo, 2016). Wanaswa, Awino and Ogutu (2017) explain that IT entails a combination of software and hardware that enables organisations to manage and control their operations in an effort to achieve specific organisational goals and objectives. The next sub-section discusses the IT components in the context of this study.

2.2.1   Information Technology components

Information Technology components integrate and communicate with each other to provide systems and processes, employed by people. According to Hunter (2015), software controls and directs the hardware and interacts with the network, sanctioning computers and servers to communicate with each other. Baller, Dutta and Lanvin (2016) explain that IT can change businesses and society, as the role of hardware, software and services becomes increasingly important for governments, organisations and individuals, as using networks that enable them have become integral in day-to-day lives.

2.2.1.1   Hardware

Hardware in IT comprises the physical aspect of computers, telecommunications and other devices. With the rapid, constant, inevitable advances of hardware, organisations, especially IT management, are compelled to develop long term IT strategies to remain competitive (Bharadwaj et al., 2013). Williams and Sawyer (2014) argue that hardware operates under the control of software and is inoperable without it.

2.2.1.2   Software

Software is the summation of all commands necessary to perform an activity on data processing systems (Kirchmer, 2012). Software instructs the hardware. It can be broadly divided into two categories: systems software and application software. Systems software manages the hardware and creates the interface between the hardware and the consumer, thereby providing access to the computer hardware and making system resources available (Bourgeois, 2014). Application software, on the other hand, is the group of programs that process and perform user-related system activities, designed for a particular goal (Kirchmer, 2012; Bourgeois, 2014).

Baller, Dutta and Lanvin (2016) state that software operates on hardware such as personal computers (PCs) which include desktops and laptops, ultra-portables, servers or mainframes, tablets and smart phones, as well as operating systems and systems software which include databases and security packages, business applications, and consumer applications such as games, personal finance and reference software (Baller et al., 2016). As time lapses, newer versions of software are developed which render past software inadequate to meet organisational goals. As a result, some organisations implement an IT strategy to modernise their software to be competitive and sustain the organisation.

2.2.1.3 Network

Many organisations use network to communicate and conduct their day-to-day business with employees, customers, partners, suppliers and other stakeholders. Networking is defined as the ability of computing systems to communicate with each other, essentially to facilitate communication between individuals and groups (Bourgeois, 2014). With the maturity of networking technologies, the adoption and use of internet technologies is prevalent in many organisations. Bourgeois (2014) asserts these networking technologies have allowed organisations to implement functionalities to employees, business partners and other stakeholders, thereby increasing efficiencies and effectiveness, and improving communications. The continuous innovation of networking technologies poses critical consequences for IT organisations. The role of IT is significant; most organisations cannot survive without IT.

2.2.2 Role of Information Technology in organisations

Depending on the requirements and demands of an organisation, IT has a distinct and broad scope of use. Kroh et al. (2018) assert the use of IT definitely influences organisational-wide innovation performance, leading to sustainability and competitiveness. Moreover, according to Alleyne (2011), IT has helped to generate systems for responding to a wide range of social needs. In today's global world, IT is universally regarded as a business enabler. Organisations increasingly implement IT for strategic reasons such as enabling and improving efficiencies as well as advancing the control and productivity of internal processes (Stewart, 2008).

Kumar (2014) suggests that IT narrates technology-focused processes that increase the capability of an organisation to deliver revenue-generating services. Onn and Sorooshian (2013) argue that IT plays a significant role because its purpose is to create computer-based systems of information by employing computer systems, increasing the productivity of an

organisation. Rodríguez-Escobar and González-Benito (2015) posit that IT has contributed significantly to the processing, storage and distribution of information.

IT is pivotal to any organisation, irrespective of the sector in which it operates and manner and purpose of use. Organisations of all sizes, whether public or private (Brown et al., 2012), use IT as a primary enabler. Amit et al. (2008) concur that the increasing use of IT is spreading fast, its pervading effects noted in the education sphere, government institutions, business, homes and organisations. Society is increasingly dependent on IT as it pervades our daily lives.

Affirming this assertion, Nolan (2012) states that IT is everywhere (education, healthcare, manufacturing, transportation, retailing, and basic services, including war); it is ubiquitous; it matters and matters a lot. IT is critically important, playing many roles in strategies and operations of every successful organisation. Similarly, both private and public organisations such as health systems, transportation, communication and national security, are entirely dependent on IT to perform even basic functions (Allenyne, 2011).

While some professionals and academics argue that IT is a source of competitive advantage, others argue against this notion. Carr (2005) disputes that IT is a source of competitive advantage as it is available to everyone. Piechota (2015) agrees though certain categories of IT have become commodities, not all have. As a result, standardisation and diffusion of IT and innovation capabilities are growing instead of diminishing (Piechota, 2015). Power (2013) argues that IT shifted from a potential source of competitive advantage to a necessity for competitive parity. Drnevich and Croson (2013) maintain a neutral view, suggesting that IT gives an adaptable organisation the opportunity to take advantage of opportunities such as enabling access to global markets, or upgrading to a strategic platform that supports better products and service offerings that lead to competitive gain. It also allows for the avoidance of strategic difficulty caused by a competitor's unexpected action that threatens an organisation's existence (Lui, 2011).

Davenport (2013) is of the view that IT is rarely effective without simultaneous human innovation, translated into a strategy. The use of IT in processes strongly influences strategy and is influenced by strategy. No single business resource is better positioned than IT to bring about radical improvements in business processes (Davenport, 2013). To date, very few organisations could be sustainable without IT. Dos Santos et al. (2012) argue that organisations have, in fact, achieved their contemporary status through the use of IT.

However, as some opportunities have become inappropriate, there is a need for organisations to develop and implement IT strategies for the continuous creation of appropriate opportunities. Carr's (2003) assertion in his article IT Doesn't Matter drew criticism from IT professionals across the discipline, with counter-arguments from professionals such as Broadbent, McDonald and Hunter (2003) arguing that "IT does matter", not because of hardware or even standard commercial software. It is as a result of the intelligent and innovative application of information resolves business difficulties and develop customer value at high speed, little cost, and the right measure (Broadbent et al., 2003). Almost a decade later, Dos Santos et al. (2012) reaffirm IT appropriateness in the business world. Dos Santos et al. (2012) assert that IT innovations offered opportunities for organisations to create value at some point, and later became essential for organisations to sustain their business.

Although IT is significant, it is not without challenges. The changes IT has made on the core nature of business are evident; hence, organisations are persistently adopting and adapting to the diverse opportunities IT offers. However, the converse is also true: IT has not always delivered business value, a key reason being the lack of synergy between an organisation's business strategy and IT strategy (Chao & Chandra, 2012). Today, while most organisations are inarguably dependent on IT, not all of them involve the same level of dependency. Notwithstanding, IT is still necessary to enable business operations and strategic ways of organisations; clearly, IT strategies are required. Bourgeois (2014) argues that merely procuring and implementing the latest technologies, whether hardware, software, network or telecommunication, will not, on their own, make an organisation successful. IT is not a mystic bullet.

The significance of IT as an enabler for organisations to achieve goals and objectives needs to be understood. Organisations realise strategic advantages by employing information and communication technologies more effectively than their opponents (Teubner, 2013). In support of this, Peppard, Galliers and Thorogood (2014) posit that for achieving sustainable competitive advantage, IT on its own is not adequate: organisations require an infrastructure and strategic IS platforms.

Organisations require IT departments to develop and implement IT strategies that continue to enable and improve business objectives. With the rapid spread of IT and the increasing connectivity of the modern world, relying on an IT strategy is no longer a luxury for organisations; indeed, it has become necessary for survival.

2.3   Information Technology strategy

It is evident from literature that the concept of an 'IT strategy' is poorly understood by many scholars. Bartenschlager and Goeken (2009) assert, for example, that IT strategy seems to be inadequately understood by professionals, deemed an abstract concept in both professional and academic research.

Literature, according to the authors, suggests that various scholars articulate and define IT strategy in different ways (Bartenschlager & Goeken, 2009). Substantiating their assertion, Bartenschlager and Goeken (2009) refer to the term "Informatikstrategie" (informatics strategy). Other authors use "IT strategy" and "IS/IT strategy" (Chan, Huff & Copeland, 1997), "Information strategy" (Smits, Poel, & Ribbers, 1997) and "strategic information plan" and "IT strategy" (Lederer & Salmela, 1996) without explaining the difference. Karpovsky, Hallanoro and Galliers (2014a, 2014b) consent that inconsistent terminology such as IS planning, IT planning, strategic IS planning (SISP), IS strategy, IT strategy, are all being interchangeably applied in recent years.

Agreeing with this assertion, Teubner (2013) explains that some authors refer to "IS strategy", others refer to "IT strategy", whereas others combine the two the terms "IT/IS strategy", "strategic information plan" or "information strategy". Seeing that this study does not intend to highlight the technological means to which IT and IS are referred, this present research uses the term IT strategy. Teubner and Mocker (2008) and Chen et al. (2010), positing that there are various understandings of an IT strategy, articulate common conceptions associated with an IT strategy. Table 2.1 below presents the strategy concepts.

Table 2.2: Strategy concepts (Adapted from Teubner & Mocker, 2008; Chen et al., 2010)

Conception	Central questions to be answered	Intended effect	Position adopted	Relation to business strategy
IS strategy as basic (managerial) disposition towards IT	What is the role of IT for our business? What is our disposition towards IT investments, IT use and IT management?	Establishing an organisation-wide consensus on importance and use of IT as well as on IT investments	Organisation centric Normative	IS strategy being self-contained and distinguishable from business strategy
IS strategy as departmental plan	Which tasks are to be carried out by the IT function in the next planning period?	Identifying required IT resources and ensuring their	Department centric	IS strategy being an operationalisation of business

Conception	Central questions to be answered	Intended effect	Position adopted	Relation to business strategy
	Which resources are required to do so?	timely and reliable acquisition and allocation so that business can run smoothly	Strategy execution oriented	strategy on the organisational level of the IT function
IS strategy as extended arm of business strategy	For a given business strategy, how can IT be used to support it?	Creating the IT facilities necessary for the implementation of the business strategy and attainment of competitive advantages	Business centric	IS strategy being subordinate to business strategy; it is an extension of business strategy rather than a strategy in its own right
	In particular, how can IT be used to gain and sustain a competitive business advantage?		Competitive success-oriented	
IS strategy as master plan	Which IT and related assets are needed across the organisation?	Provide the IT facilities and capabilities that render the organisation able to do successful business in the future.	Information processing centric	IS strategy being a strategy in its own right, it is deployed in alignment with business strategy.
	How to develop and deploy IT and related assets		Build-out oriented	

Despite the various names employed in research, IT strategy clearly defines what has to be done, in which priority, and how success will be measured. Iyamu and Kekwaletswe (2010) define IT strategy as a roadmap that, over time, provides a technical design for the implementation of information technology and information systems, applying a formal process.

The view of many professionals and academics is that an IT strategy is simply about introducing innovation to meet business objectives. This view is affirmed by Leung and Sun (2008:5) who suggest that a "strategic enabler is the anchor of innovation competence, whereas strategic positioning and planning informs strategic execution". Davenport (2013) defines innovation as the introduction of something new to bring about radical change. As a result, innovation is regarded as an organisational instrument with which to execute the business objectives. While strategy states the business objectives, innovation represents an instrument for an organisation to execute the strategy.

Through the innovative use of IT, organisations are able to outperform their competitors (Kandampully, Bilgihan, & Zhang, 2016). Concurring, Kroh et al. (2018) are of the view that disruptive innovation is putting some organisations at the lead in a highly competitive environment. Innovations concerning IT have the potential to provide valuable opportunities for organisations (Kauffman, Liu & Ma, 2015).

According to Chen et al. (2010), IT strategy uses IS to support business strategy; it is the main plan of the IS function, and the collective view of the role of IT within the organisation. Cui et al. (2015) affirm that an IT strategy concerns the use of IT to support business operation and strategy. However, Iyamu (2015b) maintains that an IT strategy is a phrase that concerns a complex mix of concepts, ideas, visions, experiences, objectives, knowledge, recollections, views and opportunities that provide overall guidance for certain actions in the interest of specific outcomes within the computing environment.

Thus, an IT strategy guides an organisation in how to pursue its objectives. Twum-Darko and Iyamu (2015) posit an IT strategy assists and supports organisations to set direction, comprehend and concentrate on the future in this ever-changing business environment. Therefore, IT requires a strategy to achieve its set goals and objectives (Twum-Darko & Iyamu, 2015).

IT strategy encourages organisations to afford the importance it deserves. Hence, it is pivotal that IT management conceptually connect the design and implementation of IT strategies that run in tandem to what the business is attempting to reach strategically. Business and IT strategy should be highly interdependent. Bharadwaj et al. (2013) assert that an IT strategy is influenced by business strategy, transforming business processes and scope. It is only when an organisation's IT and business strategies are aligned that transformation is achieved. Consequently, organisations must develop an IT strategy that considers various principles and priorities aligned to the organisation's strategic plan to optimise the benefits of IT (Wanaswa et al., 2017).

In contrast to Bharadwaj (2013), Mithas, Tafti and Mitchell (2013) believe that organisations should consider combining IT and business strategy, with IT included in the overall business strategy. In support, Mithas and Lucas (2010), Mithas and Rust (2012a), and Mithas et al. (2012b) state that business strategy dictates that business and IT should operate harmoniously for an organisation to gain competitive advantage.

According to Arvidsson, Holmström and Lyytinen (2012), it is evident that an IT strategy is not just about adapting new technologies; it concerns issues of information, knowledge and changes of organisational practice. Hence, Queiroz et al. (2012) classify IT strategy as "IS for efficiency", "IS for flexibility", or "IS for comprehensiveness". Teubner (2013) states that an IT strategy professes that information and technology are utilised in pursuit of business objectives entrenched into the organisation. Very few organisations can survive this dynamic, competitive environment without an IT strategy.

High (2014) also emphasises the importance of developing and implementing an IT strategy in concert with the overall organisational strategy. The significance of an IT strategy in organisations has become increasingly prevalent. Krimpmann (2015) argues that in today's digitalised world, it is anticipated that business units of organisations will procure standard IT services from external IT suppliers, allowing their internal IT to only manage difficult and problematic services. As a result, an IT strategy must be positioned as a business enabler rather than a support function (Krimpmann, 2015).

The challenge is that many organisations are still formulating their strategies based on traditional planning approaches, yearly cycles, historical analytics and antiquated thinking (Bonnet & Maulik, 2017). Another challenge is that too many organisations' IT strategies lack the business expertise of managers from non-IT departments who should understand IT needs and opportunities from both business and IT divisions (Tiwana, 2017). The pace and uncertainty that describes this new digital economy necessitates a shift away from the traditional growth planning formulation.

As a result, organisations need to update their previously formulated IT strategy. Once a strategy has been formulated and adopted, it requires implementation. According to Ranjbar, Shirazi and Blooki (2014), although adopting the right strategy is crucial for an organisation to survive, strategy implementation is far more important. IT strategy, like any other strategy implementation, is the key to achieving an organisation's objectives.

Accordingly, IT strategy must be implemented to deliver the intended results, and the strategy must be updated regularly, reflecting change to business and IT environments. Failure to achieve the intended strategy is often the result of organisational, political and cultural issues being inadequately addressed. As indicated by Ranjbar et al. (2014), failure to implement any strategy, including an IT strategy, can lead to loss of opportunities and increased difficulties in sustaining and supporting priorities and achieving organisational goals. Notwithstanding these

problems, Bell, Dean and Gottschalk (2010) maintain that strategy implementation is the most complicated and time-consuming task.

2.3.1 Information Technology strategy alignment

As previously suggested, IT is an integral part of all areas and processes of an organisation's daily operations. This incomparable level of integration implores the notion of mutual business and IT strategy alignment (Teubner & Mocker, 2008). Gates (2010) emphasises that the importance of an IT strategy is to describe how IT will align with and support overall organisational business strategy, indicating a comprehensive level of consideration about IT and the manner in which it integrates with the organisation.

One of the many challenges' organisations encounter with an IT strategy is the alignment of an IT strategy. IT strategies should complement high-level organisational goals and identify the organisational changes necessary to realise them (Arvidsson, Holmström & Lyytinen, 2014). Yet many business and government institutions have found their IT strategies misaligned with business strategies, or even worse, so dysfunctional that business values are actually destroyed instead of bolstered (Chew & Gottschalk, 2009).

The notion Queiroz et al. (2012) postulated by numerous seminal scholars is that business strategy informs IT strategy and not the IT strategy informing the business strategy. It functions as an enabler and champion of business needs to ensure that IT strategy is aligned to the business strategy (Queiroz et al., 2012).

Business-IT strategy alignment establishes strategic direction, synchronising the organisational goals with technological capability and deepening commitment to strategies (Prasad, Heales & Green, 2010). Without business and IT alignment, the outcome of organisational competitiveness will rely on coincidence, particularly if IT capabilities are unable to deliver value and contribute to misinformation (Arvidsson, Holmström & Lyytinen, 2012).

2.3.2 IT resources and IT capabilities

IT resources are comprised of "(i) the tangible resources that make up the physical IT infrastructure components, (ii) the human IT resources that represent the technical and managerial IT skills, and (iii) the intangible IT-enabled resources such as knowledge assets" that are common enough for their value to endure a change in control (Bharadwaj, 2000:171).

IT resources may consist of people, processes, organisations and technology components, all of which relate to, and can bear consequences for, the other components (Drnevich & Croson, 2013). Lui (2011) defines IT capability as an organisation's ability to acquire, deploy, combine and reconfigure IT resources in support and enhancement of business strategies and work processes. Therefore, IT capabilities and IT resources are critical for an organisation to achieve organisational goals and sustain a competitive advantage (Peppard, Galliers & Thorogood, 2013).

Alternatively, IT capabilities focus on "(i) the firm's ability to mobilise and deploy its IT-based resources, creating value in combination with other resources and capabilities, and (ii) the firm-specific IT enabled knowledge and routines that improve the value of non-IT resources" (Bhardwaj, 2000:171). Drnevich and Croson (2013) segment IT capabilities as an IT architecture design contrasted with IT service delivery within a structure of constrained transferability. These IT resources and capabilities must be governed to ensure IT investments add value to the organisation and the business objectives are achieved.

2.3.3   Governance of Information Technology strategy

Organisations should not just have the ability to develop and implement IT strategies, they must also ensure adequate capability to operationalise their IT strategies and incorporate these into the organisational governance structures (Matta, Cavusoglu & Benbasat, 2016). Likewise, Parry and Lind (2016) suggest that IT governance is a critical element in managing and operating both business and IT strategy. Owing to the significant investment in IT and the substantial impact IT has on organisational competitiveness, organisations use essential resources to manage and employ IT resources and capabilities. As a result, the governance of IT becomes imperative (Prasad et al., 2010).

Organisations that do not have effective IT governance structures and processes to implement and operate their IT strategy experience negative consequences such as poor performance of IT resources, inaccurate information quality, ineffective operating costs and incomplete and late running IT projects (Ali & Green, 2012). Effective governance is important to align IT investment with business priorities, determining IT decision making and achieving continuous alignment between business and IT, leading to harmonised business and IT strategies (Parry & Lind, 2016). Thus, effective governance of IT will ensure that IT strategy and business objectives are aligned. The subsequent section discusses the concepts of implementation and operationalising in the context of this study.

2.4   Implementation and operationalising

IT is a strategic and innovative tool for achieving organisational goals and objectives (Peppard, Galliers & Thorogood, 2014). Huda and Hussin (2013) identified six intertwined factors during technological innovation implementation: (i) technological innovations are imperfectly or poorly designed, rendering the technology difficult to use due to deficits; (ii) potential users of technological innovation are required to acquire new technical knowledge and skills, which can be tedious and stressful for many people; (iii) the decision to adopt and implement is made by those higher in the chain of command than the intended user community.

Implementation of the IT strategy defines, enables and ensures the use of systems, rendering IT solutions capable of supporting organisational practices (Arvidsson et al., 2014). The authors further express that failure to put the implemented IT strategy to good use manifests into strategy blindness (Peppard, Galliers & Thorogood, 2014). Arvidsson et al. (2014) define strategy blindness as an organisation's inability to achieve the strategic intent of implementation of available IT abilities. While much attention is paid to the challenge of implementing an IT strategy that aligns organisational strategy to IT investment, there is a dearth of information pertaining to putting IT strategy into practice successfully (Arvidsson et al., 2014).

Attending to this challenge is a critical concern for IT strategy practice and research (Galliers et al., 2012; Nolan, 2012; Ward, 2012) as it requires identifying and fixing deficiencies in the existing operational process and then refocusing goals on creating and sustaining IT strategic programs. The section that follows focuses on the theories that underpin this study.

2.5   Underpinning theories

This study is underpinned by two socio-technical theories, structuration theory and diffusion of innovations. Theories are employed as a guide during data analysis (Mkhomazi & Iyamu, 2013). These theories underpin the study from different perspectives. Structuration theory, for example, focuses on interactions and relationships that happen among technical and non-technical agents. The theory of diffusion of innovations focuses on process of communication among actors and how innovation is diffused. Sawyer and Jarrahi (2014) explain that socio-technical theories and their underlying principles guide the development of practical applications and theoretical understanding, and suggest innovations that are related to IS in organisations and society in general.

2.5.1 Structuration theory

Structuration theory (ST) is a socio-technical theory coined by Anthony Giddens. ST stems from sociology, aiming to explain the development of social phenomena. The underpinning principle of the theory of structuration revolves around the identification of the relationship between people and the social forces that act upon them (Lamsal, 2012). Giddens (1984), viewing the relationship between structure (external forces) and agency (internal motivations) in society as important, expresses that the traditional categorisations of social phenomena determined by both objective social structures as completely independent from human agents was flawed (Giddens, 1986). As a result, social phenomena are not structure or agency; they are constantly constituted in their duality (Sawyer & Jarrahi, 2014).

The duality of structure, agent's knowledgeability and time-space relations are identified as the core elements of structuration theory (Veenstra et al., 2014). Duality of structure suggests that structure and agency are mutually exclusive. Giddens views social structure as reproduced by continuous human action, while at the same time structure enables and constrains human action (Giddens, 1984). According to Giddens (1984), actors voluntarily shape phenomena, meaning they are knowledgeable and mindful about their actions. den Hond et al. (2012) refers to time-space as relationships relating to the belief that social activities are placed in a specific time and space and are not easily separated from their context and placed into a different situation.

To examine the dualism between structure and agency, Giddens departed from the conceptualisation of structure as some particular or outside form: "Structure exists only in and through the activities of human agents" (Giddens 1989:256). Human agents take on social structures in their actions, actions that produce or reproduce social structures. Action, which has intense routine aspects, is both conditioned by existing cultural structures and also creates and recreates those structures through the enactment process (Walsham, 2006). As a result, action and structures are in a recursive relationship, representing structuration (Sawyer & Jarrahi, 2014).

The role of structure can therefore be seen as both a constraining and enabling element for human action. Liberman and Doerfel (2012) suggest that structures in organisations have these enabling and constraining aspects, enabling because they provide a valuable framework for social dealings, but also constraining as they afford little flexibility for how individuals conduct themselves and interact within the organisation's boundaries. While structuration theory assists in explaining communication practices within organisations and helps in

clarifying how employees understand their organisational rules, structures can be useful as well as adverse for organisations and employees. Structuration theory expresses the power of agency and structure over time in a social system (Whittington, 2010), with concepts described in Table 2.2 below.

Table 2.3: Structuration Theory key terms (Giddens, 1984)

Term	Description
agency	It is important to recognise the potential for agency in just about everyone, by virtue of their participation in multiple social systems: domestic, economic and political
structure(s)	Rules and resources organised as properties of social systems; structure only exists as structural properties

In structuration theory, the unconventional definition of structure is "rules and resources, rules have a broader meaning, including not only those that are legislated" (Klesel, Mokosch & Niehaves, 2015). These rules are as follows: (i) "rules of social life which are techniques or generalisable procedures applied in the enactment/reproduction of social practices" and (ii) "formulated rules" which are "codified interpretations of rules rather than rules as such" (Giddens, 1984:17-23).

Resources are of two types: allocative and authoritative. Allocative resources suggest command is generated over objects, goods or material phenomena. Authoritative resources infer command over people or actors (Giddens, 1984). IT strategy involves allocative resources such as hardware, software and processes which are the focus of strategy and authoritative resources, giving decision-making power over to the allocative resources (Whittington, 2010).

According to Jones and Karsten (2008), from an IS viewpoint, perhaps a vital concern of structure is that certain allocative resources such as material, land or information technology might seem to have a real existence but become useful resources only when incorporated within processes of structuration (Giddens, 1984). Furthermore, Giddens and Pierson (1998:82) posit, "Technology does nothing, except as implicated in the actions of human beings". Therefore, technology can have no impact on social practice, as whatever affects it depends on how social agents engage with it in their actions (Jones & Karsten, 2008).

2.5.1.1 Duality of structure

Duality of structure is one of the key components of structuration theory. den Hond et al. (2012) posit that the duality of structure is the focal component in Structuration theory. Furthermore,

as the component that has received the most robust criticism from different researchers, duality is regarded as the core of structuration theory.

Mezzanotte (2016) refers to duality of structure as the relationship between agency and structure which poses one of the most prevalent and challenging issues in social theory, asserting that structure exists only in and through the actions of human agents, whereas agency is described as the form of people's actions (Mezzanotte & Dehlinger, 2013). These dynamics may adversely affect the thoroughness and validity of the processes, technologies and capabilities required to implement an IT strategy rendering it operational.
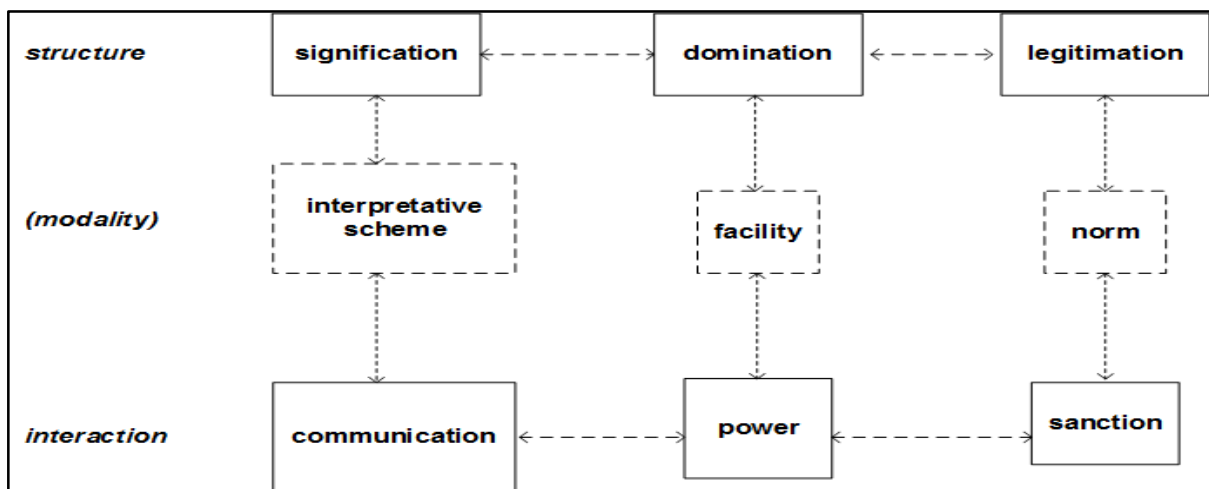
Figure 2.4: Dimensions of the duality of structure (Source: Giddens, 1984:29)

Giddens developed duality of structure as shown in Figure 2.3, comprised of three core dimensions: structure, modality and interaction.

Duality of structure view: structure

Organisations constitute actions of the agents in the system. The actions are manifested by the structures (Iyamu, 2015a). Giddens identifies the three dimensions of structure in social systems as signification, domination and legitimation. In signification, agents consider certain structures to be important (Lamsal, 2012; Dong, 2011). According to Dong (2011), domination concerns the production and exercise of power, stemming from the control of people, resources and technology. Legitimation is enacted by ways of norms comprised of codes of conduct, values, goals and morals embodied in the organisational culture and the right to holds individuals accountable for their actions (Puron-Cod, 2012).

Duality of structure view: modality

Modality, the means by which structure is translated into action (Wanyama & Zheng, 2010), is a link between action and structure, with actors appealing to modalities such as stocks of knowledge and abilities to allocate resources, using these together with appropriate actions to produce and reproduce structure (Stukart, 2009). The three dimensions of modality include interpretive scheme, facility and norm.

Interpretive scheme is defined as the frame people reference when they interact (Giddens, 1984). Some individuals have particular resources, such as allocative and authoritative resources, which facilitate the exercise of more power upon interaction. Norm is referred to as moral codes, suggesting how people should conduct themselves within a particular context (Stukart, 2009).

Duality of structure view: interaction

Human agents reproduce the properties of social systems only in social interaction with one another (Giddens, 1979). According to Giddens (1984), interaction among human agents generates results that in time change and categorise the prevailing properties of the social system in three dimensions: communication, power and sanction.

Agents communicate through employing the interpretive schemes, stocks of knowledge that agents elicit to make sense of their own and others' actions (Mkhomazi & Iyamu, 2014). According to Puron-Cid (2012), the outcome of power leads to control of people and resources. Sanction, by drawing on norms and standards of morality as considered acceptable in society, is when agents approve their actions (Puron-Cid, 2012).

In summary, IT strategy is developed and implemented with industry best practices, models and frameworks. However, it is only when the IT strategy is operationalised and day-to-day activities are regularly and continuously performed that it can be considered a social practice.

2.5.1.2 Structuration theory and Information Systems

Structuration theory is useful primarily in acknowledging and evaluating the discussion between organisational and technological structures along with human actions (Iyamu, 2015). Mkhomazi and Iyamu (2014) suggest that the theory of structuration permits scholars to explore the ways that people (agents) sanction structures that shape their emergence and set employment of technology as they interact with it in their regular practices.

Despite drawbacks and criticism from authors such as Archer (1995) who assert that structuration theory's persistence that structure and agency exist as a duality is unacceptable, ST has been beneficially influential in social sciences and sociology. Moreover, the theory has been applied extensively in the IS discipline. In fact, the theory of structuration has been applied across a variety of disciplines including sociology, political science, management, education, and information science and systems (Rosenbaum & Shachat, 2010).

According to Haron and Khalid (2011), although structuration theory is a theory of social structure, it has been used in the IS field to develop theories and analyse empirical cases. In agreement, Oppong (2013) affirms that ever since it has been published, the theory of structuration has been applied not only in psychology, but in other social sciences such as IS as a framework for carrying out empirical studies.

Authors Jones and Karsten (2008) state that IS researchers have employed various social theories such as institutional theory, critical social theory and actor network theory to study the IS phenomena. However, amongst these theories, structuration theory has emerged as the most significant. Evans and Brooks (2005) concur, explaining that several scholars in IS have applied social theories in general, and in particular, the structuration theory "to help reveal how technical systems can support or hinder human interaction in societal, organisational, and personal contexts" (p.215).

According to Kort and Gharbi (2011), the objective of structuration theory in the IS field is to provide a theoretical approach that assists the understanding of the interaction of user and information technology, the implications of these interactions and the way to control their consequences. In addition, Pozzebon and Pinsonneault (2005) confirm that the perspective that structuration theory presents is an effective framework for studying IT and organisations. As a result, employing ST has assisted IT scholars to more clearly understand how technologies provide meaning, are employed to exercise power and legitimatise certain outcomes to the detriment of others, and how people produce or reproduce organisational practices by using certain technological properties rather than others (Pozzebon & Pinsonneault, 2005).

Giddens' structuration theory, used primarily for the sociologic perspective, is suitable for research in the arena of information systems (Veenstra et al., 2014). The theory of structuration can be a powerful instrument for revealing empirical phenomena and analysing complex data, hence its influence in IS research (Evans & Brooks, 2005). Of the same view, Mezzanotte

(2016) posits that ST is a social science theory that does not pay much attention to IT. Nonetheless, as IT plays an important role in today's business operations, ST provides a lens for this study to better understand structures and agency conduct and influence on the organisation's implementation and operationalising of an IT strategy.

2.5.1.3 Rationale of structuration theory in Information System

Structuration theory's main emphasis is to understand how social practices are structured across time and space. The theory of structuration is a general sociological theory regarded as connecting multiple levels from society down to the individual (Walsham, 2002). IT is a social concept; hence the application of a social theory in this study. Veenstra et al. (2014) postulate that although ST only infrequently refers to IT, it has been extensively used in IS studies because it is regarded as particularly useful to describe unexpected results of IT implementation. The authors further state that ST can report differences between effects of an IT implementation process as well as during the design of the technology.

Structuration theory plays a significant role in this study in comprehending the social, organisational and personal contexts within which an IT strategy is implemented and operationalised. The theory draws a vital connection to comprehend an IT strategy, which on the one hand is constrained or enabled by the societal context in which it operates, and on the other hand, is a means for sustaining or amending that context.

According to Rose (2003), social theory has a significant role to play in the advancement of understanding how technological systems support human interaction in societal, organisational and personal contexts. It has been argued that without social interpretation, technology can be viewed as 'meaningless' (Brodie et al., 2003). This theory is definitely suitable for information systems research (Jones & Karsten, 2008).

Therefore, in this study, ST will serve as a lens to understanding the meaning of the actions, rules and resources associated with the operationalisation of an IT strategy. The interaction between agency and structure signifies a mutually constituted duality. According to Wiggins and Bowers (2015), structuration advocates that human agents (agency) continuously produce, reproduce and change social societies (structures). Similarly, an IT strategy operationalising recursively produces outcomes that mutually reproduce the social world, because the rules and resources available for formulation, development, implementation and dissemination are distinctive to every organisation.

2.5.2 Diffusion of innovations

Verloop (2013) explains innovation is about successfully introducing a new idea. Though an innovation is not an assurance that a return on investment will be realised, the implementation decision cannot happen if the idea or invention is not useful or expected to be useful (Quintane et al., 2011). Quintane et al. (2011:931) explain that innovation is "a product, process, software, idea, concept, etc., considered new in the environment into which it is introduced". Similarly, Nemutanzhela and Iyamu (2015) assert that innovation is an idea, practice or object that is perceived as new by individuals or other units of adoption.

As a result, diffusion of innovations is a process whereby an innovation is communicated over certain channels over time by members of a social system (Iyamu, 2015b). In agreement, Polyviou and Pouloudi (2015) suggest that diffusion of innovation happens when a new idea is disseminated in organisations through certain channels over time. In other words, DOI suggests how, why and at what rate new ideas, products and services are adopted or rejected through a social system, over time, and with results (Rice & Pearce, 2015).

Nemutanzhela and Iyamu (2011) refer to diffusion as a specific kind of communication concerning the dissemination of messages that are perceived as new ideas. Communication is therefore a process which participants form, disclosing information to each other to reach a mutual understanding (Rice & Pearce, 2015). Information affects uncertainty in a situation where a choice exists among a set of alternatives (Rogers, 2003).

Diffusion is a process in which (i) an innovation (ii) is communicated through certain channels (iii) over time among the members of a (iv) social system (Berry & Berry, 2018) as depicted in Figure 2.2. IT strategy embraces technologies which are viewed as innovative, and these are communicated through strategic road maps and plans over a certain time period in an organisation with employees who are members of a social system (Nemutanzhela & Iyamu, 2011).
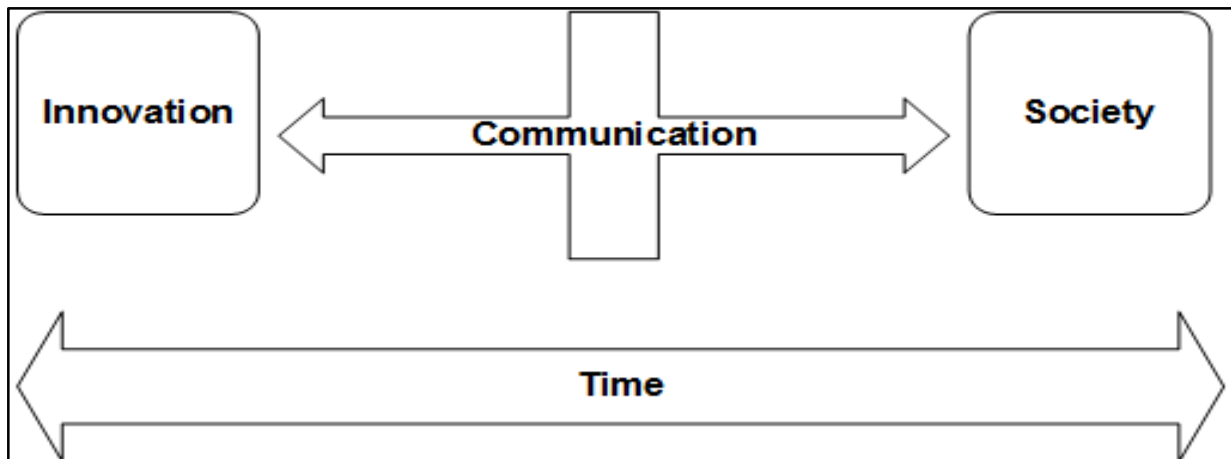
Figure 2.5: Diffusion of innovations

Four main elements leading to success or failure of an innovation (Posthumus, Aarnoudse & Stroek, 2013) are discussed below:

Innovation

Greenhalgh et al. (2008) explain that people adopt various innovations and then disperse these at different intervals to other people. Some innovations are adopted, whereas others are completely abandoned. Zollet and Back (2015) define innovation as an idea, practice or object seen as new by an individual or other constituent of adoption. Regardless of whether or not the idea is objectively new, it is the perceived newness of an idea for an individual (Nemutanzhela & Iyamu, 2015). IT management and other business managers may have known about an IT strategy for some time, but then, as it has not been operationalised, adopted or rejected, it is still an innovation.

The dissemination of new ideas has been analysed primarily for technological innovations and generally uses the words technology and innovation interchangeably. Technology comprises two components, hardware and software. Micó, Masip and Domingo (2013) suggest that the introduction of new technology in an organisational setting may promote the opening of innovative prospects; however, innovations create uncertainty in technical, financial and social contexts.

Communication channels

Communication channels are the second element of the diffusion of innovations process. Scott and McGuire (2017) describe communication as a "process in which participants create and share information with one another in order to reach a mutual understanding". Communication therefore occurs between sources through channels. A source, according to Rogers (2003), is

an individual or an institution from which the message originates. A channel, though, is the means by which a message gets from the source to the receiver. Diffusion, an explicit form of communication, consists of communication elements such as an innovation, two individuals or other units of adoption and a communication channel.

Communication channels can be categorised as mass media and interpersonal channels, with mass media channels including a large medium such as television, radio, or newspaper to create awareness-knowledge, allowing messages to spread to large audiences (Enfield et al., 2012). Interpersonal channels, on the other hand, relate to two-way communication between two or more individuals. As a result, interpersonal channels are more powerful in engendering strong attitudes held by individuals or persuading an individual (Scott & McGuire, 2017). Radwan and Kinder (2013) argue that communication is more than ways for knowledge sharing, but modes of action that are themselves reproducing knowledge.

Time

According to Scott and McGuire (2017), the aspect of time is ignored in most behavioural research. Rogers' view is that including the time dimension in diffusion studies demonstrates one of its strengths. The innovation-diffusion process, innovativeness and adopter categorisation, and rate of adoption are all 'time' aspects involved in diffusion.

Social system

The social system is the last element in the diffusion process. Rogers (2003) describes the social system as "a set of interrelated units engaged in joint problem solving to accomplish a common goal" (p.23). Because diffusion of innovations occurs in the social system, it is influenced by the social structure of the social system. Scott and McGuire (2017) state that the social and communication structures of a system enable or inhibit diffusion of innovation in the system.

2.5.2.1 The innovation-decision process

The innovation-decision process describes how employees in organisations will adopt or reject a new idea. The objective of the process is to reduce the uncertainty surrounding a new idea. According to Micó et al. (2013), the innovation-decision process, presented in Figure 2.3, comprises three pre-stages: (i) initiation, where the organisation defines a problem or a new technology and collects information about it; (ii) decision, where the technology is adopted or rejected. Decision is influenced by the characteristics of the organisation such as previous

practices, innovation, and norms and the decision-maker traits such as personality and communication behaviour interacting with the characteristics of technology and mixture of knowledge and persuasion; and finally (iii) implementation, which in organisations is as critical as the decision-making process, as the technology and the organisational makeup may be redefined and problems refined before the technology is fully incorporated into the workflow of the organisation (Micó et al., 2013).

Makovhololo et al. (2017) define the innovation-decision process as an information-sourcing and information-processing, where an actor aims to reduce uncertainty about the advantages and disadvantages of an innovation.

Coggio (2015) suggests that the innovation-decision process (Figure 2.3) is comprised of five stages which describe how individuals become aware of and respond to the uncertainty of an innovation: *(i)* knowledge, becoming aware of and learning about the innovation; *(ii)* persuasion, developing a favourable or unfavourable attitude about it; *(iii)* decision, engaging in activities that result in adopting or rejecting the innovation; *(iv)* implementation, putting the innovation to use if it has been adopted; and *(v)* confirmation, seeking reinforcement of the decision. These stages typically follow each other in a time-ordered manner (Coggio, 2015).
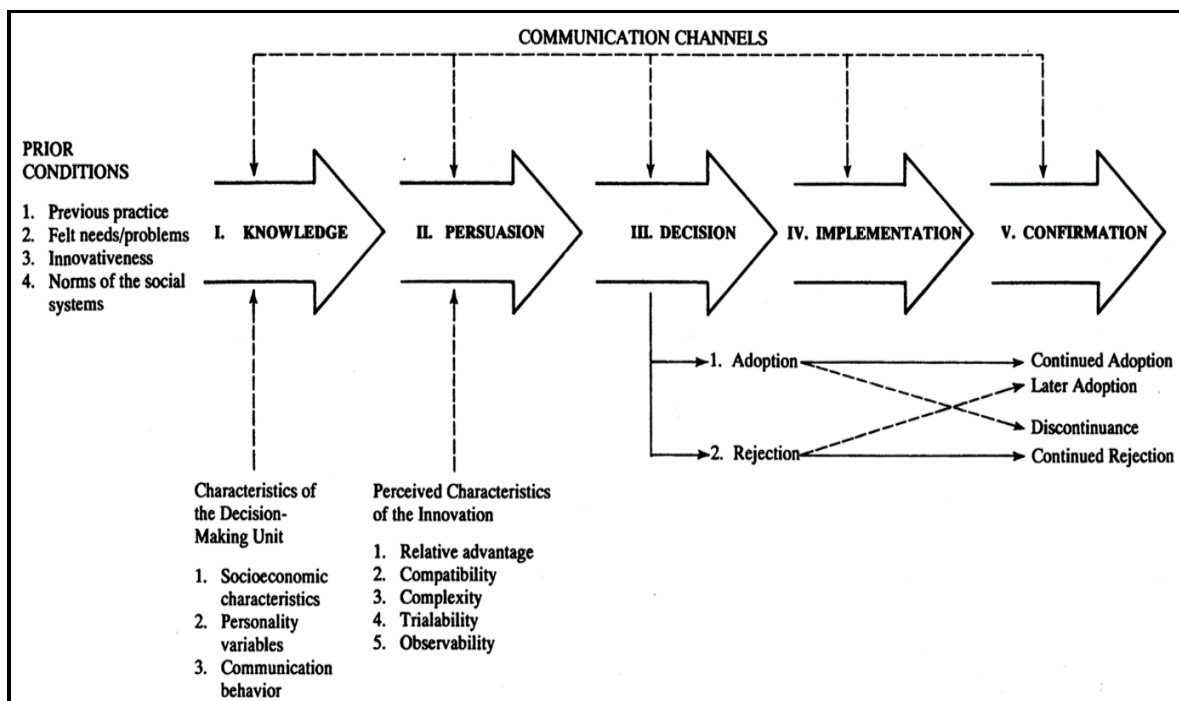
Figure 2.6: Innovation-decision process (Source: Rogers, 2003:171)

The five stage model of the implementation and adoption of innovation in organisations is presented in Figure 2.3 and discussed in detail in the next section.

Knowledge: innovation-decision process view

The innovation-decision process begins with the knowledge stage. In this step, an individual learns about the existence of innovation and seeks information about the innovation. During this stage, the individual attempts to determine what the innovation is and why and how it functions (Makovhololo et al., 2017). According to Rogers, the questions inform three types of knowledge: *(i)* awareness-knowledge, *(ii)* how-to-knowledge, and *(iii)* principle-knowledge.

i.   Awareness-knowledge (what-knowledge) suggests that actors are aware that an innovation exists. This type of knowledge can motivate the individual to learn more about the innovation and, eventually, to adopt it.

ii.   How-to-knowledge (how-knowledge) involves information about how to properly use an innovation. To increase the adoption chances for an innovation, an individual should have a sufficient level of how-to-knowledge prior to pursuing the innovation.

iii.   Principle-knowledge (why-knowledge) focuses on the functioning principles describing how and why an innovation works. Actors may have all the necessary knowledge, but this does not mean that an actor will adopt the innovation because the individual's attitudes also shape the adoption or rejection of the innovation. Consequently, it may be necessary to persuade the individual to adopt or reject the innovation.

Persuasion: innovation-decision process view

The persuasion step takes place when the individual has a definite negative or positive attitude towards the innovation (Coggio, 2015). The formation of a favourable or unfavourable attitude toward an innovation does not always lead directly or indirectly to an adoption or rejection (Rogers, 2003). The individual shapes his attitude after he becomes aware of the innovation. While the knowledge stage primarily focuses on the cognitive (or knowing), the persuasion function is mainly affective (or feeling) focused. Thus, at the persuasion stage, an individual interacts at a more psychological level with the innovation (Rogers, 2003).

Rate of adoption

At the persuasion stage, actors adopt an innovation based on the perceived characteristics of the innovation. According to Sasaki (2018), the rate of adoption is the comparative speed with which an innovation is adopted by actors in a social system. The number of individuals who adopted the innovation for a period of time can be measured as the rate of adoption of the innovation (Lien & Jiang, 2017).

Generally, as decision-making comprises a great level of uncertainty, decision makers look for ways that could assist them in assessing the innovation and understanding its potential consequences (Polyviou & Pouloudi, 2015). Olsson, Skovdahl and Engström (2016) distinguish five attributes that influence the decision to adopt an innovation: *(i)* relative advantage of the new technology compared to existing ideas; *(ii)* compatibility with regard to user needs; *(iii)* complexity to understand and implement; *(iv)* trialability of innovation before use; and *(v)* observability of the results to the adopter.

Getting a new idea adopted, even when it has obvious advantages, is difficult; therefore, the availability of all of these attributes of innovations serve to aid the diffusion of innovation process and fast track the adoption rate (Zhang et al., 2015). Hence, a technology innovation will only be adopted when the outcomes are perceived as beneficial to the organisation and individual. DOI characterises the individuals of a social systems into five categories – innovators, early adopters, early majority, ate majority and laggards – based on attitudes towards an innovation (Lien & Jiang, 2017; Rice & Pearce, 2015).

Decision: innovation-decision process view

The decision stage takes place when an individual chooses to adopt or reject the innovation. Sasaki (2018) refers to adoption as the full use of an innovation for the best course of action available, where rejection means the opposite, not adopting an innovation. To cope with inherent uncertainty, if an innovation has a partial trial basis, most individuals first want to try the innovation in their own situation prior to arriving at a definitive adoption decision. Rogers introduced different innovation-decision types, especially for studies in organisational settings. As this study was conducted in an organisational setting, it is imperative to understand the different types of innovation-decision (Table 2.3).

Table 2.4: Types of innovation-decisions (Source: Rogers, 2003)

Innovation-decision type	Description
Optional innovation-decisions	Options to adopt or reject an innovation are made by an individual independent of the decision by other members of the organisation
Collective innovation-decisions	Preferences to adopt or reject an innovation made by consensus among the members of an organisational setting
Authority innovation-decisions	Choices to adopt or reject an innovation are made by a few individuals in an organisation who possess power, high social status or technical expertise
Contingent innovation-decisions	Preferences to adopt or reject an innovation may be taken only after a previous innovation-decision

Even after an innovation has been adopted, it can still be rejected. In some cases, the order of the knowledge-persuasion-decision stages can be knowledge-decision-persuasion for certain innovations (Rogers, 2003). The implementation stage follows the decision stage.

Implementation: innovation-decision process view

At the implementation stage, an innovation is put into practice. While the knowledge-persuasion-decision stage is strictly a mental exercise, the implementation stage involves explicit behaviour change, operationalising the innovation. Rogers (2003) claims that an innovation brings the newness in which some degree of uncertainty is involved in diffusion. Therefore, uncertainty about the outcomes of the innovation still exists at the implementation stage, notwithstanding that the decision to adopt has been made earlier.

Rogers suggests that implementation problems are more complex if the adopter is an organisation as compared to an individual. An organisation involves numerous people in the innovation-decision process and quite often, the implementers and decision makers are different sets of people. In addition, the organisational structures that shape and form the organisation may prevent the smooth implementation of an innovation (Rogers, 2003).

Confirmation: innovation-decision process view

Once the innovation-decision has been made, at the confirmation stage the individual seeks reinforcement for this decision. According to Rogers (2003), this decision can be reversed if the individual is "exposed to conflicting messages about the innovation" (p. 189). However, individuals tend to stay away from these messages and seek supportive messages that confirm the decision.

During the innovation-decision process, every so often, not all individuals or departments in the organisation incorporate the technology simultaneously, and attitudes and actual use vary between early adopters and laggards (Micó et al., 2013). Thus, discontinuance as a decision in rejecting an innovation that has previously been adopted may yet occur. The discontinuance of an innovation may result from the innovation not having been fully operationalised into the day-to-day functions by the adopters at the implementation stage of the innovation-decision process.

2.5.2.2 Diffusion of innovations in Information Systems research

According to Dilaver (2014), diffusion studies have nearly disappeared from sociology in recent decades while emerging as the standard in other fields such as marketing science and health studies and IS. Hence, several IS studies use the diffusion of innovations theory. Similarly, Zhang et al. (2015) suggest that the innovation of diffusion theory is one of the most prevalent theories for studying the adoption of information technologies (IT) and understanding how IT innovations are diffused within and between societies.

Oliveira and Martins (2011) consent, postulating that DOI is one of the most applied theories in technology adoption at both the individual and organisational level. Rogers' theory is most suitable for investigating the diffusion and adoption of IT strategies (technologies and processes) in IT and IS organisations. In agreement, Loukis, Charalabidis and Androutsopoulou (2017) and Lien and Jiang (2017) argue that DOI has been comprehensively applied analysing IT-related innovations in different fields in both the public and private sectors.

Most of the diffusion research involves technological innovations. Aizstrauta, Ginters and Eroles (2015) use the words technology and innovation as synonyms. Technology is a design for instrumental action that reduces uncertainty in the cause-effect relationships involved in achieving a desired outcome (Aizstrauta, Ginters & Eroles, 2015). Consequently, the challenges some organisations encounter concern how to operationalise their technology solutions.

According to Zollet and Back (2015), though many other theories are employed in IT adoption research, most research on IT adoption at an organisational level is developed from DOI. The innovation of diffusion is one of only two theories applicable to studies at an organisational level. But DOI is better able to describe intra-organisational innovation of diffusion and is deemed more comprehensive (Oliveira & Martins, 2011).

Agreeing, Korpelainen (2011) and Aizstrauta, Ginters and Eroles (2015) aver that most theories concentrate on the individual level, for instance the technology acceptance model (TAM), theory of reasoned actions (TRA) and theory of planned behaviour (TPB); however, they may also emphasise on an organisational level or on the level of a social system, with DOI specifically focused on a group or an organisational level. In this study, the focus is on operationalising IT strategy in organisations.

From the early employment of DOI to IS studies, the theory has been adopted and adapted in various ways. Research has continuously determined that technical compatibility, technical complexity and relative advantage (perceived need) are critical precursors to the adoption of innovations (Sharman, Rao & Raghu, 2011). Although DOI has been employed in several studies in the IS discipline, it can be quite a daunting undertaking to employ the theory as a guide for analysis of data. Iyamu (2014) compiled comprehensive but simplified guidelines that IS researchers can follow, especially with regard to the innovation-decision process.

Similar to any other theory, DOI has strengths and limitations. The diffusion of innovation theory provides a comprehensive foundation on which to understand the factors that influence the options an individual has about an innovation. This strength forms the basis for understanding adoption (Straub, 2009). The usefulness of the theory, according to Straub (2009), is that the theory is adaptable and flexible enough to fit both formal and informal adoption environments. Furthermore, a significant number of studies on diffusion occurred in informal environments such as agriculture adoptions and consumer behaviour, suggesting that the theory can be applied beyond an organisational setting.

One of the criticisms of the theory, however, is its failure to find a favourable environment for ideal diffusion of innovation because is it not always definite that an innovation would diffuse at the same rate between two diverse organisations (Wanaswa et al., 2017). Besides, Wanaswa et al. (2017) state that because the theory is generally descriptive rather than prescriptive, it neglects to prescribe how the different characteristics of an innovation interact to impact the acceptance and use of innovative ideas between organisations of various sizes, ages and experiences.

2.6 Summary

The chapter undertook a literature review regarding the key concepts of the study. IT is globally considered as a critical instrument in the sustainability and competitiveness of organisations.

IT strategy is imperative for supporting organisations in the achievement of their goals and objectives. IT is not a magic bullet, though: merely procuring and implementing the latest technology will not, by itself, render an organisation sustainable and competitive.

Therefore, the implementation of IT strategy only addresses what was implemented, it does not address whether the strategy has become a regular and continuous part of the day-to-day activities of the organisation, thereby operationalising it.

The socio-technical theories, structuration theory and diffusion of innovations theory, were also discussed, with structuration theory as a lens to understand the relationship between agents in organisation and diffusion of innovations to diffuse technology. At the core of the structuration theory is the attempt to treat human action and social structure as a duality rather than a dualism. Diffusion of innovations theory focuses on the diffusing of innovation through the innovation-decision process.

CHAPTER THREE
RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter discusses the research methodology that was employed in this study, including the research philosophy, approach, methods, design and data collection techniques. Also covered in the chapter are socio-technical theories, structuration theory and diffusion of innovation theory that underpinned the study.

The methodology and theories were selected based on the aim of the study, was to propose a solution in the form of framework that can be used for operationalising IT strategy in organisations. Suggestions for guiding the data analysis are also discussed. In addition, research ethics were considered, serving as guiding principles in the process.

3.2 Research philosophy

Research philosophy is defined as abstract ideas and beliefs informing research. Saunders, Lewis and Thornhill (2015) argue that research philosophy is the transformation of knowledge and the nature of that knowledge. This is exactly what this study has embarked on, developing knowledge in the information technology sphere, particularly with the operationalising of IT strategy in organisations. Two types of philosophies, epistemology and ontology, are common in Information Systems (IS) research (Ritchie et al., 2013).

3.2.1 Epistemology

Epistemology focuses more on creating acceptable knowledge from the context of research (Tsang, 2014a). This means that the philosophy focuses on the social world, concentrating on questions such as 'How can we know about reality?' and 'What is the basis of our knowledge?' (Krauss & Putra, 2005). Epistemology provides a philosophical background for deciding what kind of knowledge is legitimate and adequate. According to Wynn and Williams (2012), epistemology concerns the assessment of knowledge and justification of beliefs, while ontology denotes assumptions about the nature of reality.

In support, Hathcoat, Meixner and Nicholas (2019) explain that ontology issues have to do with what exists, while epistemology concentrates on the type, shortcomings and limitations, and motive of knowledge. Therefore, epistemology relates to that which is acceptable knowledge in a field of study (Saunders et al., 2015).

3.2.2 Ontology

Ontology is the study of 'being', that is, the nature of existence and what constitutes reality (Sefotho, 2015). For example, positivists believe the world is independent of our knowledge of it – it exists 'out there'; while for relativists and others, there are multiple realities and ways of accessing them. While ontology embodies understanding what is, epistemology tries to understand what it means to know. Thus, according to Saunders et al. (2015), ontology concerns the viewpoints we adhere to about the way in which the world operates.

Authors Furlong and Marsh (2010) and Krauss (2005) argue that although it is a contested position, ontology and epistemology are related. Stewart, Gapp and Harwood (2017) contend that as detaching ontology from epistemology can be challenging, scholars tend to maintain a continuous paradigmatic position. Substantiating their statements, the authors assert that ontology advances into epistemology (Furlong & Marsh, 2010). Ludwig and El-Hani (2019) also maintain that ontological and epistemological views are intertwined with distinct value systems.

Different studies apply different research philosophies based on the objectives of the study. This study employs both epistemology and ontology philosophies, in that, from an ontological perspective, it is a well-known fact that the IT strategy was developed in the organisations used in the research; and yet the operationalisation of the IT strategy was unknown, which enacts the epistemology standpoint.

Therefore, both ontological and epistemological philosophies were appropriate for this study, primarily because IT strategy cannot be operationalised if it does not exist. This somehow confirms positions of Lui (2018) that epistemology investigation is not divorced from ontology, and that both philosophies are in fact intertwined (Sice, Bentley & Rauch, 2018). Although the epistemology assumption is often associated with different paradigms such as positivism (Reddy, 2011), critical realism (Wynn & Williams, 2012) and interpretivism (Walsham, 2006), the focus here is on the interpretivist approach.

3.2.3 Interpretivism

Interpretive approaches of research start from the position that people's knowledge of reality and human actions are socially constructed (Walsham, 2015). Walsham (2006) explains that interpretive methods depart from the view that our knowledge of reality, including the sphere of human action, is about the meaning human actors in society give to it. The interpretivist

aims to employ subjectivism, to understand the meaning which individuals associate to things within context (Goldkuhl, 2012).

Therefore, researchers of this paradigm are realistic as they relate to real-world situations. As they evolve naturally, generally these researchers manage to be discreet, conscientious and flexible (Tuli, 2011). Ordinarily, interpretivism does not "start with a theory as with post-positivist, they rather generate or inductively develop a theory of patterns of meanings throughout the research process" (Creswell, 2014:8). Interpretivism acts as a lens in an endless exploration and investigation of phenomena (Neuman, 2013).

Interpretivism, according to Rubin and Babbie (2016), is a method of social research that focuses on comprehending an individual's inner feelings, seeking to interpret an individual's everyday experiences and deeper meanings, and applying subjective reasons for their behaviours. Therefore, according to Creswell (2014), an interpretivist focuses on understanding phenomenon from an individual's perspective, exploring interaction between individuals, the past and societal background that they occupy. Examples of interpretivism are among others case studies, phenomenology and ethnography (Scotland, 2012).

This study followed the interpretivism paradigm. Tuli (2011) considers interpretivism a constructivist approach that is often associated with qualitative research as it perceives the world as a social system. This means that organisations can also be considered social systems, where various opinions and views exist towards common goals or diverse interests. The IT strategy exists in an organisation, and its operationalisation is about goals and interest. Thus, the interpretivist approach was most appropriate for this study. Thanh and Thanh (2015) explain how the interpretivist sees the world through the eyes of individuals and participants who have their own understanding of reality concerning their view of the world.

3.3   Research strategy

The research strategy is the means that describes the research approach and research methods employed in a study. Depending on the aim and objectives of a study, research is classified into different research types.

3.3.1   Different types of research

The aim and objectives of this study were to explore the factors that manifest the operationalising of an IT strategy in organisations from the perception of the human agency

based on their experiences. Therefore, exploratory research was followed. Bhattacherjee (2012) explains there are a number of different ways of classifying research – exploratory, descriptive and explanatory – depending, again, on the aim and objectives of research.

3.3.1.1 Exploratory research

This research type seeks to explore what is happening and to ask questions about it (Gray, 2013). Gratton and Jones (2010) claim that exploratory research is applied when there is little or no knowledge about a phenomenon. The authors further explain that exploratory research "looks for clues about the phenomenon, attempts to gain some familiarity with the appropriate concepts and looks for patterns or ideas emerging from the data without any preconceived ideas or explanations" (Gratton & Jones, 2010:6).

According to Myers (2013), the aim of exploratory research is to understand what is going on, thereby building theories. McNabb (2015) likewise states that the objective of exploratory research is to provide the researcher with better understanding about the research problem.

3.3.1.2 Descriptive research

The aim of descriptive research is to describe a phenomenon and its characteristics (Nassaji, 2015). In this respect, De Vaus (2014) states descriptive research plays a significant role in highlighting the reality and degree of social situations. However, descriptive research is more concerned with what and not how or why something has happened (De Vaus, 2014). In doing so, the results obtained are merely reported, and no attempt is made to explain the outcome (Gratton & Jones, 2010). Gray (2013) explains one of the drawbacks of descriptive research, though, is precisely that it cannot describe why an event has transpired.

3.3.1.3 Explanatory research

Different from descriptive research, explanatory research is broader and provides meaning and description. Hence, the purpose of explanatory research is to build theories and predict events (McNabb, 2015). According to Marlow (2010), the main aim of explanatory research is to identify and assess causal relationships between factors associated with a phenomenon, instead of only describing the phenomenon.

3.3.1.4 Predictive research

Gratton and Jones (2010) introduce yet another research type, predictive research. Predictive research, as its name suggests, predicts future phenomena on the basis of the explanations recommended by explanatory research (Gratton & Jones, 2010).

In summary, qualitative research is particularly suited for exploratory research. Therefore, this study undertakes to explore and understand the factors leading to the operationalising of IT strategy in organisations, as there are only a few exploratory studies previously conducted which explore the operationalising of IT strategy.

3.3.2 Research approach

At the research approach stage, an essential differentiation is whether a study is about building-a-theory or testing-a-theory, traditionally defined as between deductive and inductive approaches (Saunders, et al., 2015). However, some research employs a third approach, abductive (DePoy & Gitlin, 2015).

3.3.2.1 Deductive research approach

According to the deductive approach, a prior acceptance of the truth exists; thus, the emphasis is on testing-a-theory. DePoy and Gitlin (2015) indicate that the deductive approach involves moving from a general principle of understanding about a certain case on a basis of a theory and its ideas, to developing and formally testing hypotheses. As a result, the deductive approach begins with a theory, or hypothesis, and tests the hypothesis.

Myers (2013) suggests that with the deductive approach the research moves 'top-down', beginning with a broad theory about the subject; thereafter, hypotheses are developed and tested following the collection of empirical data. This deductive approach is particularly suitable for answering 'why' questions but cannot be employed to answer 'what' questions (Blaikie, 2010).

3.3.2.2 Inductive research approach

The inductive approach operates from no prior acceptance of existing truth. Through this approach, a framework is developed. The inductive approach moves from specific cases to draw a broader generalisation about the phenomenon studied (Eriksson & Kovalainen, 2015). Therefore, the inductive approach develops a theory emerging from analysis of the collected data. Using inductive approach, the research commences 'bottom-up', starting off by collecting

data about a subject, then analysing the data so that patterns are detected, leading to the formation of exploratory hypothesis; thereafter, hypotheses are developed into a general theory (Myers, 2013).

3.3.2.3 Abductive research approach

According to Hoy and Adams (2015), an abductive approach is either deductive or inductive; it is a process of examining various phenomena, studying their relationships and formulating a key idea. This process involves the formulation of new theories and ideas, moving from the normal description and meaning given by individuals, to categories and concepts that develop the base of an understanding or an explanation of the phenomenon under study (DePoy & Gitlin, 2015; Eriksson & Kovalainen, 2015). The differences between the two approaches are summarised in Table 3.1, below.

Table 3.5: Deductive or inductive reasoning in qualitative research (Source: Myers, 2013)

Deductive Reasoning	Inductive Reasoning
• Research starts 'top-down' • Research starts with a theory or some hypotheses they intend to test • It's confirmatory	• Research starts 'bottom-up' • Research starts with empirical data from which they intend to build a theory • It's exploratory

Though both deductive and inductive approaches can be applied in qualitative research, the latter is more common (Woiceshyn & Daellenbach, 2018). While the purpose of a deductive approach is either to test-a-theory or confirm-a-theory, it is limited and more constrained, whereas the aim of the inductive approach is to build-a-theory, so it is more flexible and exploratory in nature (Myers, 2013).

Summing up the research approach discussion, when research design is case study based, then an inductive approach is applied. It is therefore imperative that the rationale behind such research is explicitly articulated. The primary focus of this study was to answer 'what' questions; hence, the inductive approach was more appropriate. Also, with the dearth of existing theory explaining the operationalising of IT strategy in organisations, the inductive approach has facilitated the development of a framework to operationalise IT strategy in organisations, as articulated as an aim of the study.

Moreover, the exploratory nature of this study implores for case research to build theories. With a case study, particularly as a real-life setting approach, the contexts and experiences of the participants are critical for strengthening not just the academic but also the practical

relevance of the findings. It is noteworthy, though, that there are no set rules with regard to the research methods associated to these approaches. In most cases, the use of the inductive approach is related to qualitative methods of data collection and analysis, whereas the deductive approach is typically associated with quantitative methods (Gabriel, 2016).

Thus, the next section focuses on research methods and the rationale for selecting the qualitative method.

3.4   Research methods

Research design is a plan that explains the required data, techniques that are used to collect and analyse the data, and how these selections answer the research question. Research methodology is a compass, or a map, of the way research is conducted (Jonker & Pennink, 2010). According to Wahyuni (2012), a method is a standard to conduct research within the setting of a certain paradigm. Leedy and Ormond (2014:14) define research method as "the general approach the researcher takes in carrying out the research project". Research method is the fundamental belief undergirding a study, compelling a researcher to choose one set of research methods over another (Wahyuni, 2012).

The three most common research methods are quantitative, qualitative and mixed methods (Murray, 2010; Creswell, 2013). The quantitative method generates numerical data, thereby quantifying the problem (Poni, 2014). The qualitative method creates textual data, and mixed method involves both numerical and textual data (Wilson, Onwuegbuzie & Manning, 2016). Venkatesh et al. (2013) argue that the mixed methods are most suitably used for phenomena that cannot be fully understood if either qualitative or quantitative methods are applied.

3.4.1   Quantitative method

Quantitative method, according to Bryman (2012), is a research method that emphasises quantification in the collection and analysis of data. It involves a deductive approach, with the focus on testing theories. The role of quantitative research methods is to maximise objectivity, replicability and generalisability of findings, and the general interest is in prediction (Harwell, 2011).

According to Hoy and Adams (2015), the quantitative method entails a systematic examination of phenomena that include experiments and other scientific techniques performed in controlled

ways to measure performance. With the quantitative research approach, researchers primarily use post-positivist statements to develop knowledge (Nightingale, 2012).

3.4.2   Qualitative method

Qualitative methodology undertakes to enhance the understanding of why things are the way they are in social world and why people act the way they do (Tuli, 2011). The emphasis of qualitative research is words and texts in contrast to quantitative research. Qualitative methods involve the collection, analysis and interpretation of nonnumeric data obtained through interviews, observations, images and documents (Wilson et al., 2016). A qualitative research method seeks after meaning, intending to understand a situation. According to Hesse-Biber and Leavy (2011), qualitative research focuses on the social meaning people attach to their experiences, circumstances and situations, and the meaning people entrench into writing and other matters.

McNabb (2015) concurs: qualitative research methods assist researchers to understand people and the social and cultural contexts in which they live. Bryman (2012) describes qualitative method as a research method that stresses words and texts rather than quantification in the data collection, and analysis that emphasises an inductive approach and weighs on the generation of theories.

3.4.3   Mixed methods

Mixed methods characterise the third method (movement), with quantitative and qualitative the first and second, respectively (Venkatesh, Brown & Bala, 2013). Researcher Harwell (2011) defines mixed method research as a mixture or combination of quantitative and qualitative research techniques, methods, approaches, concepts or language within the same study. Similarly, Venkatesh et al. (2013) refer to mixed methods as a combination of quantitative and qualitative research methods into a single study.

Based on the above description, the decision to conduct any of the three research methods hinges on the research question, purpose and context. Having insufficient understanding of what constitutes the operationalisation of IT strategy in organisations thus encourages the exploration of the influencing factors from the subjective perspective of the participants. This study, therefore, employed a qualitative research method to examine the factors influencing the operationalisation of IT strategy. Qualitative researchers study things in their natural

settings, undertaking to make sense of, or interpret the phenomena in relation to the meaning people give to them (Denzin & Lincoln, 2011).

In this study, an understanding was established by engaging directly with participants and allowing them to share their understanding of how IT strategy is operationalised. Creswell and Poth (2017) suggest researchers conduct a qualitative research because they desire to explore the contexts or settings in which participants in a study address a complex problem or issue.

According to Vaismoradi, Turunen and Bondas (2013), the qualitative method is not a distinct research approach; different perspectives and heterogeneity have formed a variety of research designs such as grounded theory, phenomenology, ethnography, action research, narrative analysis and discourse analysis. The subsequent section, then, will explore research design.

3.5   Research design

A research design is employed to achieve the objectives of the study. According to Wahyuni (2012), a research design is vital to link a methodology and the applicable group of research methods to address the research questions that are generated to study social events. Various research designs can be applied when conducting research. Researchers in qualitative studies have employed different research designs broadly categorised into action research, survey, grounded theory and ethnography (Williams, 2011).

3.5.1   Action research

Action research is a process through which professionals study their specific environment to solve problems embedded in their day-to-day setting. Hine (2013) defines action research as a process of systematic investigation that seeks to improve social issues affecting the lives of everyday people. Put simply, action research is research through action. Worrall and Harris (2013) describe it as a combined process that involves cyclical feedback from the people with whom the research is working.

Action research enables researchers to create proactive changes to a system, a practice, a process or an environment by attempting to bring about changes into their own practices so that practitioners will learn more about it and become aware of ways to improve their practices (Worrall & Harris, 2013). In summary, action research is a systemic, investigative approach, oriented towards bringing positive change in the researcher's own environment (Holter & Frabutt, 2012) or within the broader society (Hine, 2013).

Although action research could attain the objective of this study, due to the iterative feedback process involved and the opportunity of risk for direct researcher intervention, this research study does not integrate an action research design. In addition, action research is usually restricted to a single organisation, making it difficult to generalise findings, as different researchers may interpret events differently (Al-Khouri, 2013). Stringer (2013), concurring, posits that the purpose of action research is to find a solution applicable to a specific practice in a local setting.

Therefore, generalised plans, programs or solutions may not suit all environments or groups to whom they are applied. As this study employed multiple cases and the generalisation of the developed framework was intended, action research was not suitable.

3.5.2 Survey

Bryman (2012) affirms that in survey research design, quantitative or quantifiable data is gathered mainly by questionnaires or structured interviews on multiple cases, at one point in time, revealing patterns of association among variables. Fowler (2013) adds that the use of a survey is to generate information, quantitative or statistical descriptions, regarding certain traits of the study population.

Venkatesh et al. (2013) suggest that surveys, a quantitative research design approach, are able to extend to a study by assisting researchers collect data regarding different aspects of an event from numerous participants. Although surveys may provide a useful means of reaching a broad range of participants, this study was not about the quantity of participants, but the quality and uniqueness of the data collected. Consequently, survey research design was not the preferred option for this study.

3.5.3 Grounded theory

Grounded theory is applied to phenomena that are not well-understood. Mitchell (2014) explains grounded theory does more than just apprehend, it also creates an applicable theory about the related phenomenon. According to Charmaz (2014), grounded theory methods consist of methodical, but flexible, guiding principles for collecting data to create theories from this data gathered. Grounded theory refers to an iterative process, going back and forth between data and analysis. As a result, the researcher continually revises and revisits the data on an evolving basis of analysis (Charmaz, 2014; Lee, 2012).

The main aim of grounded theory is to create new, contextualised theories directly from data (Lee, 2012). The theory that is produced is grounded in and emanates from the data (Mitchell, 2014). Given that researchers are deeply involved in the process, grounded research objectivity and thoroughness is frequently doubted. Notwithstanding, Corbin and Strauss (2008) assert that the development of grounded theory is based on systemic, rigorous and orderly processes: grounded theory is a structured method.

Grounded theory has been criticised by some scholars (Lee, 2012; Mitchell, 2014) arguing that a shortcoming of this theory is that it is a lengthy, repetitive process involving multiple iterations of data collection, rather time consuming and labour intensive. Furthermore, because the grounded theory process involves a continuous iterative loop of comparison and theoretical sampling, researchers find it challenging to judge when the analysis has reached saturation or when a grounded theory study is complete (Harwood, Gapp & Stewart, 2015). As a result, grounded theory was not selected for this study.

3.5.4 Ethnography

According to Wahyuni (2012), ethnography is a qualitative method by which researchers study a cultural group as a collective in a natural setting over an extended period of time by gathering primarily observational and interview data. Ethnography research design focuses on examining the day-to-day behaviour of people in a particular group with the intention of understanding cultural norms, values, beliefs social structures and other patterns (Leedy & Ormrod, 2014).

Charmaz (2014) postulates that the aim of ethnography is to acquire 'insider' understanding of the researched world of the group by participating and observing in the setting, community and social world as a member. Ethnography, according to Rubin and Babbie (2011:436), is "a qualitative research approach that focuses on providing a detailed and accurate description of a culture from the viewpoint of an insider rather than the way the researcher understands things". The main criticism of ethnographic researchers is that they adopt, uncritically, the participants' viewpoints and engage in prolonged unfocused activities in the field setting (Charmaz, 2014).

3.5.5 Case study

A case study is a research technique that enables an in-depth exploration of a real-life phenomenon in its natural setting (Yin, 2017). Wahyuni (2012) suggests that research should

preferably employ multiple cases to facilitate comparisons between the studied practices of the observed phenomena. In this way, the research establishes a comprehensive perspective of these practices.

Leedy and Ormrod (2014) also suggest that a multiple case design or collective case study can be employed whereby researchers' study two or more cases at a time, cases that are either similar or different in certain key aspects, to compare and contrast, develop a theory or propose generalisations. Furthermore, multiple cases can amplify external validity and guard against preconceived notions of participants. Yin (2014) explains that multiple case studies help to validate a particular subject, as they serve as multiple studies surrounding the same concept. When multiple cases are employed, for theory building purposes, they are likely to generate a more robust and testable theory than one case (Barratt, Choi & Li, 2010).

In this study, case design was employed for the research. Two South African based organisations, Broad Spectrum and Triumph Technologies, were selected for the study, to gain an empirical understanding of how IT strategy can be operationalised in a real-life setting. An overview of the organisations are presented in Chapter 4. The rationale for selecting these particular organisations is presented in Table 3.2 below.

The case study design was most appropriate in that it strengthened the research perspective, primarily because it allows the phenomenon to be studied from a real-life perspective (Yin, 2014). The inclusion of two cases enabled the researcher to obtain a comprehensive view from the different organisations regarding how IT strategy is or can be operationalised. As presented in Table 3.2, the cases selected were from the public sector and private sector, as these two sectors are diverse in nature based on their foci and service offerings. Their similarities, contrasted by differences, render the study highly appropriate and relevant in its examination of factors influencing the operationalising of their respective IT strategies.

Table 3.6: Research cases

Case	Type of organisation	Rationale for case selection
Broad Spectrum (BS)	Broad Spectrum is a public sector organisation, wholly owned by the South African government, offering ICT services such as telecommunication services	• The organisation has developed IT strategy, in the process of implementation • Access was granted for the study to take place • The organisation represents other public enterprises, due to similarities in their settings and culture
Triumph Technologies (TT)	Triumph Technologies is a private multinational global employee-owned organisation that offers information and communications technology (ICT), infrastructure networking, telecommunication equipment and smart device services and products	• Similar to BS, the organisation has developed IT strategy, which it is in process of implementing • Access was granted for the study to take place • The organisation represents other private enterprises, due to similarities in their settings and culture

Case study design and qualitative methods are often associated with each other in IS research (Ko & Fink, 2010), primarily because of flexibility and their context-based nature (Hyett, et al., 2014). However, the design does attract criticism such as a lack of systematic handling of data, rigidity, unreliability and difficulty for generalisation (Gaya & Smith, 2016). Yin (2017) responds that systematic reporting of evidence does occur with the purpose of generalising the theoretical propositions rather than to the populations as in statistical research.

Before Yin, McLeod (2008) asserted that to some extent any research that is concerned with generalising case studies tend to generalise to situations on the basis of analytical assertions, while surveys and other quantitative methods tend to generalise to populations on the basis of statistical assertions.

3.6 Data collection

Data collection is a process of gathering materials related to the phenomenon studied. Different techniques – such as observations, experiments, documentation and interviews – are commonly used in collecting data in IS research. In this study, two techniques, documentation and interview, were employed for data collection. Even though other techniques are briefly discussed here, the focus is on documentation and interview. The discussion of other

techniques was drawing indirect justifications as to why documentation and interview were selected as the most suitable.

3.6.1 Observation

Observation is about watching people in a particular setting being studied. Observations can be overt (disclosed - the participants know they are being studied) or covert (undisclosed - the researcher hides his identity from the research subjects, thus acting as a sincere member of the group) (McLeod, 2015). The technique is predominantly a qualitative research method as researchers observe phenomenon studied (Creswell, 2014).

Though observations are useful in studying subjects that might be uncomfortable for participants to talk about, the researcher may be viewed as interfering, or some researchers may lack good attending and observing proficiencies (Creswell, 2014). As a result, this study elected to conduct interviews that permit research control over the line of inquiry.

3.6.2 Experiments

Experiment data collection techniques involve randomly allocating participants to experimental conditions in a managed environment (Wohlin & Aurum, 2015). The technique is often employed to manage a situation and control behaviour directly, precisely and systematically (Wohlin et al., 2012). Recker (2013) suggests that experiments and surveys are characterised by emphasis on quantitative methods, involving thinking in numbers. Wohlin et al. (2012) suggest that experiments are often performed to compare two or more procedures, such as specific methods, techniques or tools. Participants are allocated the use of one or more procedures, with the objective of numerically analysing the data using statistical methods.

According to Bertrand and Duflo (2017), there are various experimental methods such as laboratory or field experiments. Laboratory experiments are conducted in controlled settings (Asparouhova et al., 2016), whereas field experiments are carried out in real-world settings (Bertrand & Duflo, 2017).

Although experiments are a controlled data collection technique, Wohlin and Aurum (2015) argue that some studies involving experiments experience major problems such as lack of rigour, poor experimental design, incorrect use of statistical techniques and conclusions that are not following reported results. Due to the qualitative nature and narrative analyses conducted in this study, experiments were not a suitable data collection technique.

3.6.3 Documentation

Documentation involves gathering existing documents related to the phenomenon under scrutiny (Bryman & Bell, 2011). Bryman (2012) refers to documentation as materials that can be read, that have not been generated particularly for the purpose of social research, that are related to the social researcher's problems and issues, are that preserved to form part of the analysis. Iyamu (2014) states that the advantage of documentation is that it may provide useful information that participants may have partially or even totally forgotten to share with the researcher. Documents assist in supporting the data from the interviews.

Different types of documents – personal notes, public files, organisational strategies and reports, mass media outputs, visual documents and virtual records – can form part of the data collection (Bryman & Bell, 2011). Bowen (2009) describes this type of technique as a thorough evaluation of documentation with the intention of extracting meaning from them.

In this study, documentation was employed as a secondary data collection technique. Documentation such as corporate plans, IT strategy documents, IT strategy implementation plans and any similar documents related to the study were requested from the organisations. The organisation in the public sector readily shared suggested documentation such as their IT strategy and IT policies. However, the organisation in the private sector was unwilling to share any form of documentation pertaining to their IT strategy.

3.6.4 Interview techniques

Interviews are aimed at defining and clarifying people's real-world life as they live it, comprehend it, experience it and made sense of it (Schultze & Avital, 2011). According to Rabionet (2011), the interview is a prevailing and adaptable instrument that describes the ways and opinions of people signifying their experiences. Furthermore, interviewing differentiates itself from other data collection techniques in that the researcher directly engages participants in a conversation to produce detailed circumstantial and dependable accounts of participants, their understanding and their ways of inferring meaning (Schultze & Avital, 2011).

The interviews have been one of the most commonly used techniques for primary data collection in the field of IS studies (Qu & Dumay, 2011). Interviews afford the researcher a valuable opportunity to learn about the spheres of others. In addition, interviews enable the interviewer to follow up and more extensively probe responses, motives and feelings (Marshall & Rossman, 2014). Interviews that relate to qualitative data collection can provide significant

insight into the research inquiry by allowing researchers to garner intimate details from the narratives. There are three types of interviews: unstructured, structured and semi-structured (Marshall & Rossman, 2014).

3.6.4.1 Unstructured interviews

By contrast, unstructured interviews, as they do not reflect any predetermined interview questions, are engaged in with little or no structure. Wilson et al. (2016) refer to unstructured interviews as non-standardised, non-directed and flexible as no detailed interview guide is followed. Interviewees are encouraged to provide as in-depth responses as possible. Such an interview may simply start with an opening question and will progress meanderingly based on the initial response. Therefore, unstructured interviews elicit responses that are entirely the participant's own; the researcher does not dispense cues or guidelines for the response (McNabb, 2015).

According to Leedy and Ormrod (2014), unstructured interviews are advantageous in the sense that they are more flexible and more likely to produce information that the researcher had not intended to request. With few predetermined interview questions, unstructured interviews elicit different information from different participants; consequently, it can be difficult to compare the responses of various participants (Leedy & Ormrod, 2014).

3.6.4.2 Structured interviews

Structured interviews are standardised, verbally managed by which a list of predetermined questions asked to all interviewees with very little or no deviation and with no scope for follow-up questions to responses that support further explanation (Pathak & Intratat, 2012; Wilson et al., 2016). By their very nature, structured interviews only allow for limited participant response and are, therefore, of little value if 'depth' is required.

3.6.4.3 Semi-structured interviews

Semi-structured interviews consist of several key questions that aid in defining the areas to be explored, but also allow the interviewer or interviewee to deviate in pursuit of more details about an idea or response (Rabionet, 2011). According to Evans and Lewis (2018), semi-structured interviews are one of the most extensively used techniques for collecting data within the social sciences. This interview format is used most frequently in IS as it furnishes participants with some guidance concerning what to talk about, which many find helpful.

The flexibility of this approach, particularly compared to structured interviews, allows for the elaboration of information that is important to participants but may not have previously been considered pertinent by the research team (Rabionet, 2011). Semi-structured interviews are useful because they permit researchers to explore subjective viewpoints from each participant's perspective (Evans & Lewis, 2018) and obtain in-depth interpretations of their experiences.

In order for the study to explore individual's experiences with regard to operationalisation of IT strategy, the semi-structured technique was used to conduct the interviews. Interview guidelines were formulated based on the research questions as stated in Chapter 1. According to Galletta (2013), semi-structured interviews include open-ended questions posed to elicit information from participants, thereby encouraging the researcher to engage in a conversation with the participants (interviewees) (Galletta, 2013; Kallio et al., 2016).

This means that the semi-structured interview is flexible and affords for probing during the interviews; the interviewer is able, then, to seek clarification where desired. According to Wilson et al. (2016), semi-structured interviews are non-standardised in terms of use of an interview guide; however, the sequence of questions can be rearranged ad hoc depending on the direction of the interview, and further questions can be posed for prompting and probing. Further, semi-structured interviews enable the researcher to narrow down the areas with regard to IT strategy operationalisation that the researcher wants to speak with participants about.

The number of interviews varied depending on the size of the organisation and when a point of saturation was reached. Targeted participants, drawn from different levels of the organisational structure, business and IT divisions, were selected based on knowledge and work experience. Knowledge was based on their understanding of how the organisation put an IT strategy into use and work experience entailed their length of employment within the organisation. Participants were an array of business and IT executives, IT managers, IT project managers and IT specialists.

3.7 Data collection journey through semi-structured interviews

Obtaining permission to conduct the study in the public sector was less challenging than in the private sector. The researcher underwent a rigorous process to obtain permission from organisations in the private sectors to collect data. Before engaging with any of the organisations mentioned in this section, the researcher had to request permission formally, in writing, from these organisations to conduct research. Written correspondence to all organisations included an electronic mail, a research permission letter from the university and a statement of ethical consideration guidelines.

For the first case, the researcher obtained permission at their place of employment, a public institution, to conduct research. However, the researcher decided not to conduct the research there as the researcher was familiar with the environment and needed to guard against potential bias. According to Dunn et al. (2016), when carrying our research, every researcher maintains a set of interests, whether personal, commercial, moral or otherwise, which may evolve into partiality pertaining to a specific research. Therefore, the researcher approached another public organisation.

The first organisation that accepted to partake in the study is referred to as case #1. With the organisation, the process was a bit easier as compared to the second case. This is because the chief executive officer (CEO) shown interest, and as result many employees were also willing to participate. In addition, the CEO assigned a facilitator to assist with logistical arrangements such as the use of meeting rooms for interviews. The participants were interviewed on the premises of the organisation, which was made possible owning to the CEO involvement.

It was a more difficult task to get another organisation that was willing to participant in the study. In the process, ten organisations were contacted, through email and verbal communication. The objectives of the study were sent to the relevant authorities in the organisations. There were follow-ups through telephonic conversations, to the requests. After so much efforts, an organisation agreed to participate in the study. The organisation is referred to as case #2.

Herewith are the organisations approached:

Organisation 1: This was a small-to-medium enterprise. The chief executive officer was willing to assist; however, during the initial engagement between this CEO and the researcher, he admitted that the organisation does not have an IT strategy. They were still in the process of compiling an IT strategy, thereby discouraging the researcher from using the organisation as a study case.

Organisation 2: The researcher met with one of the then executive committee members who informed the researcher that the organisation was going through a restructuring process, so the timing was not ideal, referring the researcher to engage the human resource executive of their main shareholder.

Organisation 3: The researcher was excited to learn that the chief information officer (CIO) was a doctoral candidate, so he would appreciate the study request. Upon engaging him, he unfortunately indicated that the IT operations are in Durban, South Africa, 600 kilometres from where the researcher resides. While the researcher was prepared to travel 600 kilometres to conduct the study, further engagement with the CIO turned out to be fruitless.

Organisation 4: The main operations of this organisation were in Cape Town, South Africa, which involved 1000 kilometres travelling for the researcher. While the researcher was willing to undertake this assignment, after the first correspondence with the chief executive officers (CIO) and follow up telephone calls, no feedback was forthcoming.

Organisation 5: This was a management-consulting organisation with eight employees. They had no IT strategy and the IT was supported by one individual, a department too small to study.

Organisation 6: The researcher was referred by a fellow researcher. Initially, the prospect of conducting research at this organisation seemed positive. The researcher engaged the chief executive officer (CEO) who referred the researcher to the chief information officer (CIO). Upon communicating with the CIO, he indicated that he was on vacation for two weeks and would contact the researcher on his return. On his return, the researcher contacted the CIO and set up a meeting with him.

At the meeting, the research explained the purpose of the research and the objectives. The CIO seemed keen to assist, but he requested time to discuss the request with the CEO and Board of Directors. For three months, the researcher followed up with the CIO. In the third

month, the CIO indicated that they could not grant the researcher permission to use the organisation as a case study due to the competitive nature of their business.

Organisation 7: The researcher spoke to this organisation a month before the Christmas holiday season. The CIO undertook to revert to the researcher after the holiday season, but upon repeated follow-ups, the researcher received no response from the CIO.

Organisation 8: The researcher engaged this organisation and had an initial meeting with the CIO. Subsequent to this meeting, the researcher sent a formal request with supporting documents such as the ethical clearance certificate and permission letter to conduct research from the university. The CIO then informed the researcher that their legal department was reviewing the request. After following up for four months, no feedback was received.

Organisation 9: This organisation repeatedly told the researcher that permission was granted to conduct research and a formal letter would be furnished, but to no avail as no letter arrived.

Organisation 10: This organisation granted the researcher permission to conduct the research at the South African regional office. This organisation is case #2 of the study.   The language barrier was a challenge as the organisation originates from a different continent and the business language of the organisation was both English and Hakka. The majority of the employees at the South African regional office spoke the Asian language, Hakka. However, Hakka is a language foreign to the researcher.

One participant at this organisation preferred to be interviewed in one of the official languages in South Africa, Sesotho. The researcher, familiar with the Sesotho language, complied and conducted the interview in Sesotho. The researcher translated the audio transcript from Sesotho, ensuring the subjective views of the participant were correctly captured, while another participant was speaking in the Hakka language with which the research was not familiar. However, the participant was accompanied by a translator who translated the interview questions from English to Hakka and the interviewee responses from Hakka to English.

A total of 29 employees, 13 and 16 from Broad Spectrum and Triumph Technologies respectively, were interviewed by using the semi-structured interview technique. A set of criteria were used in selected the participants. This includes, areas of specialisation, experience in the field, and years of service at the organisations used as cases in the study.

The number was reached at point of saturation, meaning there was no new information that was forthcoming.

The interviews were audio-recorded and notes and comments were made where necessary. Before the data could be analysed, it was transcribed. According to Allen and Wiles (2016), it benefits the researcher to transcribe interviews immediately after conducting them; listening to the recording when it is still fresh in the mind of the researcher makes transcription considerably easier.

3.8 Data analysis

Data analysis is a mechanism employed to analyse the data collected from the selected cases. Data analysis was carried out in units, on a case-by-case basis, using structuration theory and diffusion of innovations theory as lenses to interpret the findings. In a qualitative approach, data collecting and analysis can be performed concurrently, thereby adding to the depth and quality of data analysis, while the conventional manner is to collect all the data prior to scrutiny to obtain an outcome (Vaismoradi et al., 2013).

In this study, the data was collected until a point of saturation was reached, and then it was analysed to determine the points and patterns that could be uncovered. According to Saunders et al. (2017), saturation is attained in qualitative research as the measure to end data collection, as the indication that data collected or analysed up to a certain time, after which more data collection or analysis is pointless.

3.8.1 Units of analysis

Units of analysis are the main entity analysed in a study. According to Iyamu (2011), the units of analysis approach allows data to be analysed on a unit-by-unit basis. The two organisations that were involved in the study were the main units, as shown in Table 3.3. Each of the units had sub-units, including both technical and non-technical agents (Table 3.3).

Table 3.7: Units of analysis

Main Units	Sub-Units	
Broad Spectrum (Case #1)	Technical (IT staff)	IT Managers
		IT Specialists
	Non-Technical (Business)	Business Managers
		Business Analysts and Business Users
Triumph Technologies (Case #2)	Technical (IT)	IT Managers
		IT Specialists

Main Units	Sub-Units	
	Non-Technical (Business)	Business Managers
		Business Analysts and Business Users

The unit-based analysis assisted the researcher to understand and examine the factors that influence the operationalisation of IT strategy. The analysis of the data on units was guided by lenses of two socio-technical theories. The results from the two case studies were combined to give deeper understanding into how IT strategy is operationalised in organisations, and to make a case for generalisation. According to Pilot and Beck (2010), the outcome of qualitative analysis is a generalisation, in spite of the language used to describe it.

3.8.2 Analysis through lenses

Underpinning theories have become useful for data analysis techniques in qualitative studies. Deciding on underpinning theories is generally determined by the goal and objectives of the study. As indicated by Iyamu (2015), different studies have different objectives and dimensions, and certainly different challenges; therefore, multiple theories could be employed to obtain full coverage of the data analysis. Moreover, a single theory has the potential of leaving some gaps in a study as theories have their own limitations making is challenging to underpin some studies.

Against this backdrop, two socio-technical theories, structuration theory (ST) by Giddens (1994) and diffusion of innovations (DOI) by Rogers (1995, 2003) were employed as lenses in the analysis of the data, at macro and micro levels. These theories were discussed extensively in Chapter 2.

Structuration theory, through the duality of structure, focuses on the interaction and relationship that exist among technical and non-technical agents in the organisations. Therefore, the objectives of the study were analysed through the duality of structure. The duality of structure was employed to examine the relationship that exists amongst actors in the operationalisation of an IT strategy. However, structuration theory does not provide an examination of the process involved through which people adopt or reject an innovation.

The theory of diffusion of innovations through the lens of the innovation-decision process was applied to discuss the findings from both cases interpretively, focusing on the manner by which innovation was diffused. The innovation-decision process was used to understand how the IT

strategy is operationalised, moving from awareness through to confirming the use in the daily operations of the organisation.

3.9   Ethical considerations

Social science ethics, according to Vosloo (2014), relate to what is moral and what is immoral when conducting research. Accordingly, Gratton and Jones (2010) opine that researchers, irrespective of research methods, designs and techniques, are subjected to ethical considerations. Creswell and Poth (2017) argue that researchers must protect their research participants, foster trust with them, advocate and uphold the integrity of research and ultimately protect the institution or organisation from mischievousness.

This study, aligned to the Code of Ethics of the institution, sought approval from the institutional review board to ensure that principles such as voluntary participation, harmlessness, anonymity and confidentiality are sustained, and that no risks are posed to participants. In addition, the research was conducted into 'cases' in which the study had no vested interest in the result. Selecting a case where the study has vested interest in the result eliminates objectiveness from a quantitative research perspective and does not allow for forthright expressions of various views required by qualitative research (Creswell, 2014).

Bhattacherjee (2012) discusses some of the principles of ethical behaviour that are applicable when conducting scientific research:
Informed consent: a form that clearly delineates each participant's right to not participate and right to withdraw before responses in the study can be recorded.

Voluntary participation and harmlessness: participants must be aware that their participation in the research is strictly voluntary, that they have the choice to withdraw from the study at any time without adverse consequences. Furthermore, they are not harmed for participating or not participating in the research.

Anonymity and confidentiality: in protection of participants' interests and future well-being, identities must be protected in a scientific study. This is done by the dual principles of anonymity and confidentiality. According to Allen and Wiles (2016) anonymity is the level to which the identity of a participant is unspecified and unidentified, so the participants cannot be connected to their responses.

In some research, such as face-to-face interviews, anonymity is not possible. In such instances, participants must be guaranteed confidentiality, whereby the researcher is able to identify a person's responses, but promises not to divulge that person's identify in any report, paper or public forum (Allen & Wiles, 2016).

Disclosure: ordinarily, researchers have a responsibility to provide some information about their study to potential participants prior to data collection to aid in their decision of whether or not to participate in the study, information such as who is conducting the study, for what purpose, what outcomes are expected, and who will benefit from the results.

Analysis and reporting: researchers also have ethical obligations to the scientific community in terms of how data is analysed and reported in their study. Unanticipated or adverse findings must be fully disclosed, even if these results germinate reservation concerning the research design or the findings.

These ethical principles were adhered to in the conducting of this study. Prior to carrying out the research, the Cape Peninsula University of Technology Ethics Committee granted ethical approval for the research. The researcher also obtained signed permission and consent from each organisation after providing an information sheet and ethical code of conduct that outlined the background to the study and the voluntary nature of participation in the study. The researcher signed a Non-Disclosure Agreement (NDA) with Broad Spectrum (BS) and a Non-Disclosure Commitment with Triumph Technologies.

The authors Gratton and Jones (2010), Bhattacherjee (2012), Creswell (2014) and Vosloo (2014) agree that it would be unethical to harbour expectation that the participants would agree to participate in the study. Hence, participants were given the right to not participate, to withdraw their involvement without prejudice or disadvantage at any stage, with which their data would be immediately destroyed. Participants were informed that the intended use of the data was to develop a framework to assist organisations in operationalising their IT strategy and that the findings may also be anonymously referenced for peer-reviewed journal publications.

3.10 Summary

This chapter set out the research methodology and design employed in the study. Specific study-related research philosophy, strategy and methodology were identified to ensure the objective of the study, the development of a framework to operationalise IT strategy in

organisations, is achieved. Various research methodologies and designs were discussed; however, the study was centred on the decisions made as highlighted in the next section.

The research philosophy selected was epistemological, using an interpretive paradigm. The research strategy selected was exploratory in nature and an inductive approach was deemed appropriate for this study. The research method and design were qualitative and case studies, respectively. Data collection was based on semi-structure interviews, with interview questions guiding discussions during the interview sessions. Documentation obtained from the organisations ('cases') was also included as collected data.

Data analysis was conducted through the lens of the duality of structure from the structuration theory. The findings from the two cases were analysed interpretively employing the innovation-decision process of the diffusion of innovations theory. Ethical considerations, important rules of guidance for any research, were discussed in this chapter. In the next chapter, an overview of the cases is presented.

CHAPTER FOUR
OVERVIEW OF CASES

4.1   Introduction

This chapter presents an overview of the organisations that were engaged as 'cases' in this study, Broad Spectrum (BS) and Triumph Technologies (TT). Both organisations are South African based. As discussed in Chapter 3, the organisations were selected based on specific criteria, including: (i) a developed IT strategy in the organisation; (ii) a willingness to participant in the study; and (iii) previously established distinct foci for the organisation. One of the organisations was a public institution and the other from the private sector.

This overview presents a background of the organisations as well as their products and services. Their organisational structures are presented, with emphasis on the IT divisional structure, as it is this structure that serves as the custodian responsible for the IT strategy. This chapter is divided into four main sections, beginning with the fieldwork. Then the second and third sections present an overview of the organisations investigated for this study. Lastly, the chapter concludes with a summary.

4.2   Fieldwork

After submitting the research proposal with consent letters from two organisations to the Cape Peninsula University of Technology's Faculty of Informatics and Design, the research proposal was accepted by the CPUT Ethics Committee. Thereafter, contact was extended to the organisations to initiate the research. The first organisation required a permission letter from the university granting the researcher permission to conduct research. This letter was immediately obtained and forwarded to the organisation. Fortunately, neither of the organisations giving consent to conduct the research withdrew.

The researcher spent five months obtaining permission from the first organisation, referred to as case #1, from the public sector. While collecting data from the first organisation, the research embarked on an exercise to find an organisation in the private sectors. This task took 12 to 13 months after approaching ten organisations to obtain permission from the second organisation, referred to as case #2, to conduct research. The public sector organisation head offices and the private sector regional office are both situated in Johannesburg, Gauteng province, in South Africa.

Based on the aim of the study, the qualitative methodology was used as indicated in Chapter 3 of this study. The research design employed was a case study. A case study enabled the research to obtain a thorough understanding of the phenomenon in a real-life setting. Both cases were employed as follows: to gain an understanding of the subjective views and findings from the perspective of the participants.

For the purposes of the study, the identities of the organisations are kept anonymous and pseudo names were used to protect the identity of the organisations. In adherence to the ethical considerations of research, participants and the organisations were allocated pseudonyms to avoid disclosure of their identities. The pseudonym BS01, for example, meant BS for the organisation Broad Spectrum, and 01 for participant number one. During the data collection stage, all interviews were recorded using a voice recorder to ensure the information gathered from the participants was captured and stored as proof. The recordings from the interviews were transcribed to cite and reference the participants during the analysis phase, presented in Chapter 5 of this study.

The organisations operate in the telecommunication sector, providing information technology and telecommunication services to the public and private sectors. These organisations have either previously implemented an IT strategy or are in the process of implementing an IT strategy, affording them a clear position from which to determine the factors that influence operationalisation of the IT strategy.

4.3   Overview: Broad Spectrum – case #1

Broad Spectrum, a licensed state-owned company in the telecommunications sector, established in April 2007, with the government as a major shareholder. Broad Spectrum (BS), as a public institution, has as its main objectives the expansion of availability and affordability of access to electronic communications, including, but not limited to, underdeveloped and under-serviced regions. At the time of the study, the organisation had a staff complement of 168 employees, both permanent staff and contractors.

4.3.1   Broad Spectrum: service and product offering

The institution's purpose is to establish national, regional and municipal fibre-optic networks as the backbone for broadband access. Its core function is to provide terrestrial and undersea wholesale broadband connectivity products and related value added services to public and private licensed or license-exempt customers across all industries in South Africa, while also

supporting projects of national importance and extending their cooperative and commercial engagements into African and international markets.

Broad Spectrum has a fibre-optic network nationally with over 100 points of presence. The national long-distance fibre-optic network provides a number of the majority of fibre routes. The network covers all nine provinces, major cities and towns of South Africa, extending to the borders of neighbouring countries such as Botswana, eSwantini, Lesotho, Mozambique, Namibia and Zimbabwe to provide required interconnectivity. They are a Tier 1 investor in the West Africa Cable System (WACS) that connects South Africa to the United Kingdom, with landing stations in Angola, Cameroon, Canary Islands Congo, Cape Verde, Democratic Republic of Congo, Ghana, Ivory Coast, Namibia, Nigeria, Togo and Portugal.

Broad Spectrum's wholesale product and service offerings are based on advanced technologies in the telecommunication industry, including Ethernet, network operations centre as a service, network monitoring and maintenance services and customer tie-cable maintenance services. They offer disaster recovery NOC as a service where customers can utilise their premises to monitor their networks in cases of disaster. Another service offered by Broad Spectrum is monitoring and maintenance services of third party fibre optic network.

4.3.2   Broad Spectrum: governance structure

Broad Spectrum's major shareholders are the government and the development corporation of South Africa, with the governance structure presented in Figure 4.1. The board of directors are responsible to the shareholders for conducting the business of the organisation as the board provides leadership and vision to the organisation so that shareholder value is enhanced and its competitiveness, sustainability and growth are achieved. The board approves the organisation's strategy, including IT strategy.
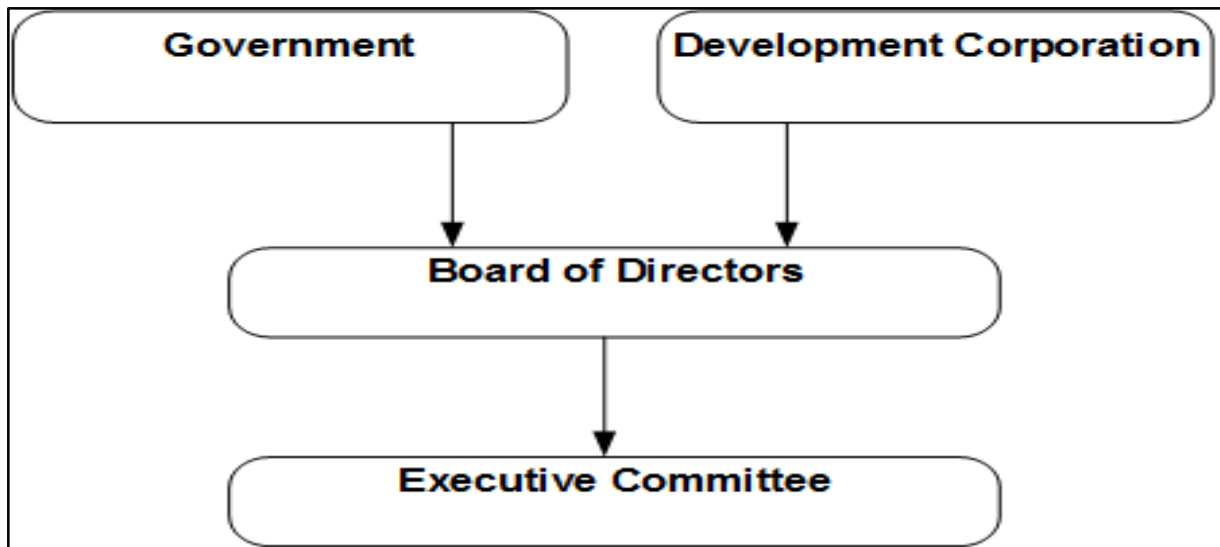
Figure 4.7: Broad Spectrum governance structure

The Board has delegated specific authorities to the chief executive officer (CEO) to ensure the effective day-to-day management of the organisation. The CEO created an executive committee (Exco) to assist with this task.

4.3.3   Broad Spectrum: executive committee

The executive committee (organisational structure) is depicted in Figure 4.2. The executive committee is led by the chief executive officer (CEO) who reports to and is accountable to the Board of Directors for the management of the organisation.

Figure 4.8: Broad Spectrum executive committee

The executive committee comprises the chief executive officer who is the chairperson, chief financial officer, chief technology officer, chief marketing and sales officer, executive human resources, executive compliance and risk and audit (Figure 4.2).

4.3.4 Broad Spectrum: IT departmental structure

The technology department, headed by the chief technology officer (CTO), had a staff complement of 68 people. The CTO is responsible for the formulation and implementation of the IT strategy. The IT strategy is recommended by the executive committee to the board of directors who approve it.
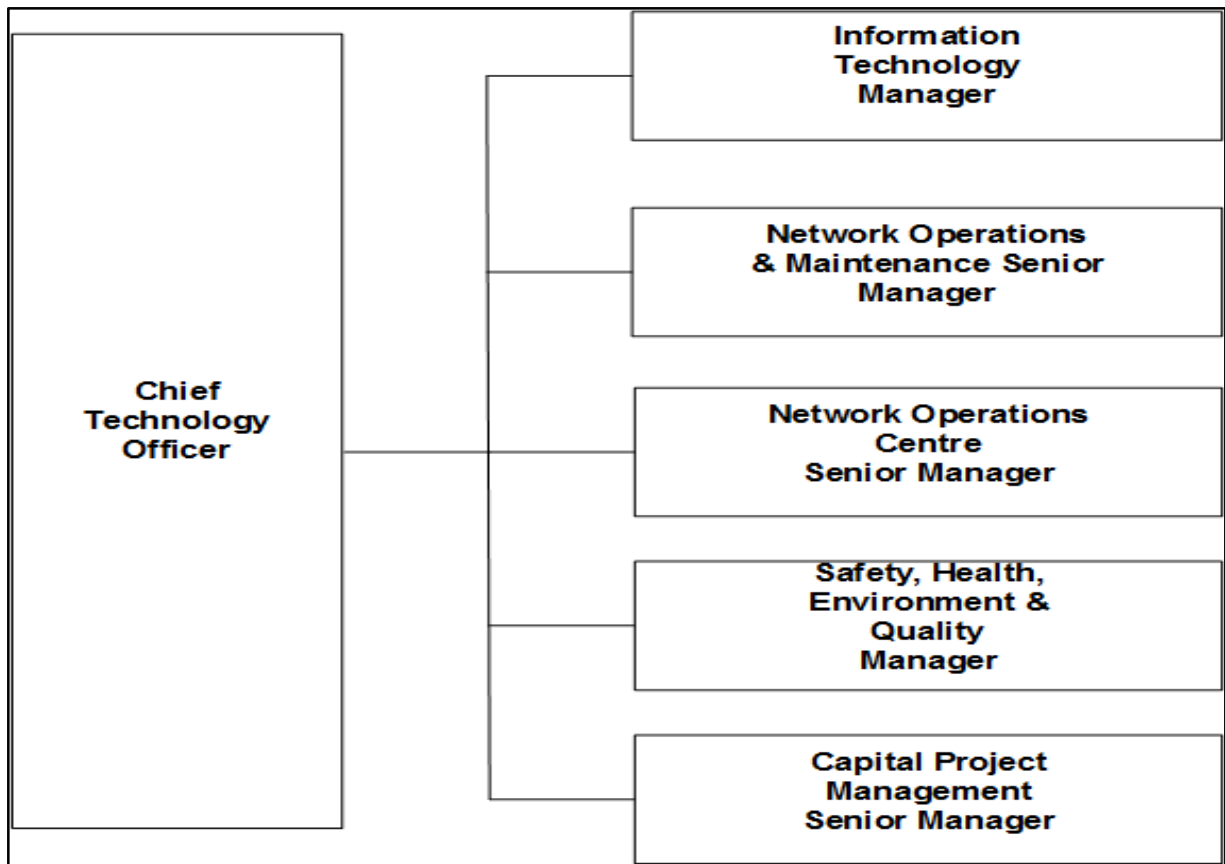
Figure 4.9: IT organisational structure

The information technology (IT) departmental structure was realigned for operational optimisation and effectiveness. Figure 4.2 depicts the IT department's organisational structure that consists of the following divisions: IT, network operations and maintenance, network operations centre (NOC), Safety, Health, Environment and Quality (SHEQ) facility and capital projects management (CPM).

The IT support unit performs activities such as desktop and telephony, hardware and software support and maintenance. The network operations and maintenance division support customers who are on the organisation's fibre-optic network. This division has about 40 employees nationally. The network operations centre (NOC) monitors the fibre-optic network on a 24x7x365 day basis, working closely with the network operations and maintenance division. The NOC permanently monitors the fibre-optic network to ensure that all service levels with external customers are met.

The Safety, Health, Environment and Quality (SHEQ) facility division is responsible for IT security and IT governance, ensuring that policies, processes and controls are in place to govern the operations of the organisation from an IT perspective.

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The capital projects management section is responsible for managing IT and business projects, ensuring that IT enables and supports the business events, processes and activities. Several sub-committees, such as the technical design committee and IT oversight committee are in place. The technical design committee's main function is to review and approve any technical and/or technology related designs before they are implemented and operationalised.

The IT oversight committee fulfils an oversight role of IT activities with the aim of ensuring that the organisation's information is secure and governance is adhered to. The objectives of the committee are to minimise operational risk, to comply with laws and regulations for assurance of operational continuity, and safeguarding the confidentiality, integrity and availability of information.

4.4   Overview: Triumph Technologies – case #2

Triumph Technologies is a global information and communications technology (ICT) organisation founded in 1987. Triumph Technologies Holding is a private organisation wholly owned by employees of the organisation. The organisation operates in over 170 countries and regions, including South Africa, with more than 180 000 employees, 36 joint innovation centres and 14 research and development institutes and centres. Triumph Technologies has a sizeable geographical footprint spreading across the world, with a presence in Asia Pacific, the Americas and Europe, the Middle East and Africa (EMEA).

4.4.1   Triumph Technologies: service and product offering

This organisation, case #2, offers information and communications technology (ICT), infrastructure networking, telecommunications equipment and smart device services and products. Case #2 offers integrated solutions across four key areas: telecommunication networks, Information Technology (IT), smart devices and cloud services.

Triumph Investment & Holding Co. Ltd. provides information and communications technology (ICT) solutions and services for telecommunication carriers, enterprises and consumers worldwide, operating in three segments: carrier network, enterprise business and consumer business.

In addition to the three business segments, it provides consulting, customer experience management, system integration, customer support, network rollout and learning services, as well as enterprise services such as professional and technical support, and training and

certification services. The organisation serves telecommunications, public safety, government, transport, power grid, finance, media and entertainment, healthcare, oil and gas, manufacturing, smart retail, and hospitality industries worldwide.

4.4.2   Triumph Technologies: organisational structure

The TT global organisational structure is presented in Figure 4.4. Triumph Technologies Holdings Board of Directors (BOD) is the highest body responsible for corporate strategy and operations management, and for ensuring the protection of customer and shareholder interests. The BOD established the executive committee whose role is to examine and reflect on major issues within the organisation. the executive committee is the authorised decision-making committee responsible for oversight and execution of the BOD vision.
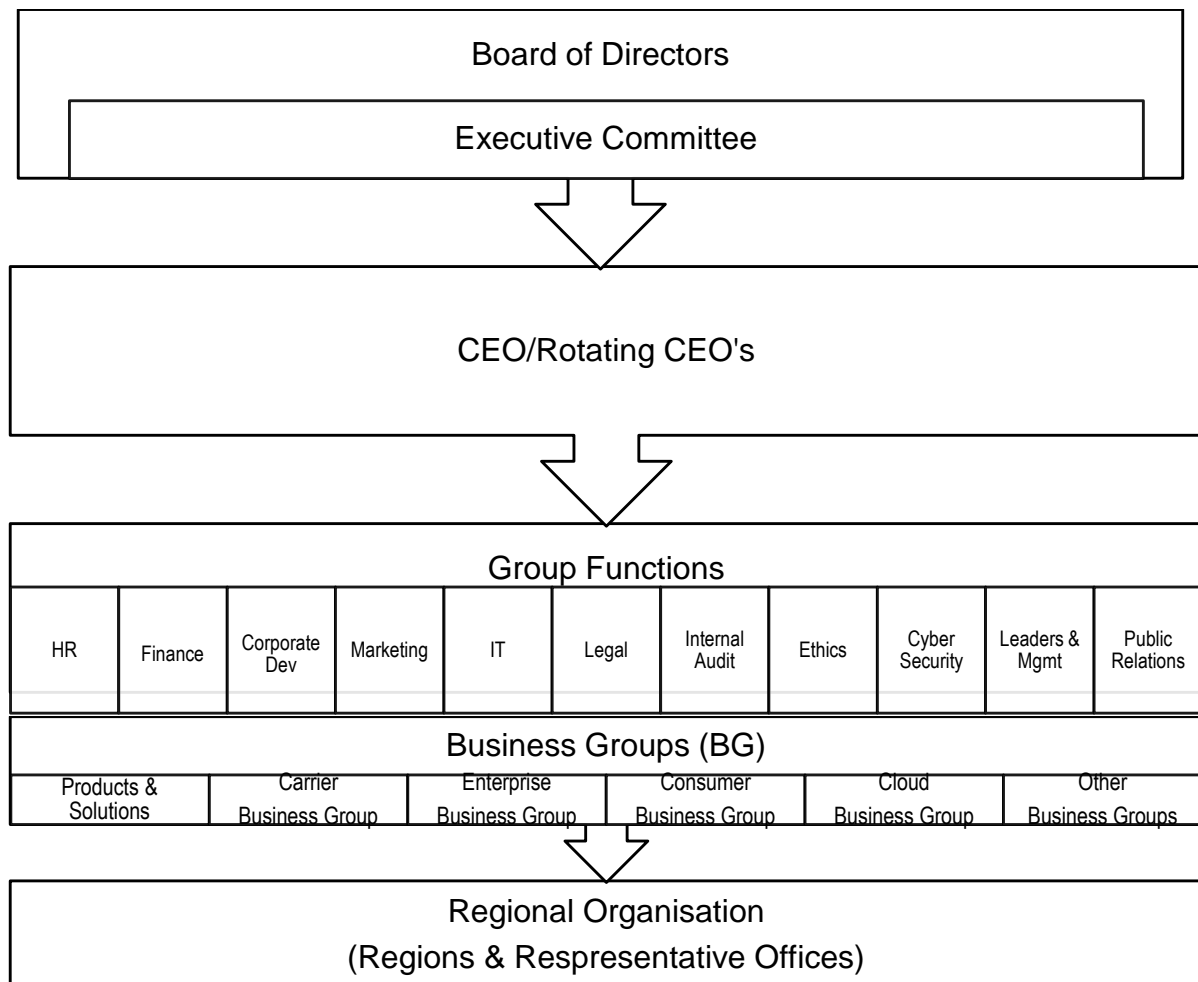
Figure 4.10: Global organisational structure

The chief executive officers are mandated by the BOD to manage the daily operational functions and strategic initiatives of the company, including the IT strategy. Moreover, the chief

executive officers are responsible for the management of the business groups and units, overseeing the regional and representative offices.

The business groups and units are categorised into three main groups: carrier, enterprise and consumer business groups. The carrier and enterprise business groups support solution marketing, sales and services that target carrier customers and enterprise/industry customers, respectively. The two business groups provide innovative, differentiated and advanced solutions based on business characteristics and operational patterns of different customers while continuously improving the organisation's industry competitiveness and customer satisfaction. The consumer business group focuses on serving device consumers, dealing with all aspects of the consumer domain, as well as assuming responsibility for business performance, risk controls, market competitiveness and customer satisfaction in the consumer business.

4.4.3   Triumph Technologies: regional business structure

The South African regional office for TT was established in 1999. Triumph Technologies South Africa has over 1,050 permanent employees and over 5000 subcontractors, based in Johannesburg, South Africa. Triumph Technologies South Africa Pty Ltd. operates as a subsidiary of Triumph Technologies Co. Ltd.

The South African operation's organisational structure is aligned to the global structures, organised around the following core business groups: carrier (CBG), enterprise (EBG) and consumer (CoBG) business groups, with the diagram below depicting this organisational structure.

The organisation serves South Africa's mainstream telecom operators, provides ICT business solutions to government and enterprises, and has a presence in the local consumer market with smart phones and devices. Triumph Technologies South Africa offers retail and marketing services that manufacture communication equipment including data communications, fixed-line communications, optical transmissions, mobile communications and switching products.
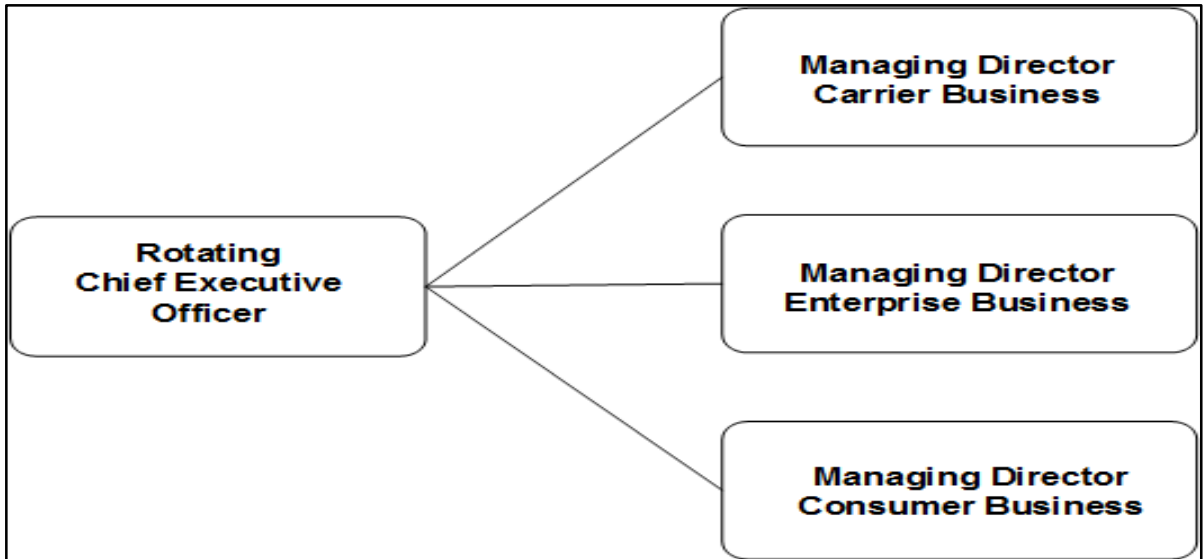
Figure 4.11: Triumph Technologies South Africa organisational structure

A rotating CEO heads up the South African regional office that also covers Botswana, eSwantini, Lesotho, Mozambique, Namibia and Zimbabwe. The managing directors of the three business groups reports to this rotating CEO. The study was conducted between the different business groups in the organisation as the IT department is responsible to deliver services to the different business groups.

4.4.4 Triumph Technologies: IT departmental structure

The local, South African IT department is structured as follows, mandated from the Southern African chief information officer.
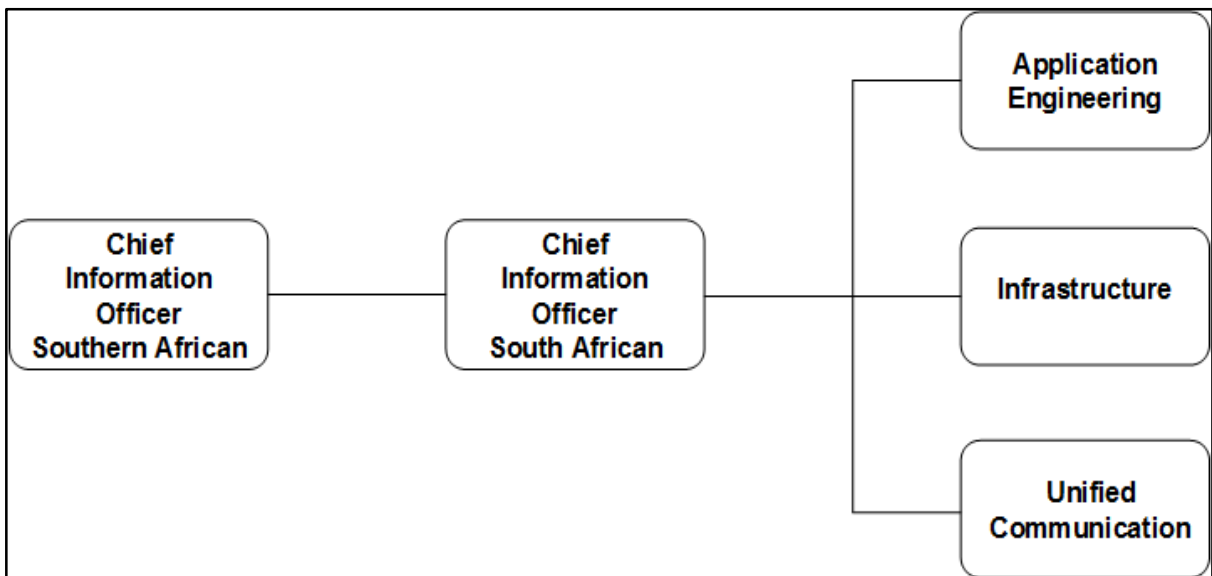
Figure 4.12: Triumph Technologies South Africa IT organisational structure

The local IT department reports into the Southern Africa chief information officer (CIO). The Southern Africa CIO has over twenty direct reportees (CIOs), one of whom is the South African CIO. However, the focus of this study is on the South African operations as a case.

The local organisation has eight IT staff including the CIO. The application engineering, infrastructure and unified communications divisions report to the South African CIO. Although the South African regional office has an IT department and Human Resources, most of the IT activities and functions, such as IT governance, training, IT policies and processes, are performed at the headquarters in Asia. This is because the IT solutions are centralised at the headquarters, and decision-making and approval through the organisation's hierarchy emanates from Asia. The regional IT resources liaise regularly with the IT department headquarters to enable and support the local business events, activities and processes.

4.5   Summary

This chapter provides information about the two cases, both ICT organisations with core businesses in the telecommunication sphere. The organisations were operationalising their IT strategy, employing people, processes and technologies. Case #1 is a public organisation managed by the government and case #2 is a private organisation with the shareholders as employees. The rationale for selecting one organisation from the public and one from the private sector is to compare and contrast how they operationalise their IT strategies, thereby developing a framework applicable to both sectors.

The next chapter presents the analysis and interpretation of the qualitative data collected. In Chapter 5, the data from the qualitative research was analysed through the lenses of duality of structure, a component of structuration theory, and innovation-decision process, an element of the diffusion of innovations theory.

CHAPTER FIVE
DATA ANALYSIS

5.1   Introduction

This chapter presents the analysis of the data. As discussed in Chapters 1 and 3, a hermeneutic approach was employed in the data analysis, guided by a lens from one theory duality of structure from the perspectives of structuration theory (ST). As discussed in Chapter 3, the theory was selected based on the aim of this present study to propose a solution for improving the operationalisation of IT strategy in organisations.

This chapter consists of four main sections. Section one is an overview of the data analysis. The second section presents the theory. Section three focuses on the analysis of data from the two cases studied. The chapter is then summarised in section four.

5.2   Overview of data analysis

As explained in Chapter 3, two organisations were selected as cases in this study. Detailed and comprehensive information about the two organisations was provided in Chapter 4. The analysis of the data was done on a case (organisation) basis, starting with case #1, Broad Spectrum (BS), followed by case #2, referred to as Triumph Technologies (TT). The results from both cases were combined in an effort to achieve the objectives of the study to gain a clearer understanding of the factors that influence the operationalisation of IT strategy in organisations. Combining the results for the proposed solution helps legitimise a case for generalisation (Boddy, 2016).

The demographics of the interviewees are shown in Table 5. The criteria used in selecting the interviewees were discussed in section 3.7, in Chapter 3. The details about the data collection are discussed in Chapter 3. Pseudonyms were used to represent both cases with the intention of preserving the anonymity and confidentiality of the organisations and participants in particular. According to Allen and Wiles (2016), the use of pseudonyms and false names to preserve anonymity and confidentiality is an ethical requirement of research.

In this study, 13 and 16 people, until the points of saturation, were interviewed at Broad Spectrum and Triumph Technologies, respectively. The interviewees were labelled for identification purposes and to protect the identity of the interviewees, as this falls under the organisations' and the university's (CPUT) code of ethical conduct. At Broad Spectrum, the

interviewees were labelled from BS01 to BS13, while those at Triumph Technologies were labelled TT01 to TT16. In addition, the labels commonly referred to as 'code' ease the analysis in terms of citation from the data. This is an example of how the codes were used for citations: BS01, 35:17-19 means the text was extracted from Participant number 1; on page 35 of the document containing the data; and line 17 to 19 of the page.

Table 5.1: Demographics of Interviewees

Case	Unit	Job Title	Number
Broad Spectrum (BB)	IT	Chief Technology Officer (CTO)	1
		IT Network and Server Administrator	1
		IT Application Support Analyst	1
		Network Operations Centre (NOC) Senior Manager	1
		IT Infrastructure Manager	1
		IT Manager	1
		SHEQ Manager	1
		IT Systems Design Specialist	1
	Business	Enterprise Architect	1
		Human Resources Manager	1
		Legal Advisor	1
		Public Relations Officer	1
		Project Coordinator	1
Triumph Technologies (TT)	IT	Chief Information Officer (CIO) South Africa	1
		Manager Infrastructure	1
		Manager Application Engineering	1
		IT Service Manager	1
		IT Project Manager	1
		Support Engineer	1
		Lead Engineer	1
	Business	Manager Legal Services	1
		Project Manager	1
		Chief Financial Officer	1
		Director Enterprise Business	1
		Director Consumer Business	1
		Administrative Clerk	1
		Training and Development Manager	1
		Human Resources Business Partner	1
		Human Resources Manager	1
Total			**29**

In addition to the data gathered from semi-structured interviews, related documents were collected and these were also carefully labelled. An example is BS DOC-01, p57:35-36 indicating that the material is the first document from the Broad Spectrum organisation; it is page 57 in the document; and it is on line number 35 to 36.

As stated in Chapters 1 and 3, ST was employed as a lens to guide the data analysis. ST was applied to examine the diffusion of technologies. As the main focus of this study, it is critically important to: (i) identify and establish the agents that are involved in the diffusion; and (ii) who the technology impacts; and (iii) how it impacts the diffusion. It is for these reasons that ST was applied.

The duality of structure from the perspective of ST was used to guide analysis of data towards achieving the objectives: firstly, establishing the factors that influence agent and structure to implementation, leading to the operationalising of IT strategy; and secondly, examining the significance for agents to operationalise IT strategy in their organisations. This includes the influencing factors as well as implications.

5.3 Structuration theory

ST has two main tenets: agents and structure (Iverson, Robinson, & Venette, 2017). According to Klesel et al. (2015), an inseparable dual relationship exists between the agents and structure. Thus, Giddens (1984) refers to the dual relationship and interactions between agents and structure as duality of structure, a theory discussed comprehensively in Chapter 2.

The duality of structure, presented in Figure 5.1 below, signifies the dimensions of the dual relationship between agent and structure. Giddens classified three dimensions of structure, namely signification, domination and legitimation, as shown in Figure 5.1. The three modalities (i.e. interpretive scheme, facility and norm) in the middle row act as mediators between structure and interaction, respectively.
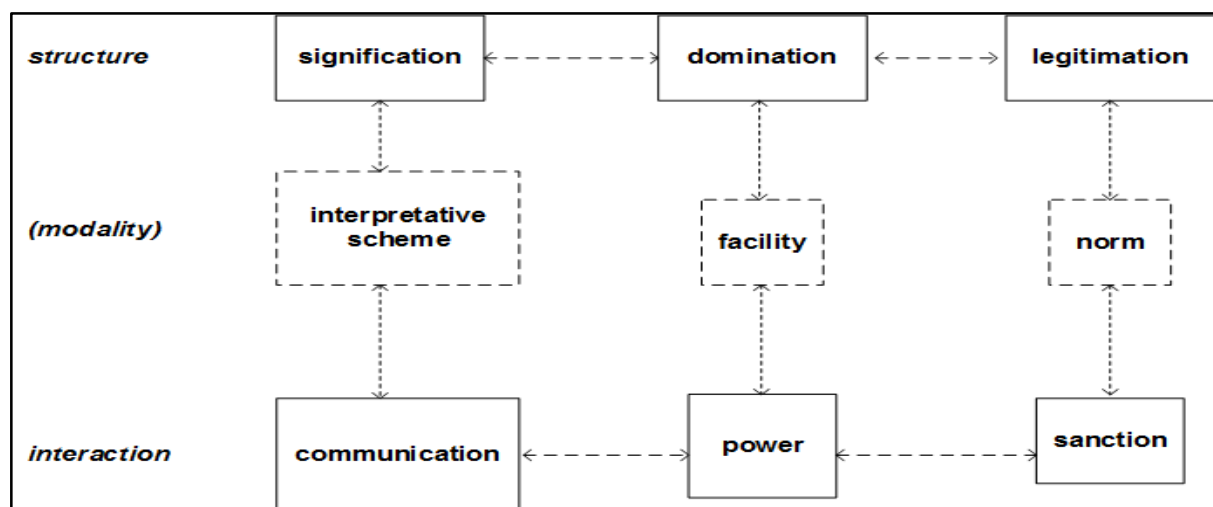
Figure 5.13: Dimensions of the duality of structure (Source: Giddens, 1984:29)

5.4 Data analysis

The analysis was conducted on the data gathered from the two cases, Broad Spectrum and Triumph Technologies, which were the cases in the study. The analysis was conducted on a case-by-case basis, as presented in sections 5.3.1 and 5.3.2.

5.4.1 Broad Spectrum: structuration view

As presented in Chapter 3, Broad Spectrum, a public telecommunication organisation based in Johannesburg, South Africa, is one of two organisations used as cases in this research. Data from the organisation was analysed by a hermeneutic approach from the interpretive stance, as discussed in Chapter 3. The analysis was guided by structuration theory as a lens as follows:

i.   Identification of the agents;

ii.   Identification of structure in the context of operationalisation of IT strategy in the organisation; and

iii. Through duality of structure, examination of how interaction was carried out within rules, using available resources, in the reproduction of events, processes and activities, in operationalising the IT strategy.

Agents

In structuration, agents are technical (such as technologies) and non-technical (such as people) (Giddens, 1984). Some of the agents involved in the operationalisation of IT strategy at Broad Spectrum (BS) are tabulated in Table 5.1 below.

Table 5.2: Agents at Broad Spectrum

Agents		
Technical	IT systems	Systems or applications used by the business units
	Software	Used by the technology specialist for technical functions, such as operating systems
	Hardware	Physical technology artefacts such as personal computers and servers
	Network and telecommunication	This included switches, routers, Wi-Fi, transmitters and fibre
Non-Technical	**IT Staff**	
	Chief Technology Officer (CTO)	Accountable and responsible for the IT strategy, business and IT strategy alignment; lead IT staff, including IT specialists, IT managers and IT senior manager governs the technical agents
	IT Network and Server Administrator	IT specialist, maintain IT systems, software and hardware and support the business users
	IT Application Support Analyst	IT specialist, manage IT systems, software and hardware and support the business users.
	Senior Manager Network Operations Centre (NOC)	Responsible for monitoring and supporting telecommunication services
	IT Network Engineer	IT specialist, maintain and support the network.
	IT Infrastructure manager	Responsible for network and telecommunication services maintenance and support
	IT Manager	Leads the IT specialists and preside over IT systems, software and hardware
	Project Coordinator	One of the business users involved project portfolio programme in the IT division
	Business Users	
	Chief Executive Officer (CEO)	Known as chief executive (CE) leading the organisation, including the IT division and other business units. Accountable and responsible for overall organisational strategy, including the IT strategy
	Human Resources Manager	User in the human resources at Broad Spectrum
	Enterprise Architect	Business user in the enterprise architecture division of the organisation
	Legal Advisor	Participant in the legal division in the organisation
	Public Relations Officer	Business user from the marketing and communications division

Table 5.1 categorised technical agents into IT systems, hardware, software and network and telecommunication. These technical agents are the instruments employed by the non-technical to operationalise the IT strategy. Likewise, the non-technical agents were divided into two types: IT staff and business users. The IT staff implement the IT strategy, thereby maintaining and supporting the technical agents for the business users and thereby operationalising the IT strategy.

The chief executive officer (CEO) provides strategic vision and operational leadership to the organisation, ensuring goals and objectives are achieved. IT staff is led by the chief technology officer (CTO) who is responsible to provide IT leadership and accountable for all IT functions. Structures were in place to ensure the IT strategy is operationalised.

Structure

In structuration theory, structure is defined as rules and resources as opposed to its literal meaning in English language (Iyamu & Roode, 2010). Table 5.3 presents the existing structure that relates to operationalisation of the IT strategy at BS, at the time of this study.

Table 5.3: Structure at Broad Spectrum

Structure			
	IT Policies	**Descriptions**	
Rules	Electronic mail policy	Outlines the requirements for Broad Spectrum email system and makes users aware of what is acceptable and unacceptable use of its email system	
	Internet policy	Defines the appropriate uses of the internet by Broad Spectrum employees	
	Laptop policy	Provides rules for the use of notebook or laptop use by employees as a work tool	
	Telephone usage policy	Sets out general rules for the appropriate use of telephones at Broad Spectrum	
	Cyber-security policy	Outlines guidelines and requirements for protecting the security of the organisation's data and technology infrastructure	
	IT security policy	Defines security controls to safeguard IT systems and ensure the security, confidentiality, availability and integrity of information	
	Service Level Agreement (SLA)	Provides IT related service IT to organisation, in place between IT department and IT service providers	
	Sources	**Description**	
Resources	IT specialists	IT personnel such as IT network and administrator and IT application support analyst at Broad Spectrum	
	Business users and managers	Project managers, business analysts, human resource practitioners, legal advisors and others in the organisation	
	Processes	Procedures and activities used in the organisation to operationalise the IT strategy	

At Broad Spectrum, as indicated in Table 5.2, rules are IT policies employed to operationalise the IT strategy. IT policies focus on strategic use and management of artefacts, processes and activities such as electronic mail (email), internet, laptop, telephone, cyber-security and IT security policies. These IT policies constrain the people within the organisation to

operationalise the processes and technologies. Similar to rules, resources are categories such as IT specialists, business users and processes. Both rules and resources were instrumental in establishing IT strategy and the operationalisation of it.

Data analysis focused on the roles agents and structure performed in operationalising the IT strategy in the organisation. Agents used rules and resources to operationalise the IT strategy. The rules and resources enabled and constrained agents who produced and reproduced structure. Therefore, duality of structure demonstrates the dual relationship between agents and structure.

Duality of structure

In accordance with the overview section above, duality of structure was established as a lens to guide the analysis of data. Thus, the summary of the analysis is presented in Table 5.4 The discussion that follows should be read with the Table to gain better understanding of the data analysis.

Table 5.4: Summarised analysis

	Signification	**Domination**	**Legitimation**
Structure	At the organisation, the IT strategy and its operationalisation were considered significant by some of the employees. This was informed and influenced by various factors such as processes, communication, technologies and people.	Due to its relevance and importance, majority of the IT personnel focused on how to operationalise the IT strategy at the organisation. Also, there were the focal persons who were driving the effort, making both operationalisation of the IT strategy and the focal persons dominant. As a result, skills and competencies were critically important, which some employees used as a source of empowerment and dominance.	In carrying the activities of the IT strategy at the organisation out, there was governance (rules, policies, regulations and standards), which make employees' actions legitimate. Also, governance was executed along organisational hierarchy.
	Interpretive scheme	**Facility**	**Norm**
Modality	Operationalisation of the IT strategy enabled and at the same time constrained business processes, events and activities at Broad Spectrum. This was	In operationalising the IT strategy at Broad Spectrum, various types of technologies (systems and devices) were used for different purposes, from enabling and	There were processes through which the IT strategy was operationalised in the organisation. This includes roles, responsibilities, skills

	based on the distinct views and understanding of the implementers of the IT strategy.	constraining perspectives. For example, a central repository was used to store and share documents. This enabled an environment where company information was secured and safeguarded.	and competencies. The IT managers were trained on the implementation of the processes.
	Communication	**Power**	**Sanction**
Interaction	At the organisation, various ways and means such as meetings, workshops and training were used to share information about IT strategy and it can be operationalised. The CTO and IT managers were responsible and accountable for sharing the information to the stakeholders, which include IT personnel, business users and management.	Authoritative bestowed on the various roles allowed some employees, particularly the manager to control how the IT strategy should be operationalised in the organisation. This type of control reduced interest and contributions from some of the employees, where power played a part.	Employees adhered to instructions in operationalising the IT strategy based on their contractual agreement with the organisation. The instructions followed a hierarchical order, which means that employees were primarily accountable to their line managers.

Signification/Interpretive scheme/Communication

At Broad Spectrum (BS), IT strategy was concerned with current and future use and management of computing artefacts to purposely advance organisational competitiveness, sustainability and efficiency. The entire organisation relied increasingly on the IT strategy. The concept of IT strategy was therefore considered significant at the organisation. Two fundamental factors were associated with the IT unit at the organisation: significance of the IT strategy and significance of the operationalisation of this strategy.

The employees considered IT strategy based on their roles and responsibilities; or the activities that technological artefacts enabled or constrained when carrying out their tasks. Through participation in the activities related to the IT strategy, some employees felt empowered. As a result, this group of employees considered the concept important. This assessment was for both personal gain as well organisational benefit. Some of the personal benefits include empowerment, skill development and incentive. On the organisational front, aims and objectives were being achieved. From a user perspective, one of the participants briefly

explains how one of the deliverables of the IT strategy was operationalised to enable employees:

> *Many business users used to struggle in finding personal or organisational electronic documents until a document management system was implemented. The system makes it easy to manage projects, assigning activities and store our company documents* (BS02, 6:249-253).

This renders operationalisation of the IT strategy critical at BS. The emphasis on operationalisation of the concept increased pressure on IT managers to ensure that highly skilled and competent personnel are involved in its deliverables. Operationalisation was important because of the advancements it brought to the organisation.

One of the objectives of operationalising the IT strategy was to improve the activities and processes of the environment, including oversight about IT solutions to the business, which led to the creation of a committee. The IT oversight committee focuses on governance, including policies, standards and principles. Through this committee, laptop and security policies were formulated and promulgated as dictated by the IT strategy. In the process of operationalising the IT strategy, the IT oversight committee ensures specifications for hardware and software and others solutions aligned to the organisation's system architectural standards.

The laptop policy safeguarded company tools, while the IT security policy controlled and safeguarded IT systems, ensuring the security, confidentiality, availability and integrity of information within the organisation. One of the respondents expressed her view as follows:

> *The IT oversight committee helped to put IT policies in place, which we tried*
> *to introduce in the past with no success. These IT policies were either not*
> *there or unknown to us. IT created these IT policies and kept them to*
> *themselves and no one knew about them* (BS12, 57:2502-2505).

Some of the critical advancements that manifest from operationalising the IT strategy were the deployment of a repository system and virtualisation. These advancements reduced the complexities within the BS environment. In the past, organisational documents and other artefacts were scattered throughout the environment. The repository system enables centralisation of documentation and artefacts, which allows ease of storage, access, use and

management. The repository system also enables improved security and business continuity. A respondent shared his view:

> *We deployed the SharePoint system, which is a repository tool. With the SharePoint system, everyone in the organisation can access and make use of documentations electronically. Through this system we have been able to improve workflows and enhance the management of documentations in the organisation* (BS05, 23:1010-1011).

There were many servers in the organisation; some were antiquated beyond their life span, occasionally malfunctioning during processing of business activities. Server manufacturers define life span as between 3-5 years. In addition, many of the servers were duplicates between business units, a result of business units not aligned and not interacting with each other. Through operationalisation of the IT strategy, these challenges were addressed by employing virtualisation.

Based on the concept of virtualisation, the number of existing servers in the environment was reduced. Many servers were discarded and replaced with newer ones with larger capacities. Virtualisation allows for the division of a single server into many compartments. A virtualised server allows the various compartments to host different systems and applications on one server, so virtualisation reduces complexity and tightens management of the environment for increased competitiveness. One of the employees expressed his view:

> *We have too many aged and malfunctioning servers in this organisation. Many of these servers have passed their life-span and are giving use problems. In instead of continuously buying additional servers, we are virtualising these servers* (BS11, 50:2177-2178).

However, some employees did not understand the IT strategy or how it can be operationalised in the organisation. This can be attributed to lack of interest, influenced by the communication, or lack thereof, certain groups of employees received. As a result, this group of employees resisted operationalisation of IT strategy in the organisation. This challenge was from both technical and non-technical perspectives, including people (employees), communication and process.

The challenge affected how innovations from IT strategy were conducted within the organisation. The resistance was based on the fact that some employees perceived new ideas and ways of performing their business activities and processes as a deterrence. An IT manager at the Broad Spectrum explained:

> …we had a situation where employees accustomed to the local area network (LAN) and manual ways to connect to the Wi-Fi, when it came to migrating to the automated way of connecting to Wi-Fi as defined by the IT strategy, some of the employees resisted its operation. The management had no choice but to force the employees to migrate (BS06, 32:1394-1395).

The significance associated with the IT strategy was based on individuals' interpretation of the concept. This means that not every employee regarded the IT strategy as significant. Even those employees who thought the concept significant did so from different viewpoints. Some of the employees associated the importance of IT strategy with alignment between IT and business units of the organisation. According to one of the participants:

> The IT strategy allows alignment between the IT and business units of the organisation, through which the business needs and activities are enabled and supported for competitive advantage (BS03, 11:449-450).

Notwithstanding the advancements introduced by operationalisation and the universal understanding of the IT strategy in the organisation, some employees still misinterpreted the concept. Furthermore, some employees were uncertain about the advanced operationalisation brought in the organisation. The misinterpretation and uncertainty of the IT strategy and its operationalisation resulted from unclear strategic goals that were only vaguely communicated to employees. Some of the interviewees expressed their concerns:

> As an organisation, we lack a coherent strategy, everybody should be able to understand and appreciate what is the overall vision that we are trying to implement (BS02, 6:274-275). Our communication should be much more aligned to what we are doing; the gap between strategy and implementation is a little too big (BS10, 47; 2052-2053).

Employees' interpretations and viewpoints about the IT strategy can be attributed to various factors such as the manner in which the concept was communicated. As elsewhere within the

organisation, communication was conducted verbally and through documentation (in writing). Occasionally, communication was through videos and presentations that entail visual and images for enhanced clarity. According to the CTO:

> *We have different ways through which we share information with the employees. We have regular meeting with employees who are involved with strategic change (implementation) activities. Also, we sometimes call general meetings of the branch, which we refer to as a 'town hall meeting'. The meeting is aimed at sharing the strategy intent about IT with the key stakeholders* (BS02, 9:403-406).

Some employees preferred to receive communication regarding IT strategy verbally, a method taking the form of face-to-face meetings and interactive workshops, giving employees the opportunity to participate in discussions regarding IT's strategic intents, and how the strategy can be operationalised. These meetings and workshops convey inclusiveness, which influences employees' decisions to support the technologies and processes implemented. One of the employees explained as follows:

> *We need to have workshops and people need to buy-in to ITs strategic intents. We need buy-in from managing executives. They must motivate their direct reports, including senior managers and lower level employees to attend workshops and implement the technologies that come from the IT strategy* (BS06, 30:1276-1278).

Some employees preferred communication about the IT strategy through documentation – including electronic mail (email) and presentations. This communication method affords the opportunity to read, re-read and reference with ease. Moreover, this method enables the employees to interpret the IT strategy at their convenience.

> *People are being migrated to a different system, and many of us would not know where how to operate the system. IT should send us a presentation that show if a certain feature used to be at a certain point, where to find it on the new tool* (BS10, 45:1943-1945).

Despite these inclusive approaches, with verbal and written documentation to communicate the activities of the IT strategy and its operationalisation, some employees still found it difficult

to interpret some of the relevant terminology (often referred to as 'IT jargon') in the IT strategy. Some employees were either uninterested or disregarded the documentation distributed to them individually or through workshops. Some of the participants stated:

> *IT will send a presentation with a lots of IT jargon to us. I would like to have input into these presentations and assist IT to communicate in simple English* (BS10, 45:1948-1949). *Communication forums where business requirements are discussed and approved are not being attended by business users. Business users' view these forums as unimportant, thus the SharePoint system will have the same outcome as the intranet of not being used* (BS10, 47: 2044-2047).

At BS, IT strategy and its operationalisation were given the utmost importance by the management, including employees. How employees interpreted the concept of IT strategy in the context of their organisation can be attributed to the respect afforded it. The interpretation of the concept was influenced by the ways in which the communication surrounding IT strategy and its operationalisation were carried out in the organisation. The approach encouraged interaction and negotiation among the stakeholders.

Domination/Facility/Power

Many employees at BS were cognizant of the importance of the IT strategy from both personal and organisational perspectives. Owing to the importance, which includes enabling competitiveness and sustainability, the IT strategy was discussed at the organisational level. The chief technical officer (CTO) presented the IT strategy and the progress of its operationalisation to the executive committees of the organisation, because the IT strategy was within his portfolio. In his role as owner, the CTO is responsible for ensuring the IT strategy is implemented through operationalising the artefacts for organisational solutions. The CTO explained:

> *I present the IT strategy at the higher level (Executive Committee) of the organisation. I explain that the formalisation of the new strategy stems from revising the current strategy and the problems the steering committee identified. Hence, the decision that a new strategy should be implemented* (BS02, 5:211-213).

The IT strategy relies on employees for its operationalisation, necessitating certain skills and competencies. Thus, some employees attended trainings, workshops and conferences to acquire these skills and competencies to empower them to participate in the operationalisation of the IT strategy within the organisation. In addition to the skills and competencies, infrastructures such as remote wireless connectivity were also needed to fulfil the objectives of operationalising the IT strategy at BS. Some employees shared their views:

> *We attend academic sessions, conferences or workshops. It is at these forums where we get to hear and learn about new things, new technologies and other solutions that serve as input into out IT strategy* (BS02, 5:182-183). *We attend training. I can't speak for all the departments but in our department, we were trained. We had about two sessions of training. In those sessions, we asked questions about the SharePoint system pertaining to its capabilities and features* (BS13, 66: 2284-2886).

At BS, several employees were privileged to be empowered through acquiring the relevant skills and competencies. Other employees were less privileged because they did not have such opportunities to acquire these skills and competencies. The employees who did not have the necessary skills did not participate in the operationalisation of the IT strategy at the organisation. By contrast, those who participated felt empowered, as they were relied upon during the course of operationalising the IT strategy. At times, some employees applied their additional skills and competencies as a source of power and dependency, which they used, whether consciously or unconsciously, to dominate their colleagues. Here, a demotivated employee at the organisation expressed her view:

> *I'm not using the SharePoint system, my IT colleagues arranged training for us, but did not attend it* (BS12, 59:2583-2594).

In fulfilling the IT strategy operationalisation objectives, the organisation provides facility in the form of infrastructure, including levels of access to systems as well as remote wireless connectivity. These infrastructures and this access enable employees to support the organisation's business processes and activities from anywhere, and at any time. This fosters business continuity, which in turn fosters sustainability and competitiveness.

The employees who had access to the facilities used this to monitor, control and coordinate the activities towards operationalisation of the IT strategy. Based on this accessibility, some

employees felt a sense of power, which intentionally or not, reproduced as they carried on with individual or group activities and events. This type of power or empowerment was domineering in the course of operationalising the IT strategy at the BS, as one of the employees explained:

> *We have so many different models that we use and these are industry standard models. If we implement a project, we use different methodologies, like PRINCE II. In the IT environment we are comply with ITIL and COBIT, this is across the organisation. We employ the best models and methodologies to implement of our IT strategy across the organisation* (BS09, 42: 1778-1781).

At BS, the empowerment employees enjoyed manifest into incentives that include job security and financial bonus. The incentives were designed to encourage employees to participate in the operationalisation of the IT strategy, while other employees who did not get these incentives were discouraged, responding with resistance to the idea of participating in the operationalisation of the IT strategy.

The challenge was that demotivated or discouraged employees contributed to the derailment of processes and activities in the operationalisation of the IT strategy. Some of the responses from this group of employees included defiance and the ignoring of instructions from those who had the authoritative power to control the IT strategy operationalised in the organisation. One of the employees stated:

> *I'm not using the SharePoint system; I even told the CEO I will not use it. My division is not using that SharePoint system to store information* (BS12, 52: 2576-2577).

At Broad Spectrum, employees were cognizant of the criticality of operationalising the IT strategy. Some employees assumed the authority that was bestowed upon them to exercise power in their participation of the IT activities at the organisation. This includes impressing their relevance, which was domineering within the environment. From another perspective, some employees did not have the facilities to contribute to the process, which derails some activities surrounding the operationalising IT strategy. So, in other words, at the organisation, some employees had power were bestowed on them through organisational hierarchy while others gained power through distinctive and useful skills.

Legitimation/Norm/Sanction

At BS, the IT strategy was a blueprint upon which the IT department and other units of the organisation relied to enable business processes, information flow and technology deployment. Reliance on the IT strategy was accentuated by the fact that many of the employees saw it as an enabler and support tool for competitiveness and sustainability. As a result, there was emphasis on the IT strategy, particularly in its operationalisation. Thus, the concept of IT strategy had to be approved and acknowledged through the organisational structure (hierarchy) which included the board of directors (BOD), the executive committee (ExCo), the IT oversight committee as well as the various user groups. One of the participants explained:

> *The IT oversight committee formulates policies with regard to implementing strategic activities. The policies govern processes and procedures of the various activities about the IT strategy. We implement a policy; make sure all the governance is in place and the accountable and responsibility is outlined* (BS09, 41:1731-1733).

The BOD was headed by a chairperson, while both ExCo and IT oversight committees were led by the chief executive officer (CEO). Members of the committees included the chief financial officer (CFO), group human resource, and chief technology officer (CTO), rendering committees powerful. This power was reflected in the allocation of resources and distribution of tasks.

The BOD follows a specific process in their approval of the organisation's IT strategy. The process includes a presentation by the promoters of the IT strategy, the executives of the organisation. Subsequent to its approval, the strategy had to be executed (operationalised) to achieve its objectives, to enable and perform business events, activities and processes. One of the components in the execution of the IT strategy is governance, which includes rules, policies, regulations and standards.

> *In our process of operationalising the IT strategy, governance is needed because it enables and allows us to have controls in all areas of activities. Governance entails enterprise risk management, adherence to legal framework, enabling assurance and internal audit, and compliance with the government legislation* (BS01, 01:77-79).

Because of its significant roles, governance was critical in operationalising the organisation's IT strategy. Within governance, the IT strategy was operationalised and distributed across the organisation, as the governance allowed the promoters of the strategy to define rules of engagement standards for various resources and employee roles and responsibilities in the operationalisation of IT strategy.

Everyone in the organisation is expected to follow the process as delineated by governance since governance components were approved by both technical and business users in the organisation thereby allowing employees to partake from different angles in the operationalisation of the IT strategy at BS.

The approval and authorisation of the IT strategy occurred at two main levels, organisational and IT departmental. This was the norm at the organisation; the process was sanctioned by the employees: at the organisational level, the BOD, ExCo and oversight committee are involved; at the IT department level, IT specialist groups, such as network and application engineers and T management, including IT managers and senior managers are involved.

At the time of this study, the BOD was the highest authority within the organisation, and as such, and in conjunction with the ExCo, provided oversight on the organisational strategy. This includes ensuring that governance was in place, providing strategic direction and monitoring of implementation progress. According to the Integrated Report 2016 of the organisation:

> *The Board of Directors is responsible for corporate governance and organisational strategy of the organisation and monitoring the organisation's progress* (BS DOC-01, p30).

The IT specialist groups, the main implementers of the IT strategy based on their responsibilities within the organisational hierarchy, took instructions directly from the ExCo in operationalising the IT strategy. This group of specialists make sure that the activities and actions relating to operationalising of the IT strategy were properly conducted following the policies, rules, regulations and standards. In addition, the IT management group was responsible for ensuring that the activities and actions implemented in the organisation were aligned to the IT strategy. The involvement of IT specialist groups and IT management designed a culture through which IT solutions were implemented as defined in the strategy. The CTO stated the approach:

> *At BS, we form a group or team that comprise of employees at various levels in the IT department. We have a team that manages various inputs on operational activities and gives input to a higher team, the IT management team. The IT Management ascertain from which business unit the operational activities emitted and establishes whether or not these activities are aligned to the IT strategy. We need to make sure that we are getting inputs from the field and from the people that are going to operationalise the IT strategy* (BS02, 5:190-195).

At BS, employees play a role in operationalising the IT strategy to approve the IT strategy and operationalisation of it. A number of employees resisted the activities and processes implemented to operationalise the IT strategy, while others supported and contributed to operationalisation by becoming change agents. The employees who resisted operationalisation of the IT strategy became detractors, as their actions (or inactions) disrupted the operationalising process at BS. Some employees, in fact, refused to participate in the operationalisation at all. One of the employees expressed her view:

> *The CTO told us the IT department is prohibiting us from saving company information on servers, it has to be on the SharePoint system. But I told the CEO it's going to be a problem unless I'm told in writing that I will not be held responsible if confidential information is lost. I'll upload the information on the SharePoint system, everybody in the organisation can do what they want with the information* (BS12, 59:2583-2587).

Even though governance was employed in the operationalisation of the IT strategy, there were identifiable challenges owing to the fact that some employees were resisting the rules and regulations in operationalising the IT strategy. It became clear that without governance the business events, activities and processes were hindered because some employees were not carrying out their responsibilities as defined by the IT strategy.

Employees and management at the organisation were well aware of the IT strategy and its operationalisation primarily because it followed authorised processes, legitimising the concept. The processes went through various stages, from the BOD to the specialist levels. The processes were intensive in that approval was required at each stage or level.

These processes became the norm at the organisation because the majority of the employees sanctioned them. Furthermore, processes were followed as a source of power for controlling the selection, implementation and use of IT solutions in the organisation.

5.4.2 Triumph Technologies: structuration view

As described in Chapter 4, Triumph Technologies is a multinational privately owned organisation in the telecommunication industry. The head office referred, to as 'headquarters' is in Asia and the regional office is situated in Johannesburg, South Africa. It is the second case of the two organisations that were studied. The data collected from the case was analysed with a hermeneutic approach from the interpretive paradigm, as discussed in Chapter 3. The analysis was guided by structuration theory as a lens by the following:

i.   Identifying agencies;

ii.   Identifying structure (rules and resources) from the perspective of the operationalisation of IT strategy at Triumph Technologies; and

iii. Through duality of structure, examining how rules and resources enable and constrain agencies to operationalise the IT strategy, producing and reproducing events, processes and activities in the organisation.

Agency

In structuration, Giddens (1984) refers to technical (including technologies) and non-technical (including people) artefacts as agency. Some of the agencies are involved in the operationalisation of IT strategy at Triumph Technologies (TT) are shown in Table 5.5.

Table 5.8: Agencies at Triumph Technologies

Agencies		
Technical	IT Proprietary Technologies	Programming languages, business intelligence tools, web services and development platforms used by the IT specialists, particularly application engineers to develop IT systems
	IT systems	Electronic flows (e-flows), mobile applications (apps), and tools and applications used by the business users and IT specialists
	IT Infrastructure	Includes laptops, printers, servers, switches
	Unified Communications	Such as network communication devices such as switches and routers, telephony devices and wireless connectivity devices

Agencies		
	IT specialists	
Non-Technical	Chief Information Officer (CIO) Southern Africa	Is the head of IT for the Southern Africa region, including South Africa. The CIO is the custodian and promoter of the IT strategy
	Chief Information Officer (CIO) South Africa	Is the leading the South Africa IT team, reporting to the CIO. The CTO is responsible for implementing and supporting the IT strategy
	Head of application engineering	Is responsible for developing IT systems development such as applications, mobile applications and electronic flows
	Head of Infrastructure	Oversees the IT infrastructure requirements and maintenance thereof
	Head of unified communications	Manages the networking and telephony devices and services
	Lead engineer	Designs the IT solutions, and oversees the IT development activities
	Technical director	Liaise with the business users, to understand their technological requirements
	IT service manager	Responsible for support and maintenance of the IT systems, IT proprietary technologies and hardware
	IT headquarters team	Provide remote supports and maintenance to the regions, in particular South Africa on the IT systems, IT proprietary technologies and hardware
	Business Users	
	Director enterprise business	Responsible for the operations of the enterprise business group manage and support solution marketing, sales and services in Southern Africa
	Chief Financial Officer	Oversees the finances of the organisation and users of the IT systems
	Director Carrier business	Lead the operations of the carrier business group managing and supporting solution marketing, sales and services in Southern Africa
	Project Manager	Implement infrastructure and networking projects
	Human Resources business partner	Providing human resources consulting services to the business groups in the organisation
	Human Resources Manager	Responsible for recruitment and talent management, and any other human resources matters
	Administration Clerk	Responsible for administrative activities such as supporting the staff in the office with stationary and scheduling meetings

Agencies at TT were divided into two categories: technical and non-technical. Technical agencies comprised proprietary technologies and IT systems. The proprietary technologies are programming languages, business intelligence tools, web services and development platforms integral to the organisation to develop and implement systems and innovations to operationalise the IT strategy.

The IT systems include the electronic flows (e-flows), mobile applications (apps), and tools and applications operationalised by the non-technical agencies to perform business activities, events and processes at Triumph Technologies.

At TT, the IT specialists and business users are the non-technical agents. Most of the non-technical agents, in particular, the IT specialists and IT management representatives such as the CIO, report into the international structures. Although the regional office has IT specialists, the headquarters IT support team based in Asia remotely supports the regional office in South Africa.

Structure

In structuration theory, rules and resources are identified as structure. Table 5.6 below represents the rules and resources identified at Triumph Technologies.

Table 5.6: Structure at Triumph Technologies

Structure		
	IT Policies	
Rules	Issue to Resolution (ITR)	This policy give assurance to business users that issues raised will resolved within the stipulated timelines
	Service Level Agreements (SLA)	Ensuring that IT services are provided as agreed
	IT Equipment Policy	Laptops, notebooks, telephony devices, video conference screens and others are supported, maintained and retired when reaching the life-span
Resources	IT & Business People	Includes IT and business people, and sub-contractors contracted to perform certain functions
	Processes	Different processes in the organisation to support the business operations such as business process outsourcing (BPO) and Lead to cash (LtoC) sales process

At the organisation, structure was classified under rules as IT policies, and resources were the IT and business people and the processes. These IT policies are the guidelines followed to operationalise the IT strategy.

These policies include Issue to Resolution (ITR), Service Level Agreements (SLA) and IT equipment policy. The ITR and SLA policies pertain to the measuring of services the IT unit provides the organisation. The IT equipment policy ensures that equipment such as laptops, servers and telephony adhere to predefined criteria.

Resources include IT and business people and processes. The IT people are IT specialists and IT management teams that implement and operationalise the IT strategy. The business people are non-IT employees who are participating in operationalising the IT strategy. Processes various from human resources, IT change management, IT incident logging and IT project management that are used by IT and business employees to perform business activities and actions.

Duality of structure

Similar to the first case above, duality of structure was used as a lens to guide the analysis of data. The analysis is summarised in Table 5.7.

Table 5.9: Triumph Technologies summarised analysis

	Signification	**Domination**	**Legitimation**
Structure	At the organisation, some employees considered the IT strategy and its operationalisation as very critical and significant in achieving efficiency and effectiveness. This consideration was based on factors, such as people, technologies processes, and continuous learning.	Owing to the IT strategy impacting business processes, activities and events, IT staff put emphasises on operationalising it. The IT staff where the main role players driving the implementation and operationalise the IT strategy. Due to their involvement as main role players, some were aware of the IT strategy and had the skills to operationalise it. Because knowledge and skills were critical, some employees used it to dominate the environment.	The organisation had rules, policies, processes, frameworks and controls that guided and managed carrying out of the IT strategy activities and actions that authorised some employees' actions and behaviour, legitimating it.
	Interpretive scheme	**Facility**	**Norm**
Modality	At Triumph Technologies, based on different views and interpretations from various employees across the organisation, the IT strategy and operationalisation of	In an effort to operationalise the IT strategy different resources (people) such as people in the headquarters in Asia were employed in various roles as enablers and at the	It was the organisational culture to that the people, processes and technologies involved and through which the IT strategy was operationalised were allocated and

	it, on the one hand, enabled and on the other hand constrained business activities, events, processes and policies.	same at time constrained some processes. An example is the remote support provided by the people in the headquarters. This constrained some business events, as they had to wait for assistance from someone who is based far and remote.	managed from a central point, the headquarters in Asia. This included skilled people, new processes and advanced technologies and training, roles, responsibilities.
Interaction	**Communication**	**Power**	**Sanction**
	Different means and ways were used to communicate, share knowledge and information about IT strategy and how it can be operationalised in the organisation. This included teleconference, video conference, meetings, workshops and electronic training. The Southern Africa CIO and the regional CIO were accountable and responsible to share information of both the IT strategy and operationalisation to the stakeholders, such as management, IT staff and business users.	The roles some employees occupy in the organisation delegate authority, in particular CIO and the heads of the different IT divisions to manage and control how to operationalise the IT strategy. This type of control, where power played a role, increases the interest and contribution from some of the employees, because they respect the authority bestowed on the person.	The work ethics and culture of some employees in the organisation was to adhere to instructions and go beyond the call of duty to operationalising the IT strategy. This was not only based on their employment agreement with the organisation, also on the work-centric and customer-centric attitude and believes.

The discussion below should be read with Table 5.7 to gain better understanding of the data analysis.

Signification/Interpretive scheme/Communication

In the organisation, the IT strategy was the roadmap defining what and how solutions should be deployed. This includes planning, IT systems development and management of telecommunication devices. In addition, through the IT strategy, synergy and consolidation of

artefacts and systems were carried out. From this viewpoint, some employees considered the IT strategy significant in that it simplifies the numerous activities that were carried out within the environment.

In operationalising the IT strategy, the consolidation approach reduced the numerous systems, some of which were redundant and others duplications. This ensures that the solutions selected and deployed were unified, enhancing consistency, standardisation, and reducing complexity, promoting efficiency and effectiveness, and advancing the organisation's competitiveness. One of the IT project managers explained:

> *Our IT strategy states hence forward if a new IT system is introduced, at least two old systems must be retired. That's our IT strategy as far as I know and it's valuable, because we have lesser IT systems and they are more efficient. We actually adhere to our IT strategy* (TT08, 43:1554-1557).

Another important aspect of the IT strategy was that its operationalisation enabled a seamless link between the branches of the organisation across the world, between the Asian and African continents. This enabled Triumph Technologies to achieve the organisational goals and objectives by reducing operational cost and increasing competitiveness. This was important to both the management of the organisation including some employees.

However, many employees did not fully grasp the significance of consolidating and unifying technology solutions in the organisation, as these employees thought it was fanciful, or nice to have. Others, however, understood the cost implications as well as the efficiency and effectiveness that such initiatives contribute to the environment. This diverse understanding was based on individual and group interpretation of the activities undertaken within the business units as enabled and supported by the IT unit through operationalisation of its strategy. The interpretation was influenced by communication.

In Triumph Technologies, electronic mail (email) and mobile electronics applications (apps) were the primary methods of communication. Video conferencing and teleconferencing were secondary methods of communication within the organisation, because both video conferencing and teleconferencing were often used for meetings and clarifications of subjects that had previously been communicated through the email. One of employees highlighted the following:

> *The IT unit will send us emails that inform us about new or updated technologies such as a new function or a new version of a system. We get information very often* (TT03, 15:531-532).

He continued:

> *The video conference is more effective. It's like face-to-face meetings, we can see people clearly. We can see people's facial expression and gestures and we can get more information than if it is only over voice* (TT03, 16:546-547).

Spoken language was a challenge during communication, whether management-to-employee or employee-to-employee. This critically influenced the interpretation of contents during operationalisation of the IT strategy within the organisation. Occasionally language had to be translated for other employees or stakeholders. In the process of language translation, some of the meanings or contexts are misconstrued. Some employees expressed their views as follow:

> *Our learning material is converted from an Asian language to English. We actually find a few issues after the translation process, this need to be improved* (TT10, 53:1973-1975). *Guidelines or materials which introduce IT system versions are normally in an Asian language. This is how HQ releases it; we in South Africa have to translate it to English for the business users to understand* (TT04, 23:832-833). *We have to engage our HQ team, The HQ teams are not fluent in English, and therefore communication becomes difficult* (TT02, 10:315-316).

Operationalisation of the IT strategy was influenced, enabled and constrained within Triumph Technologies by the significance associated to it. Moreover, interaction was of mixed feelings because some employees were privileged and others were not in terms of sharing organisational information. Thus, meanings which individuals and groups make of the technology solutions and artefacts affected the operations. In addition, communication was not always straightforward, which often influenced employee interpretations and the value they associated with the IT strategy.

Domination/Facility/Power

At TT, there were imbalances from various perspectives, such as allocation of tasks and information sharing. The imbalances enabled and sometimes constrained events, processes and activities, consciously or unconsciously. These were actions that reproduced themselves during the operationalisation of the IT strategy in the organisation.

During operationalisation of the IT strategy, various facilities were employed, including processes and spoken languages. The facilities were employed from two viewpoints, personal and organisational. At the organisational front, processes were followed in the operationalisation of the IT strategy towards achieving the goals and objectives of the organisation. From a personal perspective, some employees spoke in the language that friends among colleagues understood, excluding others from participating in discussions.

A South African language (Sesotho) and an Asian language (Hakka) were commonly spoken divisively to exclude colleagues from discussions. In addition, some employees having close or have personal relationships with their managers preferred to speak in the language only both understand instead of the generally accepted language of the environment, which was English at the time of this study. The use of the English language was mainly because they, the promoters, did not have a choice but to employ an inclusive approach for tasks to be carried out.

The reliance on a particular spoken language to exclude certain colleagues was at some point a hindrance to the operationalisation of the strategy. This was so because many of the interested employees, or those with the necessary skill-sets, found it difficult to participate in discussions, affecting their overall execution of tasks. This worsened as the exclusion approach was also practiced in formal meetings. A visibly frustrated employee articulated the following:

> *I asked myself why was I invited to the meeting, if Asian language was going to be used as medium of communication. Other attendees including the managers knew that I and other South Africans do not understand or speak Hakka. The question was, how was I supposed to understand and carry out the tasks that were allocated to me?* (TT07, 39:1388-1389).

Through the preferred spoken language, employees unconsciously created networks within the organisation, meaning that networks were formed along language lines. Consciously or

unconsciously, the networks regulated activities of the IT strategy during operationalisation. This was primarily because some of the employees were more loyal to their networks than the organisational objectives. Another reason for loyalty was attributed to the fact that some employees admitted to receiving more information from their networks than from the formal hierarchal structure within the organisation. An employee briefly shared his view as follows:

> *We all did not have the same level of privilege to information about the IT strategy and its operationalisation. Certain employees know more than others because of their access to important information which they gathered from close and trusted colleague, or the managers that rely on them* (TT16, 79:2880-2882).

In the operationalisation of the IT strategy, there were also factors of power at personal levels and from organisational hierarchical levels (positions). This factor caused imbalance in the organisation during the operationalisation of the IT strategy. At a personal level, the source of power came from knowledge, which some employees acquired through continuous learning and the privilege to information. One of the employees explained:

> *With time, I got to know more about my job, which include what it entails and how it should be carried out strategically. Only then, I actually realised the power that is associated with my position in the organisation* (TT10, 55:2059-2060).

Although there was power associated with knowledge, skills and understanding of the IT strategy and its operationalisation in the organisation, there was also power that bestowed on the positions. The HQ staff had power to approve or reject activities relating to the operationalisation of the IT strategy in the organisation. The HQ team includes the CIO and the IT specialists in Asia. Business initiatives were discussed with the HQ team who have the ultimate decision-making power. An IT specialist expressed his view as follows:

> *We discuss initiatives with our HQ team; they will approve the initiatives based on their strategic importance and its operationalisation* (TT02, 7:254-255).

It is clear that during the operationalisation of the IT strategy, there were imbalances, which means that some employees were dominant over their colleagues. This dominance was based

on levels of access to facilities that were sources of power. Power was enacted by the facilities, enabling and simultaneously constraining activities in the operations of the IT strategy.

Legitimation/Norm/Sanction

At Triumph Technologies, operationalisation of the IT strategy entails various activities through different processes, rules and regulations to fulfil organisational requirements, goals and objectives. These actions were assessed and deemed eligible for use within the organisation. Thereafter, actions were executed by humans using facilities such as technology solutions (devices), spoken language and face-to-face meetings to operationalise the IT strategy.

In operationalising the IT strategy, micro and macro approaches were employed at middle management and lower management, respectively. The different management approaches, micro and macro, were employed because of the hierarchical structured nature of the environment. The macro focuses on strategic intent, while the micro was operational. Thus, the approaches were purposely followed to enforce the different types of instructions, rules and regulations through the hierarchy, for different events and activities during operationalisation of the IT strategy.

At both micro and macro levels, long working hours (beyond the prescribed eight working hours) and late night meetings were held. Although some employees were initially not accustomed to this culture, with time, they became acclimated to this as it gradually became the norm as operationalisation of the IT strategy continued within the organisation. Few other actions, such the use of certain spoken languages for exclusivity, were also norm. This occurred even though they were consciously or unconsciously used to enable or constraint in one way or the other, the activities involved in the operationalising of the IT strategy. One of the participants stated the following:

> *The organisational culture is different compared to other organisations. We*
> *always have to report everything, we have to report where our whereabouts,*
> *what we doing, basically everything* (TT10, 63:1873-1874).

Even though the facilities were approved for organisational purposes, some of the actions that manifested were not entirely geared towards achieving the goals and objectives of the IT strategy. For example, Hakka was spoken for exclusivity purposes. Despite its negative connotation, it became a culture, a way of conducting the business of operationalising the IT

strategy, practiced over a period of time within the organisation. Some employees accepted this practice, not because they liked or agreed with it, but because they felt that had no choice.

This was because the senior organisational management sanctioned the practice. Management and even some employees sanctioned some of the actions, such as the long hours of meetings, meetings at late hours, and the use of the Hakka language for exclusivity. This was not because they wanted to, but because it facilitated productivity in the operationalisation of the IT strategy in the organisation. These actions were practiced, and eventually became the norm, mainly because they were first sanctioned by the management at the HQ, the decision-making authority in Asia. Some participants expressed their views as follows:

> *Headquarter (HQ) is in Asia. All our IT systems are coming from Asia. They have an IT department of more than three of four thousand people. All capabilities are based in Asia* (TT01, 2:45-46). *All activities are approved by HQ; for instance, once a project is completed we must load screenshots on the system. Even if we closed the project, we still need someone in HQ to approve the closeout of the project; everything is under HQ's con*trol (TT08, 42:1504-1506).

At Triumph Technologies, as an initiative to educate aspiring IT specialists to address the different spoken language imbalances, learning materials were presented. The intention of this initiative was to make operationalisation of IT strategy easier and more efficient, creating a culture of learning and inclusion. The learning culture was sanctioned by everyone who wanted to acquire skills and knowledge and participate in operationalising the IT strategy. The culture of learning encouraged employee awareness of the IT strategy, learning and understanding why and how to operationalise it. The HR manager explained:

> *We do an online course, then we take an examination; after we pass the examination, we operationalise the strategy. It a recognition that you are certified to operate the IT system* (TT13, 67:2502-2503).

In operationalising the IT strategy, many of the human actions as well as the technological solutions were reproductive. Even though the actions and technological solutions were eligible (legitimate) within the frame of the organisation, they were not always to promote organisational interest. In addition, some of the actions and activities that were considered as the norm were not generally agreed upon by the many of the employees. For example, only a

few of the employees agreed to the abnormal working hours to protect their jobs. The management sanctioned activities and actions intended for the benefit of the organisation, but with little regard for the consequences to the employee.

5.5 Summary

This chapter analysed the data collected from Broad Spectrum, case #1 and Triumph Technologies, case #2. The data was analysed employing duality of structure from the perspective of the structuration theory as lens. A summary of the data analyses was provided in Tables 5.5 and 5.6 for the respective cases, case #1 and case #2.

The results (findings) from the analysis are discussed in the next chapter. Also, the interpretation of the findings and a framework that was developed are discussed in Chapter 6.

CHAPTER SIX
INTERPRETATION OF THE FINDINGS AND FRAMEWORK

6.1 Introduction

This chapter presents the interpretation of the findings from the analysis as presented in Chapter 5. The chapter is divided into five main sections. Sections one and two discuss the findings from case #1, Broad Spectrum, and case #2, Triumph Technologies. In the third section, the findings from both cases are combined and mapped against each other, interpreted through the lens of the diffusion of innovation (DOI) theory. In section four, the framework is presented and discussed, thereby achieving the aim of the study. Lastly, a summary is presented to conclude the chapter.

6.2 Broad Spectrum: discussion of findings

From the analysis presented above, six factors were determined to influence the operationalisation of the IT strategy in Broad Spectrum (BS). As shown in Figure 6.1, the factors are as follows: problematisation; business and IT alignment; technological solutions; governance; power relationship; and skills and development. The figure below should be read with the discussion in mind to gain a better understanding of how the factors influence operationalisation of IT strategy in BS.
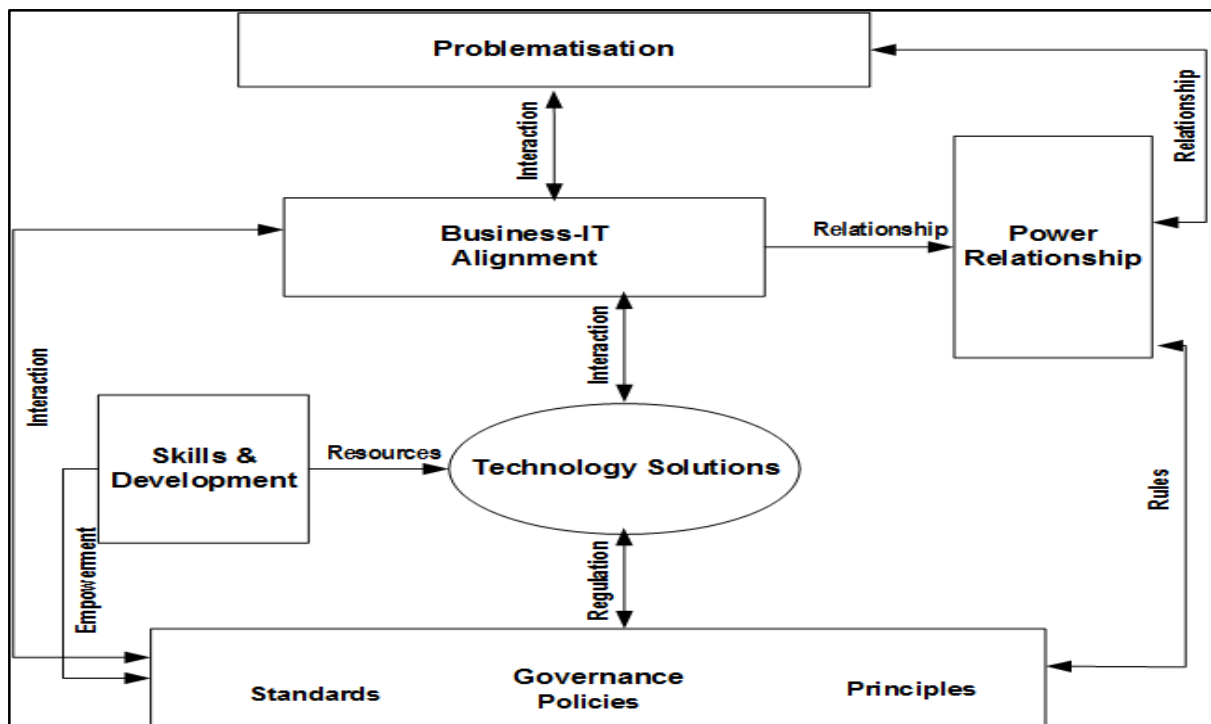

Figure 6.14: Factors influencing IT strategy operationalisation at Broad Spectrum

As shown in Figure 6.1, the factors are interconnected meaning that the factors shape and are shaped by others. Thus, by implication, the factors enable and constrain each other in the operationalising process of IT strategy in the organisation.

6.2.1 Levels of problematisation

Problematisation is a stage in the process of translation, of event, activity or episode, in which solution can be proposed (Silvis & Alexander, 2014). Problematisation refers to the stage where the focal actor outlines the nature of a problem, allowing the other actors to identify it as a problem requiring a solution (Callon 1986). Iyamu (2015) argues that this moment occurs when powerful actors identify and define real world issues. According to Heeks and Stanforth (2015), the process of problematisation allows the focal actor to convince other actors to accept the problematised item.

In order for the IT strategy to be operationalised in the organisation, the concept was presented at various levels in efforts towards a successful solution. In the process, a deeper understanding is gained by the stakeholders, particularly those who are not IT personnel. This process happens at three main levels: management, business users and IT specialists. At the management levels, approval is sought from the BOD, ExCo and oversight committee. Business users are required to contribute an indirect approval of operationalisation activities. At the third level, the IT specialists accept tasks that are allocated to them as an indication of approval based on an understating.

The level approach of problematisation, promoting inclusiveness, a primary factor for buy-in, allows people to interact and translate the content of the IT strategy and operationalisation plan into their own understanding. The interaction clarifies meaning that individuals associate with content and tasks and movement towards a common goal and purpose. This inclusiveness, as well as the understanding gained by both the business personnel and IT specialists at problematisation stage, promotes alignment.

6.2.2 Business-IT alignment

Alignment between business and IT is an appropriate and timely factor in achieving business strategic goals and objectives (van de Wetering, 2016). Kearns and Lederer (2003) argue that through alignment, dialogue between business and IT managers identify implementation responsibilities. According to Kearns and Sabherwal (2006), alignment between business and IT has accentuated organisational value for many years. The concept of business and IT

alignment is not new; its effect has been explicitly examined in prior studies (Wagner & Meshtaf, 2016).

There had to be a certain level of alignment between the business and IT units in operationalising the IT strategy in the organisation. There was interaction between the units, fostering alignment during the operationalisation of the IT strategy. The interaction also enabled the oversight committee, instrumental to the alignment that was formed between the business and IT units.

Through the alignment, individuals from both business and IT units were able to establish relations, easing collaboration in the course of operationalising the IT strategy in the organisation. The specialists and the business users were able to interact, collaborate, and share notes and ideas pertaining to solutions that were defined in the IT strategy. In addition, the alignment clarifies understanding about roles and responsibilities, including task allocations, in operationalising the IT strategy. Due to this beneficial alignment, individual resistance to certain processes of IT strategy operationalisation was minimised. Otherwise, IT experts would have had struggled even more in operationalising the IT strategy, which dictates several technological solutions for the entire organisation.

6.2.3 Technology solutions

Technological solutions refer to new tools to enable activities, management events and gain knowledge (Tidd & Bessant, 2018). Technological solutions, evolving over time and space, cover the changing needs of an organisation and its users (García-Holgado & García-Peñalvo, 2017). As technological solutions are insufficient in themselves (Welford, 2016), they are limited in what they can deliver in an organisation (Tidd & Bessant, 2018).

Technology solutions include hardware and software used in operationalising the IT strategy in the organisation. Hardware includes the physical infrastructure and other artefacts such as servers, routers, switches, laptops, desktops and printers. Software includes operating systems and business applications for management processes and activities such as human resources, financial, sales and supply chain. While the hardware supports the software, the hardware operates under the control of software and is unworkable without it.

Operationalisation of the IT strategy is achieved through the deployment of technology solutions within the organisation. The IT strategy defines and categorises the technology solutions for deployment across the organisation. However, the solutions did not exist and

operate by themselves; human skills must be coupled with the solutions for effective operationalisation. The IT unit was also empowered to develop applications, enhancing and supporting the applications and systems within the organisation. Interaction through business-IT alignment with technology solutions further enables organisational goals. Moreover, the deployment of technology solutions requires regulation through governance to ensure appropriate use and management for best organisational purposes.

6.2.4 Governance

Governance consists of control, management and planning processes, including principles, procedures, policies and standards (Selig, 2018). Batyashe and Iyamu (2016) argue that IT governance sustains business objectives and mitigates against risks through regulations and compliance. According to Joshi et al. (2018), IT governance stimulates responsibility, accountability and transparency, primarily to strengthen operational capabilities and ultimately, competitiveness.

To operationalise IT strategy, the organisation employs standards, principles and policies in the selection, implementation, use and management of the various technology solutions. Thus, the organisation implemented different standards in addressing various diverse operations and events across the organisation, standards and principles that were proprietary, or bespoke, befitting the unique organisational requirements. The proprietary standards implemented eased operationalisation. The deployment of the technological solutions, though, assumed associated risks and vulnerabilities. Policies were formulated to manage and mitigate risks such as cyber security and data loss that could potentially affect solutions, including servers, personal computers (laptops and desktops), network and electronic mail.

The concept of governance empowered certain employees in carrying out their tasks, roles and responsibilities that would have likely been impossible previously because of resistance within the organisation. This is primarily because governance was established as organisational rules and regulations, furthering to operationalise the IT strategy across the organisation from both business and IT perspectives.

6.2.5 Power relationship

Individuals and groups take advantage of power bestowed upon them to draw, establish and maintain relationships with others through interactions (Moloi & Iyamu, 2013). Nandhakumar and Jones (1997) suggest that power can be regarded as a relationship rather than a property

of individuals, and can be used as either an enabler or constraint on human actions and interactions. Anderson, John and Keltner (2012) argue that power shapes individual behaviour in that it instils an elevated sense of ability and righteousness in them.

As power was injection into the organisational structure and hierarchy, some employees relied on this to execute their roles and responsibilities in operationalising the IT strategy. Power associated with distinct positions defines the types of employee relationships and influences interactions in the course of IT operationalisation. The relationship that manifests from power enabled and constrained processes, activities and events in the operationalisation of IT strategy in the organisation, meaning that 'power relationships' resulted in employees resisting operationalisation because they were at liberty to act and behave at will.

In addition, power relationships influenced employee interactions at a variety of levels of business and IT units in the organisation. The interactions also influenced activities during problematisation of the IT strategy operationalisation. Consequently, the interactions affected the operationalisation of the IT strategy. In addition, relationships also influenced employee skills development.

6.2.6 Skills development

Technical skills, developed to provide attractive interface and maintain user interest (Nandhakumar & Jones, 1997), are opportunities for new knowledge acquisition as they stimulate and provide responsive solutions (Adams et al., 2016), and for learning about the ecosystems (García-Holgado, & García-Peñalvo, 2017). According to Batyashe and Iyamu (2016), the selection, implementation and use of IT solutions depend significantly on skills. In Van Greenberger and De Haes' (2018) explanation, skills are high on the requirement list for the innovation and transformation of solutions, as skill sets are based on knowledge which must be developed and reworked continuously (Batyashe & Iyamu, 2016).

Skills were acquired through training programs and attendance at business and academic conferences. The IT specialists acquired technical skills to manage and support new innovations. IT specialists used the knowledge acquired to operationalise the IT strategy by providing technical support to the business users. Business users were trained on the functionalities and features of the innovations that were implemented. This knowledge equipped business users to perform business activities and processes efficiently. The development and enhancement of skill were achieved through knowledge sharing and

workshop sessions promoted within the organisation as being skilled equipped and empowered business and IT units to operationalise the IT strategy.

Based on the skills and development initiatives, business and IT units were able to operationalise the technological solutions. Meanwhile, the units in the organisation developed policies, standards and principles to coincide with the operationalisation of the IT strategy pertaining to regulations.

Problematisation through interactions secured alignment between business and IT units in the organisation, alignment which manifested into development and implementation of technological solutions as defined by the operationalisation. Governance was employed in the deployment of technological solutions to ensure that the policies, standards and principles managed, controlled and mitigated against risks. However, as power relationships stirred resistance to operationalise, skills and development were introduced to diminish the resistance.

6.3   Triumph Technologies: discussion of findings

Six factors were identified from the analysis that enabled and simultaneously constrained the operationalisation of the IT strategy at Triumph Technologies (TT):   hierarchical consciousness; technology solutions; network of people; training and skill-set; exclusivity vs inclusivity; and language differentiation (Figure 6.2). The figure needs to be perused with the discussion in mind to ascertain exactly how the factors shape IT strategy and its operationalisation.
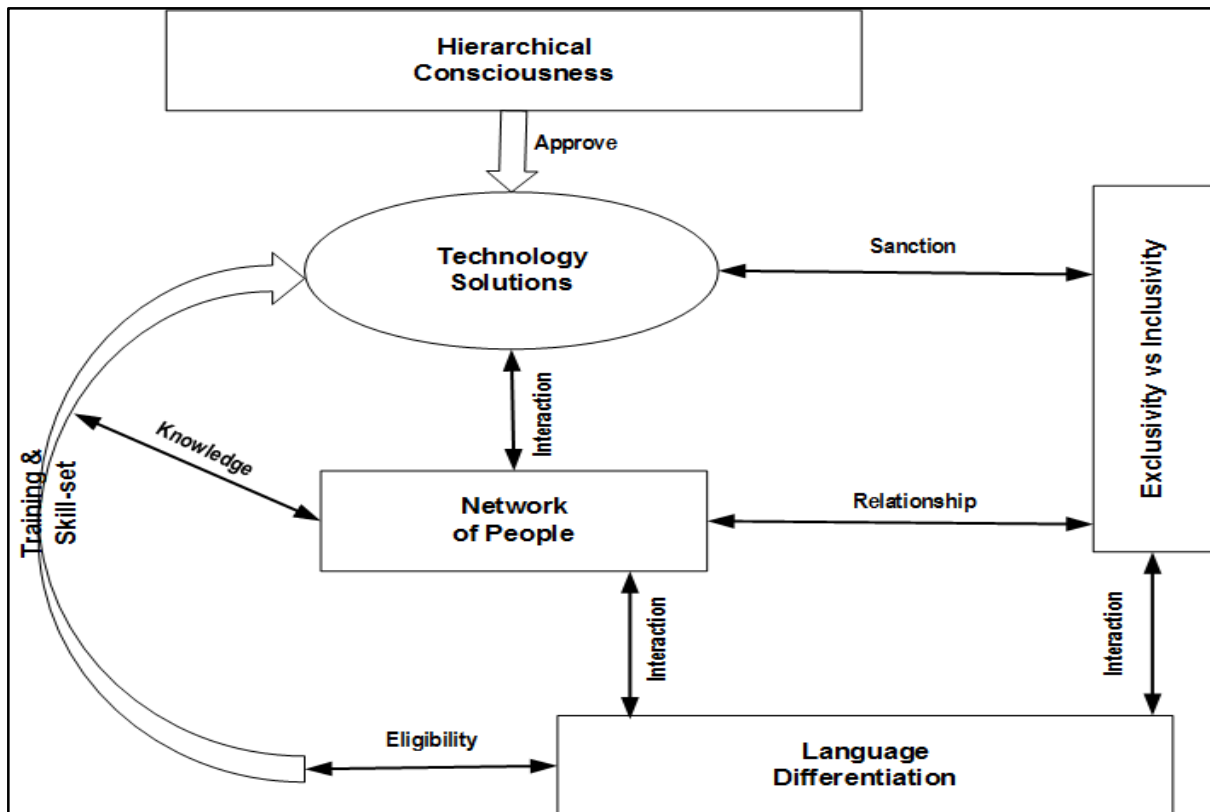
Figure 6.15: Factors affecting IT strategy operationalisation at Triumph Technologies

The factors presented in Figure 6.2 are interrelated. Thus, the factors influence and are being influenced by others. In other words, these factors enable and constrain each other during the IT strategy operationalisation process at Triumph Technologies.

6.3.1 Hierarchical consciousness

Hierarchical levels are necessary in an environment to steer information appropriately (Rekimoto & Green, 1993), such as IT strategy solution. Keller (2014) suggests that processing information or tasks that involve many behavioural options require consciousness. This is to avoid potential disintegration of solutions such as the operationalisation of the IT strategy within an environment. Mudrik, Faivre and Koch (2014) explain that consciousness can play a role in enabling tasks within and environment. Rekimoto and Green (1993) argue that some users often lose consciousness of their tasks as they navigate within hierarchy. But successful integration of artefacts or solutions requires clear consciousness of the people that are involved (Mudrik et al., 2014).

At Triumph Technologies, adherence to organisational structure was considered an important influencing factor in operationalising the IT strategy in the organisation. During the

operationalising of IT solutions, approval was sought from senior management and structures in Asia, a practice accepted by both IT specialists and business users, irrespective of whether or not they agreed with the strategy and its processes. This enabled smoothness of the processes and various activities as well as employee inclusiveness in the operationalisation of the IT strategy. Additionally, the approval of the strategy ensures that the solutions operationalised are in alignment with the organisation's universal strategy.

As organisational structure allows strategy and its process to circumvent duplication of IT solutions, promoters of the IT strategy verified and validated each innovation with senior management. The verification and validation processes occurred by way of interaction among stakeholders involved in operationalising the strategy. Without approval through the organisational structures, activities and events involving operationalisation would potentially be delayed, with some activities even facing termination or rejection. Thus, IT specialists and business users were intentionally conscious, aware of the significance of the organisational structures in carrying out their responsibilities related to the operationalisation of the IT strategy.

6.3.2 Technology solutions

Technological solutions refer to information systems and technological tools or artefacts used to enable and support activities (Adams, 2016). IT strategy defines the solutions and arranges them in priority perspective for more efficient organisational use. This evolves over time, gradually addressing the changing needs of an organisation (García-Holgado & García-Peñalvo, 2017). Technological solutions do not operate in and of themselves, but require human expertise (Welford, 2016).

Technology solutions were defined by the IT strategy, including standard deployment, management and use of the solutions for best organisational purposes. The IT systems, IT infrastructures and telecommunication devices were the main aspects of the IT strategy, with IT systems involving mobile applications, applications, electronic flows (e-flows) and tools. At Triumph Technologies, IT infrastructures consist of servers, laptops, desktops and notebooks used by the employees to manage processes and activities. Telecommunication devices were employed for teleconference and videoconference meetings with the headquarters and other branches globally.

The IT strategy was operationalised to enable deployment of the technology solutions, with the intent of improving organisational efficiencies. During operationalisation of the technology

solutions, processes and activities were managed attentively to ensure appropriateness and suitability in accordance with organisational purposes. This was because technology solutions both influence and are influenced by other factors such as hierarchical consciousness, skill-sets and networks of people (Figure 6.2). The process of operationalisation required legitimisation that happens through hierarchical consciousness of management. Also required were appropriate skill-sets and the deliberate involvement of various personnel. Above all, interaction and relationships among stakeholders were of critical importance.

6.3.3 Network of people

Network of people refers to conscious or unconscious groupings of employees within an organisation. According to Lin and Lu (2011), people engage in networks for various purposes, both personal and organisational. Mkhomazi and Iyamu (2014) explain how the interaction that occurs within networks of people influence technology deployment within an organisation. The success or failure of operationalisation of IT strategy can be influenced by the interactions and actions within networks of people. Del Giudice, Caputo and Evangelista (2016) argue that in recent years, traditional hierarchical approaches are struggling against challenges of an emerging relational set-up in which decisions cannot be imposed but must emerge from the interactions among actors.

Alignment of various agencies played a significant role in operationalising the technology solutions as the agencies formed a homogenous network of people, consciously or unconsciously, intended to achieve business objectives of the organisation. The networks, formed based on spoken languages, skills and competencies, were enabling as well as constraining in the operations of personnel. From the enabling front through the networks, deliverables were fostered, primarily because employees were either acquaintances or friends, and based on strength of relationships, they offered various levels of support to each other. From the constraining perspective, collaboration between various networks were challenging because of factors such as language differences, which, while including some, often excluded others.

In the operationalisation of IT strategy, it is important that the different networks of people involved have not only the skill-set and understanding of various processes but work collaboratively with one another to achieve organisational business objectives. Thus, skill-sets and collaboration of various people were significant in operationalising the IT strategy. Skill-set deficiencies and lack of training surrounding various processes involved in operationalisation meant inefficiency and ineffectiveness of the IT strategy.

6.3.4   Training and skill-set

The roles of employees are not as easily ascertained as believed; otherwise, the operationalisation of technology solutions will be even more complex due to human actions (Mkhomazi & Iyamu, 2014). The different standards and levels of employee actions, based on knowledge and skill, determine the success of activities within an environment (Del Giudice et al., 2016) so it is critical that organisations involve employees with the right of skill-sets as that is critical for competitive advantage (Noe et al., 2017). Thus, it is essential to train and develop employees appropriately about operationalising the IT strategy in the organisation.

Training and development meant that employees in the organisation were equipped with vital knowledge and skills for understanding the processes and activities involved in operationalising technological solutions as defined by the IT strategy. Training and development were often conducted through different methods and mediums such as electronic learning (e-learning), which gave employees the convenience of accessing training material and course participation in the operations of the IT strategy in the organisation. The training enabled some of the employees to carry out their responsibilities from anywhere, and at any time, through their mobile devices.

Through training and development, knowledge about the technology solutions was acquired. Therefore, networks of people had the capabilities and knowledge to operationalise the IT strategy. The importance of training and development during operationalisation was for the network of people to generate a common understanding about the processes and activities when interacting during operationalisation; however, employees were also eligible to interact in different languages, which created a language barrier in the organisation.

6.3.5   Language differentiation

Understanding of activities and tasks is mediated by language of instruction and engagement through facilitating communication among team members (Barak, Watted & Haick, 2016). Thus, devising effective strategy is necessary to bridge the language barrier and manage significantly negative activity (Timmins, 2002). Even though training programs are carried out, they do not always consider language barriers, an oversight that can engender additional complexities in an environment (De Jesus-Rivas, Conlon & Burns, 2016). This needs more attention in that through language the communicating of thoughts, ideals and knowledge is manifest, so language is clearly an influence in terms of how IT strategy is operationalised.

The spoken language was used, whether consciously or unconsciously, to enable and occasionally constrain operationalisation of the IT strategy in the organisation. On the one hand, when employees of the same network communicate using a preferred language, such as Hakka, in sharing knowledge and ideas to ease understanding about technology solutions and processes, smooth operationalisation is heightened; but on the other hand, when employees who are unfamiliar with the network language become difficult, communication challenges escalate. This is a constraining barrier during the operationalisation of the IT strategy. This situation was reproduced time and again in operationalising the IT strategy in the organisation.

The language differentiation influenced and was influenced by networks of people, by the exclusivity or inclusivity of employees, and by the use of technology solutions. This was both enabling and constraining in operationalising the IT strategy, as explained above. The most important thing is that language differentiation has been identified as an essential influencing factor when operationalising IT strategy in an environment as it creates division among employees in operationalising the IT strategy in the organisation.

6.3.6   Exclusivity vs inclusivity

Inclusiveness aims to enrol as many as possible participants while exclusiveness is about access by only a privilege few. According to Loveridge and Saritas (2009), inclusivity is a process that genuinely and legitimately allows broader participation in an activity. However, deceptive actors tend to use more cognition, inclusivity and exclusivity in words when interacting with groups within environment (HO et al., 2016). Chisita and Chinyemba (2017) suggest that an understanding of information system continuance for information-oriented mobile applications requires a dramatic shift from exclusivity to inclusivity to influence operationalisation of the IT strategy.

In operationalising the IT strategy in an organisation, exclusivity and inclusivity of employees were both enabling and at the same time constraining. Exclusivity minimises too many opinions and options, mineralising complications inherent in decision-making. However, the same factor of exclusivity deprived certain employees from participating in processes and activities tasked for the execution of IT strategy. The concept of inclusiveness was beneficial to both the business and IT units of the organisation, from an alignment viewpoint, as alignment between business and IT units was instrumental in operationalising the IT strategy in the organisation. Despite the positive aspect of inclusivity, it was also constraining. For example, too many

people could not be involved in certain decisions, especially those requiring technical expertise.

In the environment and during operationalisation of the IT strategy, exclusivity or inclusivity of a group of employees was sometimes consciously and sometimes unconsciously created. This happened at various levels, from senior management to technical expertise. Some employees were privileged, granted exclusive access to information pertaining to IT strategy operationalisation. Both exclusivity and inclusivity of employees influenced and was influenced by the relationship and interactions during operationalisation of IT strategy in the organisation, impacting how some employees were nominated for skills development, but not others, how processes were defined, and how tasks were assigned to certain distinct individuals in the operationalising the IT strategy in the organisation.

6.4 Interpretation and discussion of the findings

Findings from both cases are mapped side by side (Figure 6.3). From a subjective, reasoning, interpretive approach point of view, similarities are identified between the two cases. Finally, findings from both cases are discussed using the diffusion of innovations theory from the perspective of the innovation-decision process.
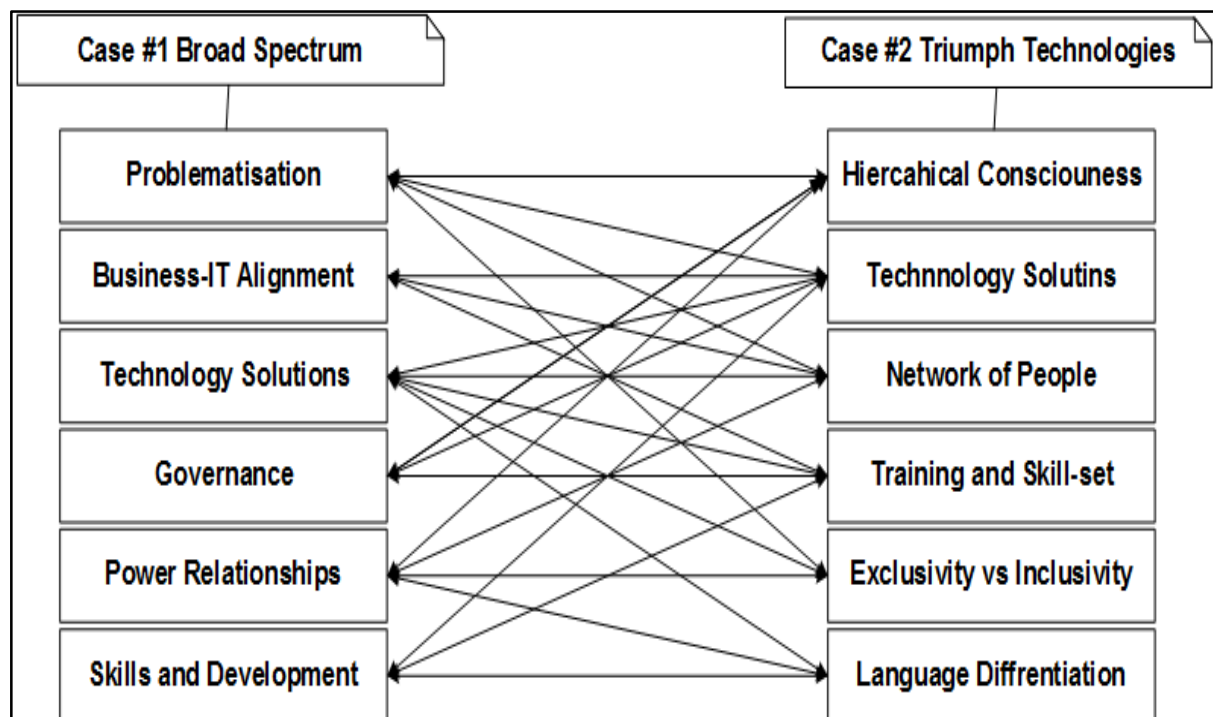
Figure 6.16: Mapping findings of case #1 and case #2

As shown in Figure 6.3, the findings from cases #1 and #2 were mapped adjacently to highlight the understanding of common factors in an effort of generalisation. Generalisation is important in basic research, managing and solving problems for societal and organisational purposes (Lee & Baskerville, 2012). Tsang (2014b) argues that generalisation is about populations or entities sharing certain essential features through observed instances.

Based on the mapping, factors were grouped into four main components, as shown in Figure 6.4: business vision, skill and knowledge, control and management and interactive scheme.
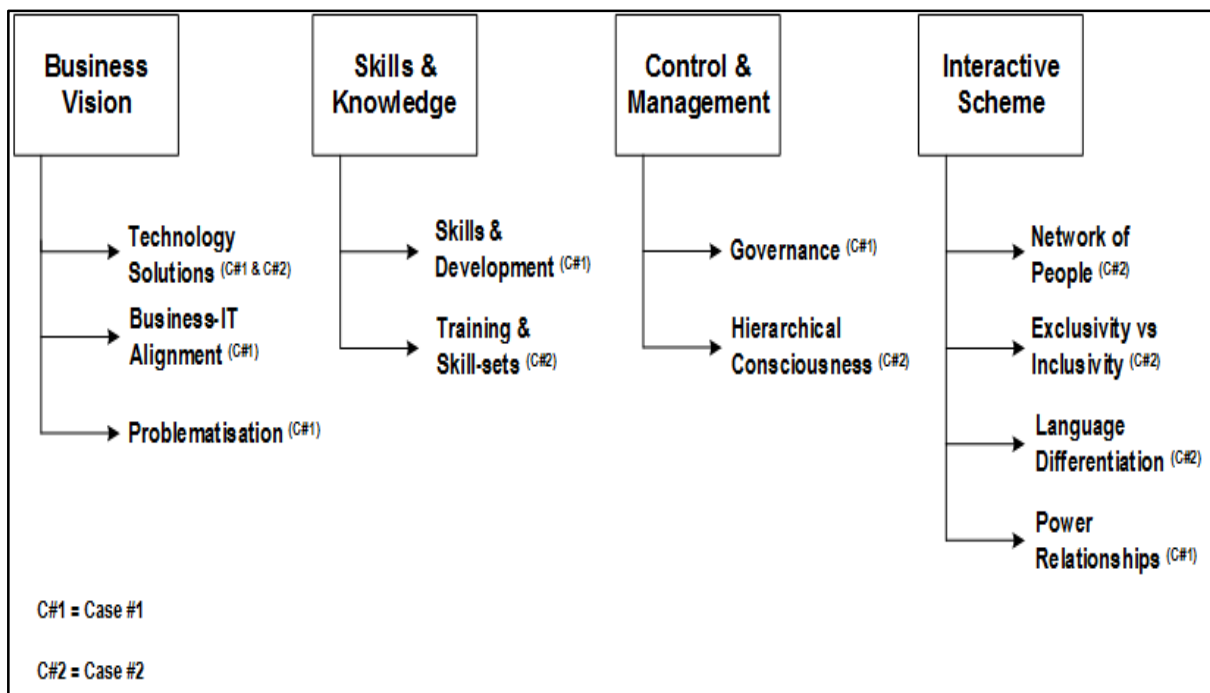
Figure 6.17: Factors influencing IT strategy operationalisation

The four main components, as shown in Figure 6.4, are interpreted using the innovation-decision process of the diffusion of innovation (DOI) theory. The subsequent section outlines the DOI theory, originally introduced in Chapter 1 and followed by a more detailed review in Chapter 2.

6.4.1 Diffusion of innovations: overview

Diffusion is the process by which an innovation is communicated through certain channels over time among members of a social system (Rogers, 2003). The four main elements in diffusion of innovations (DOI) are innovation, communication channels, over time and social systems.

Innovation is any new idea, new behaviour, new activity, new concept, new process or new event introduced to employees in an organisation for adoption. The newness feature of an innovation is communicated in terms the innovation-decision process, indicated in Figure 6.4 below. According to Nemutanzhela and Iyamu (2015), the innovation-decision process reduces uncertainty about an innovation. The innovation-decision process focuses on the five stages – knowledge, persuasion, decision, implementation and confirmation – people undergo in terms of awareness and response to the uncertainty of an innovation.
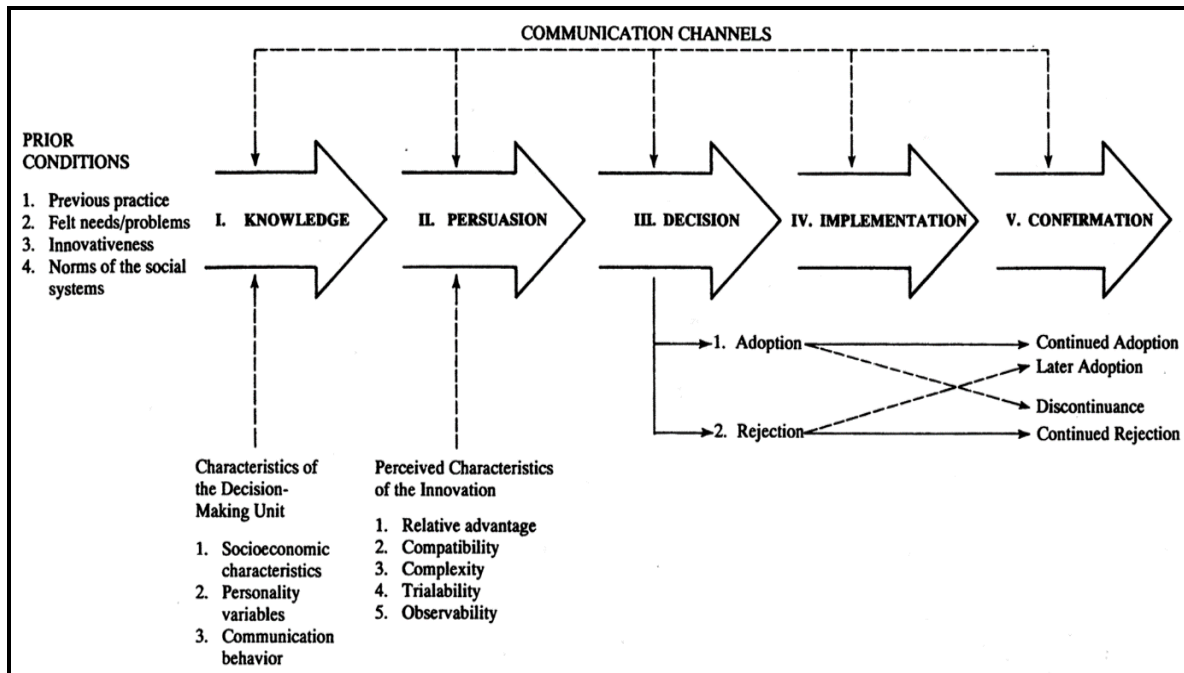
Figure 6.18: Five stages in the innovation-decision process (Source: Rogers 2003:171)

6.4.1.1 Interpretation: innovation-decision process

Results from mapping both case #1 and #2 are presented in Figure 6.4. There are four components: business vision, skill and knowledge, control and management, and interactive scheme. The discussion that follows is the interpretation of the components for which the innovation-decision process is applied as a lens.

Innovation-decision process: knowledge

The IT strategy encompasses the business vision of the organisation; its operationalisation essentially requires factors such as skill sets, control and management. This means that the employees responsible for the operations of IT strategy must be knowledgeable about the types of skill needed, and control and management of the IT solutions. Another critical factor is relationship between stakeholders. Stakeholders, for instance, need to have a certain level of knowledge concerning the capacity of individuals or groups, as together they execute tasks.

Having knowledge about the business vision of the organisation is rather significant. Both employees and management must have solid knowledge regarding the operations of the organisation from an IT perspective. An understanding of the business vision of the organisation empowers employees and other stakeholders, not only to participate in operationalisation but also to choose the suitable technology solutions for aligning business and IT objectives.

Skills sets and knowledge are acquired through training and development, thereby capacitating employees in the organisation to operationalise the IT strategy. For the respective employees and stakeholders to control and manage the different technology artefacts in the organisation, they need to apply the policies and processes relating to IT strategy operationalisation. These technological artefacts provide technology solutions governed by policies and processes.

The type of relationship among employees within the organisation influences the operationalisation of the IT strategy. Thus, it is essential to promote connective schemes among stakeholders of the IT strategy. This connective scheme allows actors (stakeholders) to communicate and share information, enhancing relationships and kindling a harmonious working environment.

Innovation-decision process: persuasion

There are various levels of alignment between employees and structures (units or departments) within the organisation relevant to operationalising the IT strategy. Some levels include business-IT units, software development-network specialist, and business users-technical support, alignments which foster beneficial persuasion to enrol in technology solution initiatives as defined by the IT strategy. Some individuals replicate themselves in the units or departments, referred to as heterogeneity.

In order to persuade management, the alignment between business and IT is essential, thereby ensuring the various organisational business units buy into the technology solutions that are operationalised. IT employees and management need to persuade business stakeholders to approve technology solutions that are defined by the IT strategy. Therefore, a business vision, guided by an operational architecture that defines how business and IT are aligned, is vital. In the quest to persuade employees and management, a moment occurs whereby the IT strategy is established and buy-in is essential; such persuasion can be fortified through the heterogeneity of actors.

Employees use their skills to persuade others to participate in operationalising the IT strategy, as those who have the knowledge, participate in operationalisation activities and processes. They also share their experience and understanding of the IT strategy with other employees, thereby empowering others with knowledge. It is easier to persuade people in the same network (units or departments) as they share common course. Employees in the same network find it easier to persuade each other about the activities of the IT strategy. Those who are not part of a network are more readily excluded from participating in the operation of tasks, affecting the overall IT strategy. To persuade people, the promoter needs to understand the spoken language (not literally), the appropriate approach, and the capabilities of the network.

Innovation decision process: decision

Intentionally or unintentionally, all stakeholders are involved in decision-making in the operationalisation of the IT strategy. Decision in the operationalisation of the IT strategy happens at three main levels – strategic and operational levels; business and IT units; and specialist and users – which can be divided into macro and micro. Some of the employees (or stakeholders) are heterogeneous in that they participate at more than one level, such as strategic, IT and specialist.

Strategy concerns both long and short-term goals. At this level, senior managers and executive members are involved in decision-making. The operational level consists of employees involved in daily task executions with decisions often focusing on organisational business vision, essentially ensuring that business activities and events are duly enabled and supported by IT solutions. The specialists focus on other aspects, from software development to technology infrastructure deployments of the IT strategy. These decisions, then, influence the ways the IT strategy is operationalised.

The necessity of making informed decisions about the technology solutions is dependent on the skills sets and awareness of employees pertaining to IT strategy and its operationalisation. Additionally, as the language of communication determines participation, this influences decisions surrounding operationalisation of the IT strategy in the organisation. It is therefore crucial to understand the diverse culture that exists within the organisation before certain irreversible decisions are made to avoid deleterious effects on the operationalisation of the IT strategy.

Innovation-decision process: implementation

The decisions regarding IT strategy are implemented at macro and micro levels. The decisions, whether rejected or accepted, are either implemented directly or indirectly, consciously or unconsciously. The decisions are influenced by various factors including the diversity within business and IT, the available skill sets, the cultures within the organisation, and the governance and management tools. Operationalisation of the IT strategy entails implementation of solutions that are prescribed in the strategy document; undeniably, implementation of solutions is critical to operationalisation of the IT strategy, meaning that it requires skilled personnel with an intelligent understanding of the business vision and an understanding of business and IT objectives alignment. Implementation of technology solutions is a vital process leading to successful operationalising.

Other factors that influence implementation of solutions in operationalising the IT strategy include control and management of technology infrastructures, as well as nontechnical factors such as people and their relationship and interactions. Implementing rules and regulations aids in seamless management of activities and processes in operationalising the IT strategy. The hierarchical structures ensure that technology infrastructures, whether approved or rejected, are implemented, resulting in the IT strategy being effectively operationalised.

The implementation of technology artefacts was influenced by a scheme of interactions that employees had among themselves and with management. Employees who were part of a network by association of spoken language were accommodating with each other in terms of implementing different technologies and formulating an exclusive network of people. Those who were not included in the network of people removed from the operationalising of the IT strategy. Through the scheme of interaction, relationships manifested and networks were formed for the benefit of individuals as well the organisation.

Innovation-decision process: confirmation

Implementation, whether approved or rejected, is confirmed, but the confirmation can be direct or indirect, or conscious or unconscious. Confirmation happens at various stages, both strategic and operational. Confirmation of implementation of technology solutions completes operationalisation of the IT strategy in the organisation.

Requirements documented in the form of templates are necessary to confirm implementation of technology solutions as defined by IT strategy and its operationalisation. One of these

requirements documented in templates includes business vision. The confirmation is controlled and managed through processes and by people. Thus, skilled employees are required to execute said tasks which have influence in the operationalisation of the IT strategy. In addition, the relationships between units (or departments) and among employees influence how technological solutions are confirmed during the operationalisation of the IT strategy within the organisation.

Employees endorsed the sharing and development programs which equipped them with knowledge for operationalising the IT strategy, enabling them to confirm the activities and processes in their diverse nature, at various stages. In addition, controls and management processes were used to operationalise the activities and processes of the IT strategy, often through different networks such as the hierarchical structures of the organisations. Employees and management adhered to the rules and policies that were part of governance during operationalisation of the IT strategy.

6.5   Framework for operationalising IT strategy in an organisation

Based on the aim of the study, to propose a solution in the form of a framework that can be used for operationalising IT strategy in organisations, as discussed in Chapters, 1, 3 and 4, qualitative data was gathered from two organisations, with analysed data presented in Chapter 5. Findings from the analysis were interpreted following the interpretivist approach, based on which a framework (Operationalisation of IT Strategy Framework) was developed (Figure 6.6).

The framework, Operationalisation of IT Strategy Framework (OITSF), comprised of seven main components: (1) collaboration, (2) heterogeneity of actors, (3) strategic intent and operational intent, (4) diverse organisational culture, (5) technology advancement, (6) macro and micro levels, and (7) operational architecture. The components are discussed below with a discussion that should be read to coincide the framework (Figure 6.6) to ensure a successful operationalisation of IT strategy in an organisation.
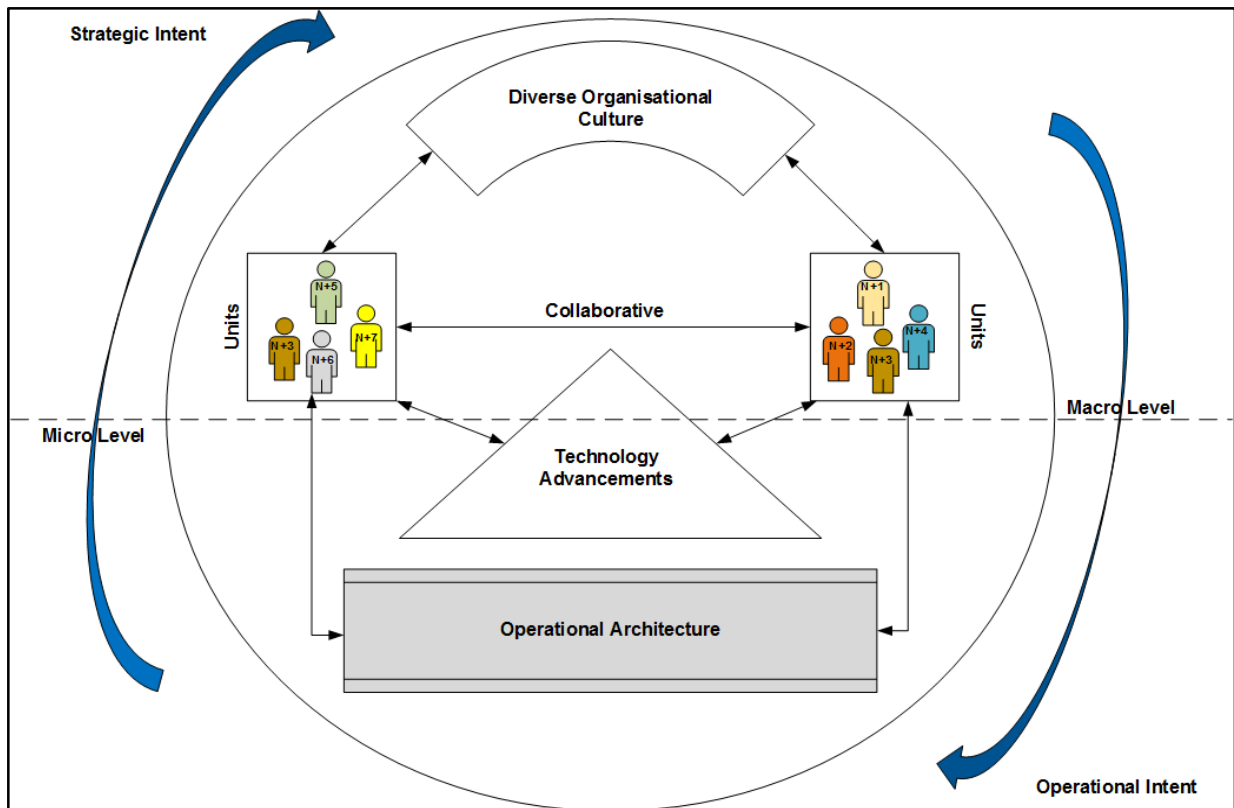
Figure 6.19: Operationalisation of IT strategy framework

6.5.1 Collaborative

There are different units or departments within an organisation, several of which are either directly or indirectly involved in IT strategy operationalisation. For operationalisation of the IT strategy to succeed, there must be collaboration between these departments in the organisation. Collaboration in the workplace leads to coordination, collective decision-making, adaptability and leadership, ultimately contributing to organisational advancement (Susanti, 2018).

Collaborative arrangements aid in smoothing operationalisation of IT strategy, ensuring that activities and events relating to the IT strategy are debated and approved by different units or departments involved. According to Barfield (2016), collaborative efforts put actors at ease, after which they more willingly and spontaneously participate in conversations, allowing various opinions to be voiced and incorporated, encouraging participation between different groups or networks within an organisation. Employees from the different organisational departments collaborate amongst each other, forming heterogeneous networks with a common goal. Clearly, collaborative efforts are instrumental in the successful operationalisation of IT strategy in an organisation.

6.5.2 Heterogeneity of actors

As shown in the framework (Figure 6.6), N+ is represents an individual. Certain actors (employees) are heterogeneous in that such as project managers, they are part of more than one unit or department. Heterogeneity of actors refers to individuals who are aligned by interest, working together with different groups (or networks), instead of working on their own (Wickramasinghe, Tatnall & Goldberg, 2018).

Heterogeneous actors need to be identified because they have the capability and capacity of influencing various groups to participate in the operations of the IT strategy. This includes ability to promote inclusiveness of employees. This enacts actor (stakeholder) interaction at both macro and micro levels making sure the strategic intent and operational intent in the organisation are addressed. Such efforts enhance successful operationalisation of the IT strategy in an organisation.

6.5.3 Strategic intent and operational intent

The goals and objectives of operationalising the IT strategy are to ensure the strategic and operational intent is realised for the organisation to be competitive and sustainable. To ensure that this goal is achieved, the activities and processes of operationalisation should be viewed from macro and micro levels. This means that both strategic and operational intents can be problematised at long-term as well as short-term periods.

The strategic intent focuses on organisation-wide, technological artefacts, activities and events operationalised to advance the operations of the organisation as a whole. Strategic intent, according to Richet, Ngwenyama and Rowe (2016), specifies the role of the IT strategy in advancing strategic goals and objectives for the overall benefit of an organisation.

From a day-to-day perspective, the operational intent concentrates on the individual units or departmental specific requirements and objectives contributing to the overall organisational objectives. Although the focus is on individual units or departments, their requirements and objectives should be fully aligned to the organisational objectives, as in turn, operationalisation of the IT strategy should consider business-IT alignment. As for operational intent, different actions and activities influence the technical and non-technical interactions relating to a phenomenon (Iyamu, 2018).

6.5.4 Diverse organisational culture

In every organisation, especially large ones such as Triumph Technologies and Broad Spectrum that were studied, there is much diversity of culture, from individual background to organisational value. However, the strength of the diverse culture should be focused towards realising the objectives of the IT strategy and its operationalisation. Lozano and Escrich (2017) highlight the importance of supporting diverse cultures in organisations as this complement and harmonises various beliefs, values, and cultures.

Organisational culture is an integral part of the operations of an organisation, directly and indirectly influencing how activities and events are conducted for personal or organisational interests. Most importantly, the interactions and collaboration between actors are driven by the culture belief and affiliation, influencing task allocation and goal execution such as IT strategy operationalisation.

6.5.5 Technology advancement

Technology advancement and IT strategy are two components operating in duality, in that one manifests to the other and vice versa. Through operationalisation of the IT strategy, technology advancement is put to practice, and in return, technology advancement enacts the IT strategy operationalisation. Wang, Qian and Lehrer (2017) refer to technology advancement as an organisational search for innovative solutions to technological challenges within an organisation.

The technology solutions operationalised are due to the changes in approaches and ways technologies enables organisational operations. This means that older or outdated technologies no longer profit the agile environments in which an organisation operates. Hence, the objectives of the IT strategy operationalisation are to provide business unit or departments, including IT, with innovative technology solutions.

Technology advancement within an organisation is identified by its IT strategy, which is often influenced by both strategic and operational intent. This means that technology advancement is based on operationalised technological solutions, informed by the operational architecture. Moreover, the advancement of technology is influenced by the heterogeneity of actors, as the actors collaborate with one another within the different units and between departments in operationalising the IT strategy. These collaborative interactions ensure that the organisational requirements are supported at macro and micro levels, respectively.

6.5.6 Macro and micro levels

All other activities and processes involved in IT strategy operationalisation are analysed. Quality is added when the analysis happens at two different levels, macro and micro, to differentiate their strategic or operational groupings and nature. The macro level is at organisation-wide level, whereas the micro level remains at individual units or departments levels.

According to Marabelli and Galliers (2017), in articulating the IT strategy, a macro level analysis focuses on high-level business processes and micro level concentration on everyday organisational practices.

The differentiation between macro and micro levels enable the operationalisation of the IT strategy to focus on organisational requirements from business unit viewpoints, meaning that business needs can be given specific attention from both strategic and operational levels, as the IT strategy is operationalised in its lifetime.

As shown in the framework (Figure 6.6.), the strategic intent leans towards a macro level, while the operational intent is prone to the micro level. At the strategic macro level, the framework highlights the multifaceted organisational objectives and requirements as identified by the different business units in the organisation. At the micro level, which is operational, the framework reduces the activities into actions to aid in decision-making regarding the technological artefacts and the operationalisation thereof. Iyamu (2018) asserts that the macro and micro level process improves engagements at strategic and operational stages, thereby promoting competitiveness and intensifying organisational capabilities.

6.5.7 Operational architecture

At the core of operationalisation of the IT strategy is the operational architecture. The operational architecture defines the interlinks, boundaries, integrations and interactions between the components involved in the IT strategy. Oslen and Trelsgård (2016) argue that an organisation with an established architecture affords common business functions, processes and systems. The operational architecture also encompasses the business processes and technology solution activities, at both strategic and operational levels.

Operational architecture in an organisation promotes standardised technology artefacts that improve operational efficiency and reduce complex and duplicate solutions. It also creates an

organisational culture with streamlined technological processes managed in a tightly controlled manner. The different business units technological architectural designs and operations are underpinned by the operational architecture.

6.6   Summary

In this chapter, the findings from the individual cases were discussed. Moreover, the findings from the respective cases were mapped. The main components emanating from the mapping process were interpreted, through the lens of the innovation-decision process from the perspective of the diffusion of innovations theory. Based on the aim of the study, a framework that can be used for IT strategy operationalisation in organisations was constructed which was based on the findings from the analysis.

The framework, Operationalisation of IT Strategy Framework (OITSF), comprised of seven main components. The framework   can be adopted by organisations in both the public and private sectors to ensure a successful operationalisation of IT strategy in an organisation.

 The next chapter concludes the research and proposes recommendations.

CHAPTER SEVEN
CONCLUSION AND RECOMMENDATIONS

7.1   Introduction

In this, the final chapter of the thesis, recommendations are presented and the study is concluded. As the research problem was motivated by the need to understand the challenges organisations face when operationalising their IT strategies, literature was reviewed to gain a deeper understanding surrounding the factors relevant to the objectives of the research.

The literature was gathered from authenticated and creditable scholarly databases. The research method adopted for the study was a qualitative method. In an effort to achieve the objectives of the study, various methods, approaches and techniques, discussed in detail in Chapter 3, were employed.

In addition, this study was underpinned by two socio-technical theories – structuration theory (ST) and diffusion of innovations (DOI) – used as lenses to guide the analysis and interpretation of the findings at both macro and micro levels. Structuration theory was applied at the macro level to determine which factors influence operationalisation and dissemination of the IT strategy. The diffusion of innovations theory was applied at a micro level to interpret the diffusion of IT strategy by mapped and combined findings of the two cases. Two organisations were selected as cases for the study, one from the public and one from the private sectors.

In this study, data was collected by conducting separate interviews within the organisations serving as case studies. Furthermore, in addiction to documentation collected from the two organisations, interviews were conducted to ascertain the factors influencing IT strategy operationalisation in organisations. These interviews engaged employees from various business units occupying various positions in these organisations. The interviews were recorded, in adherence with the ethical conduct code of research. Then the recordings were transcribed, with responses analysed using duality of structure as a lens from the perspective of structuration theory. The mapped and combined findings were interpreted, guided by the innovation-decision process from the diffusion of innovations theory, and based on the interpretation, a solution was proposed by means of a framework, the ultimate and useful aim of the study.

This framework, intended to assist organisations in effectively operationalising their IT strategy, addresses the 'white elephant' phenomenon experienced in many organisations. 'White elephant' in this context refers to technology solutions that are implemented but are not operational. This new framework will guide organisations in addressing the challenges experienced when operationalising their IT strategy. If these challenges are not addressed the IT cost in organisations will continue rise with no valuable return on investment.

This chapter is divided into seven sections. Section one presents a summary of the research. The second section describes how the sub-objectives were achieved. In the third section, the contribution of the research from a three-fold perspective – theoretical, methodological and practical – is discussed. Section four focuses on the benefit of the research; followed by section five which presents the recommendations in an effort to implement the operationalisation of IT strategy in organisations. In section six, further studies are recommended to advance the framework. Lastly, in section seven, a summary is provided for the research and of this chapter overall.

7.2   Summary of the research

This section provides a summation of all previous chapters in the study, chapter one to chapter seven. The chapters are discussed as follows;

7.2.1   Chapter 1: Research Introduction

Chapter 1 provides an introduction of the research topic and presents an overview of the entire study, including the problem statement and research problem justifying the need to conduct the research to gain an understanding concerning the operationalising of an IT strategy in organisations. Numerous studies have been conducted regarding the implementation of IT strategy in organisations; however, no study has investigated a specific and applicable framework for operationalising an IT strategy in organisations, one that fully confronts challenges organisations encounter during the operationalisation of the IT strategy. The two cases investigated in this study lend themselves to a case for generalisation (Lee & Baskerville, 2012; Tsang, 2014b).

Chapter 1 stipulates the aim of the research, to develop a framework that can guide how to operationalise the IT strategy in private and public organisations. The research objectives and research questions that needed to be answered are also identified in this chapter. The research design and methodologies which were applied and the underpinning theories that were

employed in the data analysis and interpretation of findings are discussed in the designated chapters. Data collection techniques selected in the context of the study are presented.

The application of structuration theory and diffusion of innovations as a guide to analyse collected data and interpret findings was discussed. The contribution of the study from academic, methodological and practical perspectives was addressed. And finally, ethical considerations were addressed as they as vital in research to ensure study participants are protected from any harm or risk. Therefore, this chapter provides an introduction on the entire study, including the structure of the thesis.

7.2.2   Chapter 2: Literature Review

This chapter presents a detailed review of literature related to IT strategy and its operationalisation within organisations, considering that various scholars have conducted prior studies the main areas of this study. The literature reviewed focuses on four main areas of the study, including information technology (IT), information technology strategy, implementation and operationalisation, and socio-technical theories underpinning the study.

The two underpinning theories, structuration theory and diffusion of innovations, were discussed in detail in this chapter. Duality of structure and innovation-decision process applied as lenses were also discussed. The study is cognisant of the criticisms levelled against both theories; however, the use of these theories in information system studies justifies the application of the theories in this study.

7.2.3   Chapter 3: Research Design and Methodology

In this chapter, research design and methodologies were presented. The design and methodologies include the philosophy, methods, designs, approaches, data collection techniques, data analysis and ethical considerations that were applied in the study. The research employed the qualitative methods and case study as research design were presented. The data collection techniques consisted of interviews and documentation. Emphasis was placed on the selected technique for data, interviews. Furthermore, the researcher provided insight into the rigorous and onerous process experienced in obtaining cases in the private sector.

A semi-structured interview technique was used to collect from two cases, one in the public and the other in the private sector, with the intent of establishing how these two organisations

operationalise their IT strategies. Therefore, in addressing the aim of the study, the goal was the development of a framework for the operationalisation of IT strategy. The technique enabled the researcher to record conversations, take notes and rephrase research questions during the interviewing process, seeking clarity on responses that were unclear. Participants were assured of their anonymity would be respected, and that their right to privacy and confidentiality was upheld.

Organisational documentation was requested, including annual reports, organisational structures and policies, in addition to the data collected from the interviews from interviewees. In this study, an interpretive approach explored subjective viewpoints based on their own experiences and in their own environments from the perspective of participants with regard to IT strategy and its operationalisation.

The data analysis process was undertaken through the lenses of the underpinning theories, previously discussed. Also discussed were the demographics of the participants who took part in the research.

7.2.4   Chapter 4: Overview of Cases

Overviews of the two cases selected in the context of this research were presented in this chapter, including the backgrounds of the organisations and service and product offerings. Also presented in this chapter were the organisational structures, with the emphasis on the IT structures. The different departments in the organisations' roles and functions were also explained.

Based on the criteria presented in Chapter 3, For determining the selection of organisations, both cases (BS and TT) were selected for having implemented, or having intended to implement, the operationalisation of their IT strategies, most of which were underway at the time of the study.

7.2.5   Chapter 5: Data Analysis

This chapter presented an overview of the underpinning theory, structuration theory. The two cases – Broad Spectrum and Triumph Technologies – were individually analysed with duality of structure from the perspective of the structuration theory as a guiding lens in each case. Structuration theory, discussed extensively Chapter 2 of this study, was used to determine the

relations and examine the interactions between agents – technical, non-technical and structural – and rules and resources in the operationalising the IT strategy.

In line with the undertaking in terms of respect of the anonymity of participants, pseudo names replaced the actual identity of interviewees from the different organisations. For instance, at Broad Spectrum, participant number 1 was labelled as 'BS01'.

7.2.6   Chapter 6: Interpretation of Findings and Framework

In Chapter 6, the findings and interpretation of the findings from the two cases were presented. The approach in this chapter was as follows: (i) the respective findings from the two cases were discussed; (ii) the respective findings from the two cases were mapped against each other; and (iii) the similarities between both sets of findings were identified and considered.

The diffusion of innovations theory, focusing through the particular lens of the innovation-decision process, was employed in interpreting the mapped findings from the two cases. This included assessing the knowledge participants had about the IT strategy and its operationalisation; the decisions they made to participate or not participate in operationalisation activities and processes; and whether or not the ways of persuasion for the employees in the organisation effective and efficient.

From an interpretive point of view, the factors arising from the study were interpreted usefully in developing a framework for the operationalisation of IT strategy in organisations with the intent of assisting organisations address challenges experienced during operationalisation of the IT strategy.

7.2.7   Chapter 7: Conclusions and Recommendations

Lastly, in concluding the study, this chapter evaluates the study by concentrating on how each research sub-objective was achieved. In addition, the contributions of the study from theoretical, methodological and practical perspectives are acknowledged. The benefit of the study towards the existent body of knowledge and relevant organisations, the limitations of the study, and recommendations for further research are also discussed in this chapter. Finally, a summary of the chapter to conclude the study is presented.

7.3   Evaluation of the research

The aim of this study was to develop a framework to propose as a guide for organisations in operationalising their IT strategy. To realise the aim of this study, two objectives had to be achieved: these two objectives and the manner in which each was achieved in relation to the data analysis are presented as below:

i.   *To identify the factors influencing operationalisation of IT strategy in an organisation*

There were clear indications that the implementation of IT strategy was influenced by all stakeholders: firstly, as stakeholders have knowledge of the existence of an IT strategy and an understanding of the IT strategy intent from both strategic and operational levels; secondly, stakeholders are aware of the alignment of the strategic and operational intents between business and IT. Furthermore, there was an evident lack of buy-in within the organisations to operationalise the IT strategy, notwithstanding implementation thereof from both employees and management. This augmented the challenges faced in regard to the IT strategy and its operationalisation.

These factors had dire consequences for the organisations' IT strategy operationalising. Many employees, in fact, outright defied instructions from management to implement and operationalise the technology solutions introduced through the execution of the IT strategy. Employees and management who had knowledge concerning the IT strategy were not trained or empowered to implement or operationalise it. The ways and manners applied to communicate implementation did not reach everyone in the organisation, rendering the communication ineffective and inefficient. Therefore, this research objective was achieved based on the data analysis as presented in Chapter 5, sections 5.4.1 and 5.4.2 on the two organisations (BS and TT) that were employed as cases in this study.

ii.   *To examine what constitutes operationalisation of IT strategy in an organisation*

What came out rather clearly was that employees, including management, did not know precisely what constitutes operationalisation of the IT strategy. While some were of the view that it relates to implementing the IT strategy, others could not explain what operationalisation is actually comprised of. Many employees, viewing operationalisation as solely a management process, did not wish to be involved. Moreover, management

indicated that they did not communicate or involve employees in the events, activities and processes comprising operationalisation of the IT strategy in the organisation. This objective was also achieved.

The IT strategy was disseminated through various channels, including workshops, meetings, electronic mail, teleconferencing, video conferencing and training sessions. Although these methods and channels were efficient, the effectiveness of the ways and manners of diffusing the IT strategy, coupled with the operationalising of it, were hindered by language barriers in the organisation. The spoken and written language of the organisation had a major impact on how the IT strategy was disseminated, as this resulted in an organisational culture with some employees believing they were more privileged than others. Furthermore, a culture of exclusivity and inclusivity manifested. This objective was also achieved, through the data analysis conducted in Chapter 5, sections 5.4.1 and 5.4.2 of this study.

iii. ***Based on the findings from the objectives and the aim of this study, a framework was developed for the operationalisation of IT strategy in an organisation***

The aim of this study was achieved through the development of a framework in Chapter 6, section 6.5. The framework for operationalisation of the IT strategy in organisations was achieved based on the findings from the two cases studied. The developed framework can be adopted by organisations, in both public or private sectors, to operationalise their IT strategies. The framework will assist organisations to increase the possibility of operationalising an IT strategy smoothly and successfully.

7.4   The benefit of the research

The benefits of the study can be appreciated from two perspectives: namely an academic perspective and an organisational perspective. The benefits are discussed as follows:

The benefit from the academic perspective is related to its contribution to the existing body of knowledge. As at the time of the study, not many studies had been conducted relating to operationalising of IT strategy. While several studies had been conducted pertaining to the development and implementation of IT strategy, not many has been conducted in terms of the actual operationalisation of IT strategy regarding day-to-day activities and processes. Even when studies had been conducted, these had not investigated the unique South African context.

Thus, this study augments the sparse literature in the South African environment, difficult to find as it pertains to studies in the African context, rendering this a benefit to academia.

Furthermore, the study highlighted the significance of IT strategy and its operationalisation for organisations to be competitive and sustainable. To some degree, many people in organisations are aware of the factors that influence the operationalisation of the IT strategy, as revealed in the Framework in Chapter 6 (Figure 6.6). However, too often these factors are overlooked or dismissed.

This study, therefore, was founded on empirical evidence that influences the operationalisation of IT strategy and bolstering managers with the confidence to understand these factors better because they are generated explicitly from an empirical study. The framework, following the factors, will guide managers step-by-step in terms of how to operationalise IT strategy. It is of paramount importance for managers to be aware of factors influencing the operationalisation of IT strategy, to address and rectify them as soon as possible. Organisations will therefore most definitely benefit from this study.

7.5   Contribution of the research

The significance of the study is viewed in three parts: from theoretical, methodological and practical perspectives. This section presents the contributions of the study from these three perspectives.

7.5.1   Theoretical perspective

From a theoretical perspective, while numerous studies have been conducted with respect to the development and implementation of IT strategy, hitherto little is known about the factors that influence IT strategy operationalisation. The application of socio-technical theories such as the structuration theory and diffusion of innovations theory as lenses for data analysis and interpretation of study findings has not yet been investigated a South African context. Therefore, this present study contributes to the present academic body of knowledge, increasing the existent literature in the African context and in particular, the information systems context in South Africa.

Applying both ST and DOI aided the researcher in gaining a deeper understanding of the factors contributing to the operationalising of IT strategy in organisations. While various prior information system studies have used ST and DOI, they have not been used in the same

context as this study. At the time of the study, these two socio-technical theories had not previously been applied in the particular manner as in this study. Here, ST is combined with DOI, and as the two theories have not been complementarily applied in any studies previously, hence the contribution of this study from a theoretical perspective.

7.5.2   Methodological perspective

The methodological perspective rests on employing two socio-technical theories as lenses for data analysis through the application of the element of duality of structure of the structuration theory and the component of innovation-decision process of the diffusion of innovations theory. This brings a different and unique perspective to how operationalising IT strategy has been studied in the field of information systems.

The framework has been developed through a step-by-step process. Firstly, structuration theory was applied to analyse the data separately from both cases, Broad Spectrum and Triumph Technologies. Initially, the findings from the analysis were interpreted and discussed separately. Thereafter, the findings from the two cases were mapped and combined factors were produced.

The factors from the combined findings were interpreted using the five stages of innovation-decision process of the diffusion of innovations (DOI) theory. Although the researcher has used DOI previously for data analysis, this was a new and different experience using DOI to interpret findings. Even though the two theories are involved in the same study, they are used separately – ST was used for analysis and DOI for interpretation – generating a different, unique and a new contribution from a methodological perspective.

7.5.3   Practical perspective

The practical perspective of this study culminated in a framework developed as a result of the heuristic evidence generated in the analysis process of this study. Following the framework guides managers step-by-step about how to operationalise IT strategy in organisations. Organisations that apply the framework practically will find assistance for decision-makers and managers in comprehending, at organisational levels, the factors influencing the operationalisation of IT strategy.

Decision makers and managers would benefit from understanding the factors influencing operationalisation of IT strategy, as these will assist organisations to adopt a proactive

approach in combating challenges. Hence, the framework can be applied in a practical setting as a guiding instrument to best operationalise an IT strategy.

7.6 Limitation of the study

There are two major limitations of this study that may have an implication on future research studies.

The first limitation of this study was that the study focused on the operationalisation of IT strategy in organisations. Therefore, how IT strategy is formed and developed were not taken into consideration in this study. This can be a building block into the improvement how IT strategy is developed, therefore aiding and easing addressing the factors that influence the operationalising IT strategy in organisations. The second limitation of this study is related to the fact that the study only focused on organisations in South Africa. Therefore, the generalisability of the framework across-borders would be limited.

7.7 Recommendations

The research has examined various factors influencing the operationalising of IT strategy in organisations. Organisations in both the public and private sectors should attend to these factors to be certain they have rectified any difficulties as early as possible when operationalising their IT strategies. In doing so, organisations should be able to achieve their goals and objectives over time.

7.7.1 Capacity building

For the framework to be adopted within an organisation, training for employees and management is of critical importance to ensure that those involved in operationalisation activities and processes have the requisite competencies and skills to implement these activities and processes as part of the IT strategy.

Investing in the development of people ensures that organisational goals and objectives are met, affording the organisation a competitive advantage because all stakeholders in the organisation will be able and proficient to operationalise both the strategic and operational intents of the organisation with confidence. It also gives employees the assurance that the technology solutions operationalised are relevant and aligned to various units as well as the organisation as a whole.

7.7.2 Alignment

Units within business and units within the IT department should be aligned to best support activities towards achieving organisational goals and objectives. Business unit to business unit alignment ensures harmony of the collective understanding of business objectives that inform the IT strategy. The alignment of units within IT is also important to ensure that the IT department as a whole analyses business requirement from the same perspective.

This provides business units with technology solutions that get everyone involved in operationalisation buy-in and approval. In addition, the operational architecture should be aligned to the organisational objectives. The actors involved in operationalising activities and processes should ensure that the operational architecture supports existing and new technology solutions, thereby meeting organisational requirements.

The business-IT alignment in organisations cannot be overemphasised, especially regarding the achievement of the business objectives. And the IT strategy should include technology solutions that enhance business objectives. However, many initiatives are started and then halted as business imperatives. The IT department is then left to its own demise. Hence, during operationalising of the IT strategy, business and IT should agree on technology solutions to be prioritised in line with the organisational objectives.

7.7.3 Change management

The involvement of people in the operationalisation activities and processes requires them to accept a change of thinking, a mindset alteration that requires continuous reminders of the change in the organisation. Change should be managed in ways that alleviate uncertainty and promote progress for the betterment of the organisation and its employees. Communicating the change should occur in a way that highlights the benefits and reasons why change is required. Thus, posters, workshops, visual and audio broadcasting and ever-present change agents should be introduced within the organisation to communicate and advocate change.

7.8 Further research

This study contributes in terms of two perspectives – theoretical and practical – to the existent body of knowledge. Many organisations invest money, effort and time developing, redeveloping and implementing IT strategy. Year-in and year-out, following the development of IT strategies, these are either partially implemented or not implemented at all. This results in failed IT strategy initiatives and technology solutions, ignored and not operationalised.

In the public sector, this is classified as wasteful or fruitless expenditure. And in the private sector, this is written off as an unsuccessful initiative, with cost passed on the consumers in some way or another. This is cause for serious concern in the information system sphere. IT divisions in organisations are meant to add value to the business units in the organisation so business-IT must not misalign objectives.

Taking into consideration the rigourousness with which the study was conducted to determine the factors influencing the IT strategy operationalise, the factors identified include business vision, skills and knowledge, control and management, and power relationships. If this study was not conducted, these factors would not have been proven empirically.

The researcher is certainly recommending further research in several areas: firstly, to measure the implementation of the framework in organisations; secondly, the use of different theories such as actor network theory to establish the influence of the heterogeneity of networks on operationalising IT strategy; and thirdly, the use of a technology acceptance model to examine how actors come to accept a technology solution introduced by IT strategy in an organisation.

7.9 Conclusion

This chapter presents an overall summary of the study. The study proposes a solution in the form of a framework that can be used for operationalising IT strategy in an organisation. The framework, Operationalisation of IT Strategy Framework (OITSF), consist of seven main components: collaboration, heterogeneity of actors, strategic intent and operational intent, diverse organisational culture, technology advancement, macro and micro levels, and operational architecture.

The framework results from interpretation of findings that were reached from analyses of data that were gathered from two cases, Broad Spectrum and Triumph Technologies. The analyses were through the lens of structuration theory. Structuration theory assisted in gaining better understanding of the interaction and relationship that existed among technical and non-technical agents in the organisations.

In the interpretation of the findings, the hermeneutic approach was employed, which was guided by the lens of the innovation-decision process from a diffusion of innovations perspective. The focus was to understand how the IT strategy is operationalised, from creating awareness to confirming the use and operations of the solutions in the organisations.

These components demonstrate that the influence on the operationalisation of the IT strategy are authentic; therefore, they cannot be disregarded or dismissed. Employees and management in organisations must be cognizant of the IT strategy and its operationalisation in this era of digital transformation.

This study has been successfully concluded as the aim and objectives were achieved, as intended, by the researcher. The empirical findings provide assurance to employees and management in organisations that operationalising their IT strategy renders their organisation competitive and sustainable.

REFERENCES

Adams, R., Jeanrenaud, S., Bessant, J., Denyer, D., & Overy, P. 2016. Sustainability-oriented innovation: A systematic review. International Journal of Management Reviews, 18(2):180-205.

Ahuja, S. & Gallupe, B. 2015. A Foundation for the Study of Personal Cloud Computing in Organizations. End-User Information Systems, Innovation, and Organizational Change (SIG-OSRA).

Aizstrauta, D., Ginters, E. & Eroles, M.A.P. 2015. Applying theory of diffusion of innovations to evaluate technology acceptance and sustainability. Procedia Computer Science, 43:69-77.

Ali, S. & Green, P. 2012. Effective information technology (IT) governance mechanisms: An IT outsourcing perspective. Information Systems Frontiers, 14(2):179-193.

Allen, R.E. & Wiles, J.L. 2016. A rose by any other name: Participants choosing research pseudonyms. Qualitative Research in Psychology, 13(2):149-165.

Alleyne, A. 2011. Agriculture and Information Technology: Editor's note. The Bridge: Linking engineering and society, 41(3):3-4.

Al-Jabri, I.M. & Sohail, M.S. 2012. Mobile banking adoption: Application of diffusion of innovation theory. Journal of Electronic Commerce Research, 13(4):379-391.

Al-Khouri, A.M. 2013. Critical Insights from a Practitioner Mindset (Vol. 3). Chartridge Books Oxford.

Almalki, M., Alfleit, S. & Zafar, A. 2017. Challenges in Implementation of Information System Strategies in Saudi Business Environment: A Case Study of a Bank. International Journal of Computer Trends and Technology, 43(1):56-64.

Anderson, C., John, O. P. & Keltner, D. 2012. The personal sense of power. Journal of personality, 80(2):313-344.

Archer, M. 1995. Realist Social Theory: The Morphogenetic Approach. Cambridge: Cambridge University Press.

Arvidsson, V., Holmström, J. & Lyytinen, K. 2012. Information systems strategy-as-practice. In International workshop on IT Artefact Design & Work Practice Intervention, Barcelona.

Arvidsson, V., Holmström, J. & Lyytinen, K. 2014. Information systems use as strategy practice: A multi-dimensional view of strategic information system implementation and use. The Journal of Strategic Information Systems, 23(1):45-61.

Asparouhova, E., Bossaerts, P., Roy, N. & Zame, W. 2016. "Lucas" in the Laboratory. The Journal of Finance, 71(6):2727-2780.

Baller, S., Dutta, S. & Lanvin, B. 2016. Global information technology report 2016. Geneva: Ouranos.

Barak, M., Watted, A. & Haick, H. 2016. Motivation to learn in massive open online courses: Examining aspects of language and social engagement. Computers & Education, 94:49-60.

Barratt, M., Choi, T.Y. & Li, M. 2011. Qualitative case studies in operations management: Trends, research outcomes, and future research implications. Journal of Operations Management, 29(4):329-342.

Barfield, A. 2016. Collaboration. Elt Journal, 70(2):222-224.

Bartenschlager, J. & Goeken, M. 2009. Designing artifacts of IT strategy for achieving business/IT alignment. AMCIS 2009 Proceedings, p.494.

Bartenschlager, J. 2011. Implementing IT strategy–Laying a foundation. Tagungsband der INFORMATIK.

Batyashe, T.N. & Iyamu, T. 2016. IT governance: An architectural framework based on consolidated best practices. Journal of Governance and Regulation, 5(1):7-15.

Bell, P., Dean, G. & Gottschalk, P. 2010. Information management in law enforcement: the case of police intelligence strategy implementation. International Journal of Information Management, 30(4):343-349.

Bertrand, M. & Duflo, E. 2017. Field experiments on discrimination. In Handbook of Economic Field Experiments, (1):309-393.

Berry, F.S. & Berry, W.D. 2018. Innovation and Diffusion Models in Policy Research. In Theories of the policy process (pp. 263-308). Routledge.

Bharadwaj, A. 2000. A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation. MIS Quarterly, 24(1):169-196.

Bharadwaj, A., El Sawy, O.A., Pavlou, P.A. & Venkatraman, N. 2013. Digital business strategy: toward a next generation of insights. MIS Quarterly, 37(2):471-482.

Bhattacherjee, A. 2012. Social Science Research: principles, methods, and practices.

Bidgoli, H. 2011. Using information technologies for competitive advantage. Business Education Center, viewed 3 April 2016, www.csub.edu/kej/_files/2011-01-24.pdf - 8k - 2014-08-13.

Bingley, S. & Burgess, S. 2009. Using Data Visualisation to Represent Stages of the Innovation-Decision Process. International Journal of Actor-Network Theory and Technological Innovation (IJANTTI), 1(2):13-30.

Birshan, M. & Kar, J. 2012. Becoming more strategic: Three tips for any executive. McKinsey Quarterly, July.

Blaikie, N. 2010. Designing social research. 2nd ed. Cambridge, UK: Polity.

Boddy, C.R. 2016. Sample size for qualitative research. Qualitative Market Research: An International Journal, 19(4):426-432.

Bonnet, D. & Maulik, P. 2017. Reframing Growth Strategy in a Digital Economy. Retrieved from sloanreview.mit.edu/article/reframing-growth-strategy-in-a-digital-economy. Accessed on: 21 February 2017.

Bourgeois, D.T. 2014. Information Systems for Business and Beyond. Washington: The Saylor Academy.

Bowen, G.A. 2009. Document analysis as a qualitative research method. Qualitative Research Journal, 9(2): 27-40.

Broadbent, M., McDonald, M. & Hunter, R. 2003. Does it Matter? An HBR Debate. Letters to the Editor, Harvard Business Review, June, p.10.

Brodie, J., Evans, J., Brooks, L. & Perry, M., 2003, September. Supporting human interaction through digital technology: theory and practice. In Proceedings of the 1st international symposium on Information and communication technologies (pp. 403-408). Trinity College Dublin.

Brown, C.V., DeHayes, D.W., Hoffer, J.A., Martin, E.W. & Perkins, W.C. 2012. Managing Information Technology. 7th. ed. Upper Saddle River, NJ: Prentice Hall.

Bryman, A. 2012. Social Research Methods. 4th ed. New York: Oxford University Press.

Bryman, A. & Bell, E. 2011. Business Research Methods. 3rd ed. New York: Oxford University Press.

Callon, M. 1986. Some elements of a sociology of translation: domestication of the scallops and the fishermen of St Brieuc Bay. Power, Action and Belief: a New Sociology of Knowledge?: pp.196-223.

Carr, N.G. 2003. IT doesn't matter. Educause Review, 38:24-38.

Chao, C & Chandra, A. 2012. Impact of owner's knowledge of information technology (IT) on strategic alignment and IT adoption in US small firms. Journal of Small Business and Enterprise Development, 19(1):114-131.

Chen, D.Q., Mocker, M., Preston, D.S. & Teubner, A. 2010. Information systems strategy: reconceptualization, measurement, and implications. MIS quarterly, 34(2):233-259.

Chew, E.K. & Gottschalk, P. 2009. Information Technology Strategy and Management: Best Practices.

Chisita, C.T. & Chinyemba, F. 2017. Utilising ICTs for Resource Sharing Initiatives in Academic Institutions in Zimbabwe: Towards a New Trajectory. In Managing Knowledge and Scholarly Assets in Academic Libraries (pp. 174-187). IGI Global.

Christensen, C. 2013. The innovator's dilemma: when new technologies cause great firms to fail. Harvard Business Review Press.

Coggio, G.L. 2015. Technical Communicators as Agents and Adopters of Change: A Case Study of the Implementation of an Early Content-Management System. IEEE Transactions on Professional Communication, 58(3):271-288.

Corbin, J. & Strauss, A. 2008. Basics of qualitative research. 3rd ed. Thousand Oaks, CA: Sage Publications.

Cresswell, K. & Sheikh, A. 2013. Organizational issues in the implementation and adoption of health information technology innovations: an interpretative review. International journal of medical informatics, 82(5): e73-e86, May.

Creswell, J.W. 2013. Qualitative Inquiry and Research Design: Choosing Among Five Approaches. 3rd ed. Thousand Oaks, CA: Sage Publications.

Creswell, J.W. 2014. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. 4th ed. Thousand Oaks, CA: Sage Publications.

Creswell, J.W. & Poth, C.N. 2017. Qualitative inquiry and research design: Choosing among five approaches. 4th ed. Thousand Oaks, CA: Sage Publications.

Cui, T., Hua, Y., Toe, H. & Li, J. 2015. Information technology and open innovation: A strategic alignment perspective. Information & Management, 52(2015):348-358.

Davenport, T.H., 2013. Process innovation: reengineering work through information technology. Harvard Business Press.

de Lange, T.C.B. 2015. IS/IT integration in mergers & acquisitions: a framework for a systematic approach. [Master's thesis] Enschede, University of Twente.

Del Giudice, M., Caputo, F. & Evangelista, F. 2016. How are decision systems changing? The contribution of social media to the management of decisional liquefaction. Journal of Decision systems, 25(3), 214-226.

De Jesus-Rivas, M., Conlon, H.A. & Burns, C. 2016. The impact of language and culture diversity in occupational safety. Workplace health & safety, 64(1):24-27.

den Hond, F., Boersma, F.K., Heres, L., Kroes, E.H. & van Oirschot, E. 2012. Giddens à la Carte? Appraising empirical applications of Structuration Theory in management and organization studies. Journal of Political Power, 5(2):239-264.

Denzin, N.K., & Lincoln, Y.S. (Eds.). 2011. Introduction: The discipline and practice of qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), Handbook of qualitative research (4th ed., pp. 1–20). Thousand Oaks, CA: Sage.

DePoy, E. & Gitlin, L.N. 2015. Introduction to research: Understanding and applying multiple strategies. 5th ed. Elsevier Health Sciences.

De Vaus, D. 2014. Surveys in social research. 6th ed. London: Routledge.

Dilaver, O. 2014. Making sense of innovations: A comparison of personal computers and mobile phones. New media & society, 16(8):1214-1232.

Donaldson, L. 2001. The contingency theory of organisations. London: SAGE.

Dong, S. 2011, May. The structuration theory on CRM diffusion: IT governance issues. In E-Business and E-Government (ICEE), 2011 International Conference on (pp. 1-4). IEEE.

Dos Santos, B.L., Zheng, Z., Mookerjee, V.S. & Chen, H. 2012. Are New IT-Enabled Investment Opportunities Diminishing for Firms? Information Systems Research, 23(2):287-305.

Drnevich, P.L. & Croson, D.C. 2013. Information Technology and Business-Level Strategy: Toward an Integrated Theoretical Perspective. MIS Quarterly, 37(2):483-509.

Dunn, A.G., Coiera, E., Mandl, K.D. & Bourgeois, F.T. 2016. Conflict of interest disclosure in biomedical research: a review of current practices, biases, and the role of public registries in improving transparency. Research integrity and peer review, 1(1):1.

Enfield, J., Myers, R.D., Lara, M. & Frick, T.W. 2012. Innovation diffusion: assessment of strategies within the diffusion simulation game. Simulation & Gaming, 43(2):188-214.

Eriksson, P. & Kovalainen, A. 2015. Qualitative Methods in Business Research: A Practical Guide to Social Research. 2nd ed. UK: Sage.

Evans, J. & Brooks, L. 2005. Understanding collaboration using new technologies: A structurational perspective. The Information Society, 21(3):215-220.

Evans, C. & Lewis, J. 2018. Analysing semi-structured interviews using thematic analysis: exploring voluntary civic participation among adults. SAGE Publications Limited.

Fowler Jr, F.J. 2013. Survey research methods. 5th ed. Thousand Oakes, CA: Sage Publications.

Furlong, P. & Marsh, D. 2010. A skin not a sweater: ontology and epistemology in political science. Theory and methods in political science, pp.184-211.

Gabriel, D. 2016. Blogging while Black, British and female: a critical study on discursive activism. Information, Communication & Society, 19(11):1622-1635.

Galletta, A. 2013. Mastering the semi-structured interview and beyond: From research design to analysis and publication. New York: New York University Press.

Galliers, R.D., Jarvenpaa, S.L., Chan, Y.E., Lyytinen, K. 2012. Strategic information systems: reflections and prospectives. Journal of Strategic Information Systems, 21(2):85-90.

García-Holgado, A. & García-Peñalvo, F. J. 2017. Preliminary validation of the metamodel for developing learning ecosystems. In Proceedings of the 5th International Conference on Technological Ecosystems for Enhancing Multiculturality (p. 91). ACM.

Gartner. 2018. http://www.gartner.com. [21 April 2018].

Gates, L.P. 2010. Strategic planning with critical success factors and future scenarios: An integrated strategic planning framework (No. CMU/SEI-2010-TR-037). Carnegie-Mellon University Pittsburgh PA Software Engineering Inst.

Gaya, H.J. & Smith, E.E. 2016. Developing a qualitative single case study in the strategic management realm: An appropriate research design. International Journal of Business Management and Economic Research, 7(2):529-538.

Giddens, A. 1979. Central problems in social theory: Action, structure, and contradiction in social analysis (Vol. 241). University of California Press.

Giddens, A. 1984. The Constitution of Society: Outline of the Theory of Structuration. Cambridge, UK: Polity Press.

Giddens, A. & Pierson, C. 1998. Conversations with Anthony Giddens: Making sense of modernity. Stanford University Press.

Goldkuhl, G. 2012. Pragmatism vs interpretivism in qualitative information systems research. European Journal of Information Systems, 21(2):135-146.

Gottschalk, P. 1999. Strategic information systems planning: the IT strategy implementation matrix. European Journal of Information Systems, 8(2):107-118.

Grant, R.M. 2010. Contemporary Strategy Analysis. 7th ed. West Sussex, UK: John Wiley & Sons.

Grant, R.M., 2016. Contemporary strategy analysis: Text and cases edition. 9th ed. West Sussex, UK: John Wiley & Sons.

Gratton, C. & Jones, I. 2010. Research methods for sports studies. 2nd ed. London: Routledge Taylor & Francis.

Gray, D. 2013. Doing Research in the real world. 3rd ed. London: Sage Publications.

Greenhalgh, T., Robert, G., Bate, P., Macfarlane, F. & Kyriakidou, O. 2008. Diffusion of innovations in health service organisations: a systematic literature review. John Wiley & Sons.

Halperin, R. & Backhouse, J. 2007. Using structuration theory in IS research: Operationalizing key constructs. ICIS 2007 Proceedings, p.127.

Haron, H. & Khalid, K., 2011, November. Structurational analysis of knowledge management technology in oil and gas industry. In Research and Innovation in Information Systems (ICRIIS), 2011 International Conference on (pp. 1-6). IEEE.

Harvey, L. 2012-16. Social Research Glossary. Quality Research International. http://www.qualityresearchinternational.com/socialresearch/. [30 April 2016].

Harwell, M.R. 2011. Research design in qualitative/quantitative/mixed methods. CONRAD, Clifton F.; SERLIN, Ronald C. The SAGE Handbook for Research in Education: Pursuing ideas as the keystone of exemplary inquiry. 2rd ed. Thousand Oaks, CA: SAGE Publications, pp.147-163.

Harwood, I., Gapp, R.P. & Stewart, H.J. 2015. Cross-Check for Completeness: Exploring a Novel Use of Leximancer in a Grounded Theory Study. The Qualitative Report, 20(7):1029-1045. Retrieved from http://nsuworks.nova.edu/tqr/vol20/iss7/5.

Hathcoat, J.D., Meixner, C. & Nicholas, M.C. 2019. Ontology and Epistemology. Handbook of Research Methods in Health Social Sciences, 99-116.

Heeks, R. & Stanforth, C. 2015. Technological change in developing countries: opening the black box of process using actor–network theory. Development Studies Research, 2(1):33-50.

Hesse-Biber, S.N. & Leavy, P. 2011. The Practice of Qualitative Research. 2nd ed. Thousand Oakes, California: Sage Publications.

High, P.A., 2014. Implementing World Class IT Strategy: How IT Can Drive Organizational Innovation. San Francisco: John Wiley & Sons.

Hine, G.S.C. 2013. The importance of action research in teacher education programs. Issues in Educational Research, 23(2):151-163.

HO, S.M., Hancock, J.T., Booth, C., Burmester, M., Liu, X. & Timmarajus, S.S. 2016. Demystifying insider threat: Language-action cues in group dynamics. In 2016 49th Hawaii International Conference on System Sciences (HICSS)(pp. 2729-2738). IEEE.

Holter, A.C. & Frabutt, J.M. 2012. Mission driven and data informed leadership. Journal of Catholic Education, 15(2):253-269.

Hoy, W.K. & Adams, C.M. 2015. Quantitative research in education: A primer. Sage Publications.

Huda, M.Q. & Hussin, H. 2013, March. A conceptual model of information technology innovation implementation effectiveness in higher education. In Information and Communication Technology for the Muslim World (ICT4M), 2013 5th International Conference on (pp. 1-6). IEEE.

Hunter, J.L. 2015. High Possibility Classrooms: A New Model for Technology Integration. In Handbook of Research on Teacher Education in the Digital Age (pp. 466-492). IGI Global.

Hyett, N., Kenny, A. & Dickson-Swift, D.V. 2014. Methodology or method? A critical review of qualitative case study reports. International journal of qualitative studies on health and well-being, 9, April. http://dx.doi.org/10.3402/qhw.v9.23606.

Ismail, F, Hashim, A.E., Ismail, R. & Majid. M.Z.A. 2009. The Operationalisation of Safety Culture for the Malaysian Construction Organisations. International Journal of Business and Management, 4(9):226-237.

Iverson, J., Robinson, T. & Venette, S.J. 2017. Structuration Theory and Health and Risk Messaging. In Oxford Research Encyclopedia of Communication.

Iyamu, T. & Roode, D. 2010. The Use of Structuration Theory and Actor Network Theory for Analysis: Case Study of a Financial Institution in South Africa. International Journal of Actor-Network Theory and Technological Innovation (IJANTTI), 2(1):1-26.

Iyamu, T. 2011. The architecture of information in organisations. South African Journal of Information Management, 13(1):1-9.

Iyamu, T. 2012. A Model for Operationalising Influencing Factors in IT Strategy Deployment. International Journal of Social and Organisational Dynamics in IT, 1(4):159-170.

Iyamu, T. 2015a. Application of Underpinning Theories in Information Systems. Victoria, Australia: Heidelberg Press.

Iyamu, T. 2015b. Politicking the Information Technology Strategy in Organisations. Strategic Information Technology Governance and Organizational Politics in Modern Business, p.51.

Iyamu, T. 2018. A multilevel approach to big data analysis using analytic tools and actor network theory. South African Journal of Information Management, 20(1):1-9.

Iyamu, T. & Kekwaletswe, R.M. 2010, April. Importance of the distinction between information systems and information technology. In Information Management and Engineering (ICIME), 2010 The 2nd IEEE International Conference on (pp. 342-348). IEEE.

Jones, M.R. & Karsten, H., 2008. Giddens's structuration theory and information systems research. MIS Quarterly, 32(1):127-157.

Jonker, J. & Pennink, B. 2010. The essence of research methodology: A concise guide for master and PhD students in management science. New York: Springer Publishers.

Joshi, A., Bollen, L., Hassink, H., De Haes, S. & Van Grembergen, W. 2018. Explaining IT governance disclosure through the constructs of IT governance maturity and IT strategic role. Information & Management, 55(3):368-380.

Kallio, H., Pietilä, A.M., Johnson, M. & Kangasniemi, M. 2016. Systematic methodological review: developing a framework for a qualitative semi-structured interview guide. Journal of advanced nursing, 72(12):2954-2965.

Kandampully, J., Bilgihan, A. & Zhang, T.C. 2016. Developing a people-technology hybrids model to unleash innovation and creativity: The new hospitality frontier. Journal of Hospitality and Tourism Management, 29(2016):154-164.

Kaptelinin, V. & Nardi, B. 2006. Acting with Technology: Activity Theory and Interaction Design. USA: Massachusetts Institute of Technology Press.

Karpovsky, A., Hallanoro, M., Galliers, R.D. 2014a. The process of information systems strategizing: review and synthesis. In: Cohen, R., Topi, H., Tucker, A. (Eds.), The CRC Handbook of Computing: Information Systems and Information Technology, third ed., vol. II. Chapman & Hall, London.

Karpovsky, A., Hallanoro, M., Galliers, R.D. 2014b. Information Systems Strategizing-as-organizing: A 50-year Reflection, Bentley University Working Paper, Waltham, MA.

Kauffman, R.J., Liu, J. & Ma, D. 2015. Technology investment decision-making under uncertainty. Information Technology and Management, 16(2):153-172.

Kearns, G.S. & Lederer, A.L. 2003. A resource-based view of strategic IT alignment: how knowledge sharing creates competitive advantage. Decision sciences, 34(1):1-29.

Kearns, G. S. & Sabherwal, R. 2006. Strategic alignment between business and information technology: a knowledge-based view of behaviors, outcome, and consequences. Journal of management information systems, 23(3):129-162.

Keller, A. 2014. The evolutionary function of conscious information processing is revealed by its task-dependency in the olfactory system. Frontiers in Psychology, 5(62):1-7.

Klesel, M., Mokosch, G. & Niehaves, B. 2015. Putting flesh on the Duality of Structure: The Case of IT Consumerization, in AMCIS 2015 Proceedings.

Kirchmer, M. 2012. Business process-oriented implementation of standard software: how to achieve competitive advantage efficiently and effectively. Springer Science & Business Media.

Korpelainen, E. 2011. Theories of ICT system implementation and adoption–A critical. Aalto University publication series, 1:14-17.

Kort, W. & Gharbi, J.E. 2011. Call centers performance: An application of Structuration Theory. Communications of the IBIMA. 2011(2011):1-16.

Krauss, S.E. & Putra, U. 2005. Research paradigms and meaning making: a primer. The Qualitative Report, 10(4):758-770.

Krimpmann, D. 2015. IT/IS Organisation Design in the Digital Age–A Literature Review. World Academy of Science, Engineering and Technology, International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering, 9(4):1208-1218.

Kroh, J., Luetjen, H., Globocnik, D. & Schultz, C. 2018. Use and efficacy of information technology in innovation processes: The specific role of servitization. Journal of Product Innovation Management, 35(5):720-741.

Kumar, M.P. 2014. Information Technology: Roles, Advantages and Disadvantages. International Journal of Advanced Research in Computer Science and Software Engineering, 4 (6).

Lamsal, M. 2012. The Structuration Approach of Anthony Giddens. Himalayan Journal of Sociology and Anthropology, 5:111-122.

Larsen. M.V. 2014. Strategizing through organising. The significance of relational sense making. 2nd ed. Chagrin Falls, Ohio, US: Taos Institute Publications.

Lee, T.W. 2012. Using Qualitative Methods in Organizational Research. London: Sage Publications.

Lee, A.S. & Baskerville, R.L. 2012. Conceptualizing generalizability: New contributions and a reply. MIS quarterly, 749-761.

Lee, E. & Puranam, P. 2015. The implementation imperative: Why one should implement even imperfect strategies perfectly. Strategic Management Journal, 37(8):1529-1546.

Leedy P.D. & Ormrod, J.E. 2014. Practical Research: Planning and Design. 10th ed. Upper Saddle River, NJ: Pearson.

Leung, R. & Sun, H.Y. 2008. An Innovation Competence Model for Hong Kong/China Manufacturing Companies', Industrial Engineering Research: An International Journal of IE Theory and Application, 5(2):1-10.

Liberman, C.J. & Doerfel, M.L. 2012, January. Structuring Organizational Communication: Employees' Role and Network Position as Predictive of Institutional Talk About the Adoption of Technology. In System Science (HICSS), 2012 45th Hawaii International Conference on (pp. 4445-4454). IEEE.

Lien, A.S.Y. & Jiang, Y.D. 2017. Integration of diffusion of innovation theory into diabetes care. Journal of diabetes investigation, 8(3):259-260.

Lin, K.Y. & Lu, H.P. 2011. Why people use social networking sites: An empirical study integrating network externalities and motivation theory. Computers in human behavior, 27(3): 1152-1161.

Liu, W. 2018. Ontology and Epistemology of Basic Problems of Philosophy Based on Cognitive Neurology. NeuroQuantology, 16(5):127-133.

Loukis, E., Charalabidis, Y. & Androutsopoulou, A. 2017. Promoting open innovation in the public sector through social media monitoring. Government Information Quarterly, 34:99–109.

Loveridge, D. & Saritas, O. 2009. Reducing the democratic deficit in institutional foresight programmes: a case for critical systems thinking in nanotechnology. Technological Forecasting and Social Change, 76(9):1208-1221.

Lozano, J.F. & Escrich, T. 2017. Cultural diversity in business: A critical reflection on the ideology of tolerance. Journal of Business Ethics, 142(4):679-696.

Ludwig, D. & El-Hani, C. 2019. Philosophy of Ethnobiology: Understanding Knowledge Integration and Its Limitations. http://philsci-archive.pitt.edu/id/eprint/15892. [12 June 2019].

Makovhololo, P., Batyashe, N., Sekgweleo, T. & Iyamu, T. 2017. Diffusion of innovation theory for information technology decision making in organisational strategy. Journal of Contemporary Management, 14(1):461-481.

Mair, F.S., May, C., O'Donnell, C., Finch, T., Sullivan, F. & Murray, E. 2012. Factors that promote or inhibit the implementation of e-health systems: an explanatory systematic review. Bulletin of the World Health Organization, 90(5):357-364.

Marabelli, M. & Galliers, R.D., 2017. A reflection on information systems strategizing: the role of power and everyday practices. Information Systems Journal, 27(3):347-366.

Marlow, C.R. 2010. Research methods for generalist social work. 5th ed. Belmont, CA: Cengage Learning

Marshall, C. & Rossman, G.B. 2014. Designing qualitative research. Sage publications.

Matta, M., Cavusoglu, H. & Benbasat, I. 2016. Understanding the Board's Involvement in Information Technology Governance: Theory, Review and Research Agenda. Review and Research Agenda (May 19, 2016).

McLeod, S.A. 2008. Case Study Method. www.simplypsychology.org/case-study.html.[22 April 2017].

McLeod, S.A. 2015. Observation Methods. www.simplypsychology.org/observation.html. [16 April 2017].

McNabb, D.E. 2015. Research methods for political science: Quantitative and qualitative methods. 2nd ed. London: Routledge.

Mezzanotte Sr, D.M. 7 Dehlinger, J. 2013. Building Information Technology Based on a Human Behavior-Oriented Approach to Enterprise Architecture. In Proceedings of the International Conference on Software Engineering Research and Practice (SERP) (p. 1). The Steering Committee of The World Congress in Computer Science, Computer Engineering and Applied Computing (WorldComp).

Mezzanotte, D.M. 2016, June. Planning Enterprise Architecture: Creating organizational knowledge using the Theory of Structuration to build Information Technology. In Software Engineering Research, Management and Applications (SERA), 2016 IEEE 14th International Conference on (pp. 107-115). IEEE.

Mithas, S. & Lucas, H.C. 2010. What is your digital business strategy?. IT professional, 12(6):4-6.

Mithas, S. & Rust, R.T. 2012a. Information Technology Investments and Firm Performance: The Moderating Role of IT Strategy. Working Paper, Robert H. Smith School of Business, University of Maryland, College Park, MD.

Mithas, S., Tafti, A.R., Bardhan, I.R. & Goh, J.M. 2012b. Information Technology and Firm Profitability: Mechanisms and Empirical Evidence. MIS Quarterly, 36(1):205-224.

Mithas, S., Tafti, A. & Mitchell, W. 2013. How a Firm's Competitive Environment and Digital Strategic Posture Influence Digital Business Strategy. MIS Quarterly, 37(2):511-536.

Mitchell, D. 2014. Advancing Grounded Theory: Using Theoretical Frameworks within Grounded Theory Studies. The Qualitative Report, 19(36):1-11.

Micó, J.L., Masip, P. & Domingo, D. 2013. To wish impossible things* Convergence as a process of diffusion of innovations in an actor-network. International Communication Gazette, 75(1):118-137.

Mkhomazi, S.S. & Iyamu, T. 2014. Human Interaction in the Regulatory of Telecommunications Infrastructure Deployment in South Africa. In International Working Conference on Transfer and Diffusion of IT (pp. 324-333). Springer, Berlin, Heidelberg.

Moloi, R. & Iyamu, T. 2013. Competitive Intelligence in the Enterprise: Power Relationships. International Journal of Actor-Network Theory and Technological Innovation (IJANTTI), 5(2):50-64.

Mudrik, L., Faivre, N. & Koch, C. 2014. Information integration without awareness. Trends in Cognitive Sciences, 18(9):488-496.

Murray, J. 2010. Qualitative research methods. Principles of Social Psychiatry, 77-86.

Myers, M.D. 2013. Qualitative research in business and management. 2nd ed. London: Sage Publications.

Nandhakumar, J. & Jones, M. 1997. Designing in the dark: the changing user-developer relationship in information systems development. ICIS 1997 Proceedings, 5.

Nassaji, H. 2015. Qualitative and descriptive research: Data type versus data analysis. Language Teaching Research, 19(2):129-132.

Nemutanzhela, P. & Iyamu, T. 2011. A Framework for Enhancing the Information Systems Innovation: Using Competitive Intelligence. The Electronic Journal Information Systems Evaluation, 14:242-253.

Nemutanzhela, P. & Iyamu, T. 2015, July. Theory of diffusion of innovation for analysis in information systems studies. In Science and Information Conference (SAI), 2015 (pp. 603-608). IEEE.

Neuman, W. L. 2013. Social research methods: Qualitative and quantitative approaches. 7th ed. Essex, UK: Pearson Education.

Nightingale, W., 2012. Positivist approach to research. Retrieved June, 4, p.2012.
Noe, R. A., Hollenbeck, J. R., Gerhart, B., & Wright, P. M. 2017. Human resource management: Gaining a competitive advantage. New York, NY: McGraw-Hill Education.

Nolan, R.L. 2012. Ubiquitous IT: the case of the Boeing 787 and implications for strategic IT research. Journal of Strategic Information Systems, 21(2):91-102.

Nuntamanop, P., Kauranen, I. & Igel, B. 2013. A new model of strategic thinking competency. Journal of Strategy and Management, 6(3):242-264.

Oláh, J., Karmazin, G., Pető, K. & Popp, J. 2018. Information technology developments of logistics service providers in Hungary. International Journal of Logistics Research and Applications, 21(3):332-344.

Oliveira, T. & Martins, M.F. 2011. Literature review of information technology adoption models at firm level. The Electronic Journal Information Systems Evaluation, 14(1):110-121.

Olsen, D.H. & Trelsgård, K. 2016. Enterprise Architecture adoption challenges: An exploratory case study of the Norwegian higher education sector. Procedia Computer Science, 100, 804-811.

Olsson, A., Skovdahl, K. & Engström, M. 2016. Using diffusion of innovation theory to describe perceptions of a passive positioning alarm among persons with mild dementia: a repeated interview study. BMC geriatrics, 16(1):1-6.

Onn, C. & Sorooshian. S. 2013. Mini Literature Analysis on information technology definition. Information and Knowledge Management Journal, 3(2):139-149.

Orlikowski, W.J. & Iacono, C.S. 2001. Research commentary: Desperately seeking the "IT" in IT research: A call to theorizing the IT artifact. Information systems research, 12(2):121-134.

Parry, V.K.A. & Lind, M.L. 2016. Alignment of business strategy and information technology considering information technology governance, project portfolio control, and risk management. International Journal of Information Technology Project Management (IJITPM), 7(4):21-37.

Pathak, A. & Intratat, C. 2012. Use of c interviews to investigate teacher perceptions of student collaboration. Malaysian Journal of ELT Research, 8(1):1-10.

Peppard, J., Galliers, R.D. & Thorogood, A. 2014. Information systems strategy as practice: Micro strategy and strategizing for IS. Journal of Strategic Information Systems, 23(1):1-10.

Peppard, J & Ward, J. 2016. The Strategic Management of Information Systems: Building a Digital Strategy. 4th ed. Sussex, UK: John Wiley & Sons.

Pérez Estébanez, R., Urquía Grande, E. & Muñoz Colomina, C. 2010. Information technology implementation: evidence in Spanish SMEs. International Journal of Accounting & Information Management, 18(1):39-57.

Pfeffer, J. & Sutton, R. I. 2013. The knowing-doing gap: How smart companies turn knowledge into action: Harvard Business Press.

Piechota, R. 2015. IT governance – how to increase the impact of information technology on a firm's performance. Communication and Information Technology in Society: Information and Communication Technologies (ICT) in Management, 2, p.23.

Pilot, D.F. & Beck, C.T. 2010. Generalization in Quantitative and Qualitative Research: Myths and Strategies. International journal of nursing studies, 47(11):1451-1458.

Polyviou, A. & Pouloudi, N. 2015, January. Understanding cloud adoption decisions in the public sector. In 2015 48th Hawaii International Conference on System Sciences (pp. 2085-2094). IEEE.

Poni, M. 2014. Research paradigms in education. Journal of Educational and Social Research, 4(1):407-413.

Posthumus, B., Aarnoudse, R. & Stroek, C. 2013, May. The diffusion of mobile agricultural information services in Ghana: A case study. In IST-Africa Conference and Exhibition (IST-Africa), 2013 (pp. 1-9). IEEE.

Power, B. 2013. Yes, Managing IT Is Your Job. https://hbr.org/2013/08/managing-it-is-your-job. [21 May 2016].

Pozzebon, M. & Pinsonneault, A. 2005. Challenges in Conducting Empirical Work Using Structuration Theory: Learning from IT Research. Organization Studies, 26(9):1353-1376.

Prasad, A., Heales, J. & Green, P. 2010. A capabilities-based approach to obtaining a deeper understanding of information technology governance effectiveness: Evidence from IT steering committees. International Journal of Accounting Information Systems, 11(3):214-232.

Puron-Cid, G. 2012, January. Applying extending structuration theory: A study of an IT-enabled budget reform in the context of interdisciplinary collaboration. In System Science (HICSS), 2012 45th Hawaii International Conference on (pp. 2239-2248). IEEE.

Qu, S.Q. & Dumay, J. 2011. The qualitative research interview. Qualitative Research in Accounting & Management, 8(3):238-264.

Queiroz, M., Coltman, T., Sharma, R., Tallon, P. & Reynolds, P. 2012. Strategic IT alignment: An evaluation and process-level reconceptualization of the construct. in Academy of Management Annual Meeting: The Informal Economy, Boston, MA, pp. 1-32, August 3-7, 2012.

Quintane, E., Mitch Casselman, R., Sebastian Reiche, B. & Nylund, P.A. 2011. Innovation as a knowledge-based outcome. Journal of Knowledge Management, 15(6):928-947.

Rabionet, S.E. 2011. How I learned to design and conduct semi-structured interviews: An ongoing and continuous journey. The Qualitative Report, 16(2):563-566.

Radwan, L. & Kinder, S. 2013. Practising the diffusion of organizational routines. Environment and Planning, 45(10):2442-2458.

Rana, N.P., Williams, M.D., Dwivedi, Y.K. & Williams, J. 2012. Theories and theoretical models for examining the adoption of e-government services. E-service Journal, 8(2):26-56.

Ranjbar, M.S., Shirazi, M.A. & Blooki, M.L. 2014. Interaction among intra-organizational factors effective in successful strategy execution: An analytical view. Journal of Strategy and Management, 7(2):127-154.

Recker, J. 2013. Scientific Research in Information Systems A Beginner's Guide: Springer.

Reddy, S.G. 2011. Testing the Capital Asset Pricing Model (CAPM)-A Study of Indian Stock Market. International Journal of Research in Commerce, Economics and Management, 1(3):40-46.

Rekimoto, J. & Green, M. 1993. The information cube: Using transparency in 3d information visualization. In Proceedings of the Third Annual Workshop on Information Technologies & Systems (WITS'93) (pp. 125-132).

Rice, R.E. & Pearce, K.E. 2015. Divide and diffuse: Comparing digital divide and diffusion of innovations perspectives on mobile phone adoption. Mobile Media & Communication, 3(3):401-424.

Richardson, J. 2008. The business model: an integrative framework for strategy execution. Strategic Change, 17(5-6):133-144.

Richet, J.L., Ngwenyama, O. & Rowe, F. 2016. Key Stakeholders Dissent and their Influences in the Reframing of Strategic Intent in IS-enabled Organizational Transformation. ICIS 2016.

Ritchie, J., Lewis, J., Nicholls, C. & Ormston, R. (eds). 2013. Qualitative research practice: A guide for social science students and researchers. 2nd ed. New York: Sage publications

Rodríguez-Escobar, J.A. & González-Benito, J. 2015. The role of information technology in purchasing function. Journal of Business & Industrial Marketing, 30(5):498-510.

Rogers, E.M. 1995. Diffusion of Innovations. New York: Free Press.

Rogers, E.M. 2003. Diffusion of Innovation. 5th ed. New York: Free Press.

Rosenbaum, H. & Shachaf, P. 2010. A structuration approach to online communities of practice: The case of Q&A communities. Journal of the American Society of Information Science and Technology, 61(9):1933-1944.

Rubin, A. & Babbie, E.R. 2011. Qualitative research: General principles. Research methods for social work. Cengage Learning.

Rubin, A. & Babbie, E.R. 2016. Empowerment Series: Research Methods for Social Work. Cengage Learning.

Sahin, I. 2006. Detailed review of Rogers' Diffusion of Innovations theory and educational technology-related studies based on Rogers' theory. The Turkish Online Journal of Educational Technology (TOJET), 5(2):14-23.

Sasaki, M. 2018. Application of diffusion of innovation theory to educational accountability: the case of EFL education in Japan. Language Testing in Asia, 8(1):1.

Saunders, M., Lewis, P. & Thornhill, A. 2015. Research Methods for Business Students. 5th ed. Pearson Education.

Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., Burroughs, H. & Jinks, C. 2018. Saturation in qualitative research: exploring its conceptualization and operationalization. Quality & quantity, 52(4):1893-1907.

Sawyer, S. & Jarrahi, M.H. 2014. Sociotechnical Approaches to the Study of Information Systems. In H. Topi and A. Tucker eds., Computing Handbook, Third Edition: Information Systems and Information Technology (pp. 5-1). Chapman and Hall/CRC.

Schillinger, D. 2010. An Introduction to Effectiveness, Dissemination and Implementation Research. P. Fleisher and E. Goldstein, eds. From the Series: UCSF Clinical and Translational Science Institute (CTSI) Resource Manuals and Guides to Community-Engaged Research, P. Fleisher, ed. Published by Clinical Translational Science Institute Community Engagement Program, University of California San Francisco. http://ctsi.ucsf.edu/files/CE/edi_introguide.pdf [17 February 2016].

Schultze, U. & Avital, M. 2011. Designing interviews to generate rich data for information systems research. Information and Organization, 21(1):1-16.

Scotland, J. 2012. Exploring the Philosophical Underpinnings of Research: Relating Ontology and Epistemology to the Methodology and Methods of the Scientific, Interpretive, and Critical Research Paradigms. Canadian Center of Science and Education, 5(9):10-17.

Scott, S. & McGuire, J. 2017. Using Diffusion of Innovation Theory to Promote Universally Designed College Instruction. International Journal of Teaching and Learning in Higher Education, 29(1):119-128.

Sefotho, M.M. 2015. A Researcher's Dilemma: Philosophy in Crafting Dissertations and Theses. Journal of Social Science, 42(12):23-36.

Selig, G.J. 2018. IT Governance—An Integrated Framework and Roadmap: How to Plan, Deploy and Sustain for Competitive Advantage. In 2018 Portland International Conference on Management of Engineering and Technology (PICMET) (pp. 1-15). IEEE.

Sharman, R., Rao, H.R. & Raghu, T.S. eds. 2011. Exploring the Grand Challenges for Next Generation E-Business: 8th Workshop on E-Business, WEB 2009, Phoenix, AZ, USA, December 15, 2009, Revised Selected Papers (Vol. 52). Springer.

Silvis, E. & Alexander, P. 2014. A study using a graphical syntax for actor-network theory. Information Technology & People, 27(2):110-128.

Stewart, R. A. 2008. A framework for the life cycle management of information technology projects: Project IT. International Journal of Project Management, 26(2):203-212.

Stewart, H., Gapp, R., & Harwood, I. 2017. Exploring the Alchemy of Qualitative Management Research: Seeking Trustworthiness, Credibility and Rigor Through Crystallization. The Qualitative Report, 22(1):1-19.

Straub, E.T. 2009. Understanding technology adoption: Theory and future directions for informal learning. Review of educational research, 79(2):625-649.

Stringer, E.T. 2013. Action research. 4th ed. Thousand Oakes, California: Sage Publications.

Stukart, B. 2009. Structuring the Group Dynamics for Enhancing Innovative Behavior in Online Community-Based Innovation, Thesis Master Information Studies University of Amsterdam, Faculty of Physics, Math and Informatics and Faculty of Business and Economics Department Business Studies Section Information management.

Susanti, A. 2018. An Insight into Collaboration: Lessons from Finnish Schools and thoughts to promote it in Indonesian Education Context. Proceedings International Seminar on English Language Teaching and Research (ELTAR) 2018:97-105.

Taiwo, J.N. 2016. Effect of ICT on Accounting Information System and Organisational Performance: The application of Information and Communication Technology on Accounting Information System. European Journal of Business and Social Sciences, 5(2):1-15.

Tatnall, A. 2009. Innovation translation and innovation diffusion: A comparison of two different approaches to theorising technological innovation. International Journal of Actor-Network Theory and Technological Innovation (IJANTTI), 1(2):67-74.

Teubner, R.A. & Mocker, M. 2008. A literature overview on strategic information systems planning. European Research Center for Information Systems Working Paper, (6).

Teubner, R.A. 2013. Information Systems Strategy. Business & Information Systems Engineering, 5(4):243-257.

Tidd, J. & Bessant, J.R. 2018. Managing innovation: integrating technological, market and organizational change. John Wiley & Sons.

Timmins, C.L. 2002. The impact of language barriers on the health care of Latinos in the United States: a review of the literature and guidelines for practice. The Journal of Midwifery & Women's Health, 47(2):80-96.

Tiwana, A. 2017. IT Strategy for Non-IT Managers: Becoming an Engaged Contributor to Corporate IT Decisions. Cambridge, Massachusetts, USA, The MIT Press.

Thanh, N.C. & Thanh, T.T. 2015. The interconnection between interpretivist paradigm and qualitative methods in Education. American Journal of Educational Science, 1(2):24-27.

Tsang, E.W. 2014a. Case studies and generalization in information systems research: a critical realist perspective. The Journal of Strategic Information Systems, 23(2):174-186.

Tsang, E.W. 2014b. Generalizing from research findings: The merits of case studies. International Journal of Management Reviews, 16(4):369-383.

Tuli, F., 2011. The basis of distinction between qualitative and quantitative research in social science: reflection on ontological, epistemological and methodological perspectives. Ethiopian Journal of Education and Sciences, 6(1):97-108.

Twum-Darko, M. & Iyamu, T. 2015. Politicking Information Technology strategy in organisations: a case study of a selected organisation in South Africa. Journal of Governance and Regulation, 4(3):107-114.

Vaismoradi, M., Turunen, H. & Bondas, T. 2013. Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. Nursing & health sciences, 15(3): 398-405.

van de Wetering, R. 2016. Modeling alignment as a higher order nomological framework. In International Conference on Business Information Systems (pp. 111-122). Springer, Cham.

Veenstra, A.F.V., Melin, U. & Axelsson, K. 2014. Theoretical and practical implications from the use of structuration theory in public sector information systems research. In The European Conference on Information Systems (ECIS) 2014, Tel Aviv, Israel, June 9-11, 2014.

Venkatesh, V., Brown, S.A. & Bala, H. 2013. Bridging the qualitative-quantitative divide: Guidelines for conducting mixed methods research in information systems. MIS quarterly, 37(1):21-54.

Verloop, J. 2013. Success in innovation: Improving the odds by understanding the factors for unsuccess. Newnes.

Vosloo, J.J. 2014. A sport management programme for educator training in accordance with the diverse needs of South African schools. (Doctoral dissertation).

Wagner, H.T. & Meshtaf, J. 2016. Individual IT Roles in Business--IT Alignment and IT Governance. In 2016 49th Hawaii International Conference on System Sciences (HICSS) (pp. 4920-4929). IEEE.

Wahyuni, D. 2012. The research design maze: understanding paradigms, cases, methods and methodologies, Journal of applied management accounting research, 10(1):69-80.

Walliman, N. 2017. Research methods: The basics. Routledge.

Walsham, G. 2002. Cross-cultural software production and use: a structurational analysis. MIS quarterly, 359-380.

Walsham, G. 2006. Doing interpretive research. European Journal of Information Systems, (15):320-330.

Walsham, G. 2015. Interpreting information systems in organizations. London: Cambridge press.

Walsingham, V.J. 2010. The Effect of a Gestalt Intervention Programme on the Emotional Intelligence of Preschool Children. M.Sc. dissertation, Pretoria, UNISA.

Wanaswa, P.S., Awino, Z.B. & Ogutu, M. 2017. Organizational Innovation, Technology, Strategic Planning and Competitiveness: Conceptual Perspective. DBA Africa Management Review, 7(2):25-51.

Wang, Z. 2014. Strategic Fit Issues in Information System Research: Concept, Operationalization and Future Directions. International Journal of Hybrid Information Technology, 7(1):13-24.

Wang, I.K., Qian, L. & Lehrer, M. 2017. From technology race to technology marathon: A behavioral explanation of technology advancement. European Management Journal, 35(2):187-197.

Wanyama, I. & Zheng, Q. 2010, September. Organizational culture and information systems implementation: A Structuration Theory perspective. In Information and Financial Engineering (ICIFE), 2010 2nd IEEE International Conference on (pp. 507-511). IEEE.

Ward, J.M. 2012. Information systems strategy: Quo vadis? Journal of Strategic Information Systems, 21(2):165-171.

Watson, R.T. 2007. Information Systems. Athens, GA: University of Georgia. http://archive.org/details/ost-computer-science-information-systems. [20 June 2017].

Welford, R. 2016. Corporate environmental management 3: Towards sustainable development. London: Routledge.

Whittington, R. 2010. Giddens, structuration theory and Strategy as Practice. In Damon Golsorkhi, Linda Rouleau, David Seidl, & Eero Vaara (Eds.), Cambridge handbook of strategy as practice (pp. 109–126). Cambridge: Cambridge University Press.

Wickramasinghe, N., Tatnall, A. & Goldberg, S. 2018. How the Rich Lens of ANT Can Help Us to Understand the Advantages of Mobile Solutions. In I. Management Association (Ed.), Health Care Delivery and Clinical Science: Concepts, Methodologies, Tools, and Applications (pp. 599-611). Hershey, PA: IGI Global. doi:10.4018/978-1-5225-3926-1.ch031.

Wiggins, B.E. & Bowers, G.B. 2015. Memes as genre: A structurational analysis of the memescape. New media & society, 17(11):1886-1906.

Williams, C. 2011. Research methods. Journal of Business & Economics Research (JBER), 5(3):65-71.

Williams, B. & Sawyer, S. 2014. Using Information Technology: A Practical Introduction to Computers & Communications. 11th ed. NY: Irwin/McGraw-Hill.

Wilson, A.D., Onwuegbuzie, A.J. & Manning, L.P. 2016. Using paired depth interviews to collect qualitative data. The Qualitative Report, 21(9):1549-1573.

Wixley, T. & Everingham, G. 2010. Corporate Governance. 3rd ed. Cape Town: Siber Ink.

Wohlin, C., Runeson, P., Höst, M., Ohlsson, M.C., Regnell, B. & Wesslén, A. 2012. Experimentation in software engineering. Springer Science & Business Media.

Wohlin, C. & Aurum, A. 2015. Towards a decision-making structure for selecting a research design in empirical software engineering. Empirical Software Engineering, 20(6):1427-1455.

Woiceshyn, J. & Daellenbach, U. 2018. Evaluating inductive vs deductive research in management studies: Implications for authors, editors, and reviewers. Qualitative Research in Organizations and Management: An International Journal, 13(2):183-195.

Worrall, L. & Harris, K. 2013. Using Action Research to Investigate Social Networking Technologies. Electronic Journal of e-Learning, 11(2):115-123.

Wynn, M. 2008. Information systems strategy development and implementation in SMEs. Management Research News, 32(1):78-90.

Wynn Jr, D. & Williams, C.K. 2012. Principles for conducting critical realist case study research in Information Systems. MIS quarterly, 36(3):787-810.

Yeh, C., Lee, G.G. & Pai, J. 2012. How information system capability affects e-business information technology strategy implementation: An empirical study in Taiwan. Business Process Management Journal, 18(2):197-218.

Yin, R.K. 2014. Case Study research: Design and method. 5th ed. Thousand Oakes, CA: Sage Publications.
Yin, R.K. 2017. Case study research and applications: Design and methods. 6th ed. Thousand Oakes, CA: Sage Publications.

Zhang, X., Yu, P., Yan, J. & Spil, I.T.A. 2015. Using diffusion of innovation theory to understand the factors impacting patient acceptance and use of consumer e-health innovations: a case study in a primary care clinic. BMC health services research, 15(1):1.

Zollet, R. & Back, A. 2015. Critical factors influencing diffusion of interactivity innovations on corporate websites. IEEE Transactions on Professional Communication, 58(1):2-19.

APPENDIXES

Appendix A: Ethics Approval from CPUT

Cape Peninsula
University of Technology

P.O. Box 652 • Cape Town 8000 South Africa •Tel: +27 21 469 1012 • Fax +27 21 469 1002
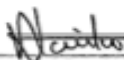80 Roeland Street, Vredehoek, Cape Town 8001

Office of the Research Ethics Committee	Faculty of Informatics and Design

The Faculty Research Ethics Committee, on 1 September 2016, granted ethics approval to

MS NR BATYASHE, student number 216177340, for research activities related to the

DTech: Information Technology degree at the Faculty of Informatics and Design, Cape

Peninsula University of Technology.

Title of dissertation/thesis:	A framework for operationalising Information Technology strategy in organisations

Comments

Research activities are restricted to those detailed in the research proposal.

Signed: Faculty Research Ethics Committee	Date 1/09/2016

RESEARCH ETHICS COMMITTEE
INFORMATICS AND DESIGN
ETHICS APPROVAL GRANTED

- 1 SEP 2016

Cape Peninsula
University of Technology

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Appendix B: Data Collection Permission Letter

Cape
Peninsula
University
of Technology

16 March 2017

Dear Sir/Madam:

TO WHOM IT MAY CONCERN

This serves as a formal introduction of the candidate, Thami Batyashe (student number: 216177340) to you. Ms Batyashe is a postgraduate student at the Department of Information Technology, Faculty of Informatics and Design. She is working on a research, for her Doctoral degree. The study seeks to understand how information technology (IT) strategy is operationalized organisations.

On behalf of Ms Batyashe, we hereby request your permission to engage with your organisation as one of the cases for her research. If granted, interview will be conducted with some of your employees. Kindly note that the data (from the interviews) will not be used for any purposes other than this research. The data will be kept confidential to the researcher and her supervisor. The identity of the interviewees will be kept anonymous. The name of the organisation will be represented with a pseudonym.

The contribution from your organisation is intended to substantiate the research purpose, and it is vital to the success of the study. Therefore, your assistance in this regard will be highly appreciated.

Should you need more information, please do not hesitate to contact the undersigned.

Kind regards

Yours Sincerely,

_____
Professor Tiko Iyamu, Ph. D.
Research Professor
Department of Information Technology
Cape Peninsula University of Technology
Cape Town

Email: Iyamu@cput.ac.za
Tel: +2721 4603205

Appendix C: Informed Consent and Research guideline questions

Dear Prospective Participant

A framework for operationalising Information Technology Strategy in organisations

My name is **Nomathamsanqa Batyashe** and I am doing research with Professor Tiko Iyamu at the Faculty of Informatics and Design, Information Technology (IT) department towards a Doctorate Degree in Informatics at the Cape Peninsula University of Technology. We are inviting you to participate in a study.

The aim of the study is to develop a framework to operationalise IT strategy in organisations.

You were selected to participate in this study as an employee of Organisation A (Case #1). Mr X, the CEO of the organisation granted permission for the study to be conducted. Your name was selected based on your knowledge and work experience.

Your role in the study involves availing yourself for a discussion with me (Thami) at a convenient time and place of your choice. A typical question may read as follows: "*In your opinion, what are some of the factors that affect the operation (use) of technologies in the organisation*"? The expected duration of participation is no more than 60 minutes.

Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep for future reference. You are free to withdraw at any time and without giving a reason. There is no penalty or loss of benefit for non-participation.

You will not benefit directly from your participation in the research. You will receive no payment or reward, financial or otherwise. The results of the research will, however, be of scientific and practical value in understanding how IT strategy is operationalised in organisations.

There are no foreseeable physical or psychological risks involved in participation. You will be mildly inconvenienced by the time it takes to respond to the questions (60 minutes). If you would like to discuss the research and your reactions to the questions, you are welcome to do so after the session.

Any information that is obtained in connection with this study and that can be identified with you will remain confidential. Confidentiality is however not a concern in this research as the questions will be answered anonymously and individual identifiers will not be requested. The data will be kept in a safe environment, and any electronic devices will be password protected.

The data collected will be used to write research report, which include but may not be limited to journal articles, conference presentation, and dissertations. Your privacy, and that of the organisation you represent, will however be protected and no identifiable information will be included in such reports.

This study has received written approval on 1st September 2016 from the Faculty of Informatics and Design Research Ethics Committee. See attachment.

If you would like to be informed of the final research findings, please contact Nomathamsanqa Batyashe on 083 284 3799 or nomathamzizi@gmail.com. Should you require any further

information or want to contact the researcher about any aspect of this study, please contact Prof Tiko Iyamu at iyamut@cput.ac.za.

Should you have concerns about the way in which the research has been conducted, you may contact any of the ethics committees of the Cape Peninsula University of Technology.

CONSENT: I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study.

Kindly note that you will not be required to sign this declaration, but that you will be indicating your consent by participating in the interview session. (A signed copy is not required, as this may identify you, and this research is done in such a way that you cannot be identified after participating in this study.)

Thank you for taking time to read this information sheet and for considering participation in this study.

1. **What are the factors that influence the implementation of IT strategy, leading to operationalisation?**
   i.   How is your IT strategy implemented in the organisation?
   ii.   What are some of the factors that affect the operation (use) of technologies in the organisation?
        - Why are some technologies not in operation (use) in the organisation?
   iii. In your view, why do you think those factors exist?
        - How do you think these factors can be addressed, to enable and support operations of technologies within the organisation?

2. **What constitute the operationalisation of IT strategy in organisations?**
   i.   Can you please explain the process of putting technologies in use (practice) within the organisation?
   ii.   What are some of the factors that are involved in the process of putting technologies in use in the organisation?
   iii. Who are the people that are involved in the process of putting technologies into use in the organisation?
        - Why do you think those people are involved in putting technologies into use?
        - How are these people involved in the process of putting technologies into use in the organisation?
   iv.   What are some of the challenges that are encountered in the process of putting technologies into use in the organisation?
        - Why do you think those challenges exist?
        - How do you think those challenges can be addressed in your view?

3. **How can IT Strategy be diffused in achieving operationalisation in organisations over time?**

    i.   Who (unit or individual) is responsible for disseminate of technologies to units and individual user.

    ii.   How are the different units and individual users involved in utilization of technologies within the organisation?

    iii.   What are some the factors or processes that are required in the utilisation of technologies within the organisation.

    iv.   What are some of the challenges that encountered in the dissemination of technologies within the organisation?

        • Why do you think these challenges exit?

    v.   What are some of the challenges that encountered in the utilisation of technologies within the organisation?

        • Why do you think these challenges exit?