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# UNIVERSITY OF SOUTHAMPTON 

Faculty of Social Sciences<br>Southampton Business School

# DELIVERING VALUE FROM DIFFERENCE: EXPLORING A COGNITIVE APPROACH TO IMPROVING IT EFFECTIVENESS 

by

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Thesis for the degree of Doctor of Business Administration

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# University of Southampton 

Abstract<br>Faculty of Social Sciences<br>Southampton Business School

Thesis for the degree of Doctor of Business Administration

# Delivering value from difference: Exploring a cognitive approach to improving IT effectiveness 

Alastair Tipple

Though IT is generally shown to be of value, few senior executives recognise this value. They believe that their firm's IT is ineffective even though they are often the key IT investment decision makers. This research takes a qualitative and practice-oriented approach to this real-world problem. It identifies and explores the cognitive or attitudinal differences towards IT effectiveness of investments across key decision makers within a case study firm.

The approach taken makes use of an intervention based on Personal Construct Theory operationalised through the Repertory Grid Technique. More specifically, Standard Repertory Grids are used to develop heat maps to visually depict the cognitive diversity between the CIO and the key investment decision makers. In collaboration with the CIO, these heat maps are interpreted and an action plan designed to reduce stakeholder cognitive diversity is developed. Triangulation of the findings is provided through a thematic analysis of a separate semi-structured interview and creation of a Governance Grid.

It is reasoned that by reducing the cognitive differences between key stakeholders, the level of shared understanding as to what comprises an effective IT investment is increased, resulting in greater commitment towards IT, and greater value derived from IT. The initial study findings suggest that an action plan based on an understanding of these differences can be developed with the CIO, is seen by the CIO as an approach that will deliver value and is in a form that the CIO is willing to enact.

Keywords: Social alignment, Shared cognition, Repertory Grid, IT effectiveness.

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## Declaration of Authorship

DELIVERING VALUE FROM DIFFERENCE: EXPLORING A COGNITIVE APPROACH TO IMPROVING IT EFFECTIVENESS

I, Alastair Tipple, declare that this thesis and the findings presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

- This work was done wholly while in candidature for a research degree at this University.
- None of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution.
- I have exercised reasonable care to ensure that the work is original, conforms to the University of Southampton's ethics regulations and does not contain any commercially sensitive material.
- I have acknowledged all main sources of help and where I have drawn on the published material of others it is always clearly attributed.
- Where the thesis is based on work done by myself jointly with others, for example an independent expert, I have made clear exactly what was done by others and what I have contributed myself.
- None of this work has been published before submission.

Signed:
Date: September 2019

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In 1983, I enrolled on the PhD programme at the London Business School (LBS) only to leave a year later to get married. In 2016, my wife Bernie encouraged me to fulfil this long-held ambition and 36 years after that first attempt this thesis is presented. Thanks Bernie, for your constant support over all these years and for letting me have another go!

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## Abbreviations

CEO Chief Executive Officer
CIO Chief Information Officer
CMO Chief Marketing Officer
COO Chief Operating officer
DSR Design Science Research
ERP Enterprise Resource Planning (a large and wide-ranging software suite)
FL Franchisee Large
FM Franchisee Medium
HR Human Resources
MIS Management Information Reporting
OD Operations Director
PCA Principal Component Analysis
PCT Personal Construct Theory
RFO Regional Franchise Operator
SCD Supply Chain Director
SME Small to Medium sized Enterprise
SMT Senior Management Team (term used when specified in the literature)
TMT Top Management Team (term used for the case study)

## 1. Introduction

### 1.1 Motivation and rationale for the research

'You might have people reaching consensus in the room, when underlying they're actually going "I don't really agree with that". Now you can get to the bottom of that'.

This was the CIO's comment on the co-developed action plan that was the output from the case study where this research was conducted. The comment is made in response to the practical value of having a better understanding of how his colleagues and key decision makers perceive the effectiveness of IT investments. Without such understanding the value to a firm from its investment in IT is reduced.

This research is largely driven by personal experience from being a CIO and as an advisor to CIOs across many industry sectors, and often observing or sensing that IT was not as effective as it could be and therefore reducing its value contribution to the firm. This wasted opportunity and financial investment has been source of personal frustration and consequently is a topic of interest.

This study is intended to be practitioner oriented. It aims to provide an approach to deliver an outcome that can be of use to a CIO who wishes to improve the effectiveness of IT investments in their firm. Over time I've arrived at a view that simply developing an IT strategy designed to underpin or help transform or create a business model is not beyond the grasp of most firms. However, getting people outside of IT to truly champion the investments outlined in the strategy, or more generally promote the value that IT can bring, is a completely different story. In an area where it is necessary to engage the hearts and minds of those involved, placing a focus on the engaging the hearts seems most important. Compared with writing a strategy, the steps involved with engaging the heart are less obvious.

Being a practitioner I'm drawn to a paper by Breu and Peppard (2003). They suggest that research based on a perceived real-world problem will be more useful than responding to research questions posed by academic literature. In
particular I alight on the distinction they make between propositional knowledge and procedural knowledge. They posit that the former is more associated with scientific knowledge expressed with 'abstract, technical and linguistic precision' that is confusing to practitioners, and therefore difficult to apply and not useful. This is not to say that a natural science approach has little value per se, simply that if the message or knowledge is conveyed or expressed in a dry and abstract manner that does not resonate with or engage the practitioner, it can easily be overlooked or ignored. That being the case, any associated knowledge will not be put to good use.

By contrast, procedural knowledge illustrates a course of action, possibly depicting concepts of interest pictorially. It is therefore of practical value, and such research is powerful as its validity is demonstrated by its use (Ackermann and Alexander, 2016).

Combining these motivations into a research agenda will mainly draw on two strands of literature. The first is social alignment and the second is a method to evaluate a critical component of that alignment. Critical to the success of this research is to present the findings in a manner that a CIO can understand and embrace. This shifts the emphasis of the exploratory research from a more propositional knowledge oriented study, represented by position A in the conceptual framework shown in Figure 1; to a more procedural knowledge or practice-oriented study represented by position B in Figure 1.


Figure 1: Conceptual overview of the research area

### 1.2 The problem

Most business sectors today consider IT to be important for achieving performance (Tejada-Malaspina and Jan, 2019) and therefore are to some extent dependent on it. Though moderated by a firm's internal and market environment (Melville et al., 2004), recent studies show that IT creates business value (Manfreda and Indihar Štemberger, 2013). For example, more value is placed on firms with high quality IT capability (Muhanna and Stoel, 2010) and such IT capability is positively associated with higher levels of financial performance (Bharadwaj, 2000, Singh and Woo, 2009). It has also been shown that IT can transform business strategies (Benlian and Haffke, 2016) and competitive landscapes (Preston et al., 2008). These examples are offered as a sample to demonstrate the different ways in which IT has been shown to deliver business value. Comprehensive literature reviews suggest that IT can create value (Schryen, 2013) but not in isolation (Piccoli and Ives, 2005). Some synergistic or strategic relationship between IT and the Business is required (Mithas and Rust, 2016, Nevo and Wade, 2010). This study recognises this requirement and examines this longstanding and important issue of IT value delivery from a business/IT strategic alignment perspective.

The value rationale for firms and for senior executives to invest in technology seems clear and its use is increasingly mandated (Rawstorne et al., 1998) as greater dependency is place on IT to realise this value. However, executives frequently state that they do not realise this value (Johnson and Lederer, 2010), though they continue to invest (Burton-Jones and Grange, 2012). In one large scale survey, despite the fact that most senior executives recognise the importance of IT (Yayla and Hu, 2014, Grill and Spillman, 1990), only 15\% of business executives thought that their IT was effective (Shpilberg et al., 2007).

IT/Business strategic alignment is a strong antecedent to improved IT effectiveness and firm performance (Avison et al., 2004). IT effectiveness is positively associated with IT success, which is often conceptualised in terms of the benefits it provides, business performance or ability to meet business goals (Chan 1997, Delone and McLean 1992, Baets 1992, Shpilberg 2007). Unfortunately, studies from the late 1990s found that only $8 \%$ of firms
achieved alignment and that only half made progress towards it (Yayla and Hu, 2009). IT/Business alignment may lead to effective IT which in turn creates business value, but it is difficult to achieve (Chan, 2002).

That most firm's IT is perceived by senior management as ineffective despite often large investment (Burton-Jones and Grange, 2012), and that so few firms are able to align and reap the positive effects, suggests a disconnect and a real world problem. This study explores how an understanding of the attitudinal differences towards IT effectiveness across a firm's IT investment decision makers and influencers (who are the participants/actors in this study) might be used to improve alignment to deliver greater business value.

### 1.3 Positioning in the literature and theoretical background

The framework shown in Figure 1 provides an overview of the conceptual approach being taken to this research. By examining the social alignment across IT decision-making stakeholders from a cognitive perspective, the research aims to identify how different stakeholders construe IT effectiveness. Identifying these differences can provide the basis for a contextualised change plan targeted at reducing the tangible factors that would otherwise thwart social alignment and hence IT effectiveness. This is an approach that is not seen in the literature. More commonly, studies exploring social alignment aim to surface more abstract and generalisable antecedents of social alignment. The view taken in this study is that this change-oriented approach provides more practical support to a CIO or firm wishing to improve IT effectiveness through improved social alignment. The rest of this Chapter provides an overview of the positioning of this study in the three areas shown in Figure 1.

### 1.3.1 Business/IT alignment, social alignment and cognition

 Three decades ago Henderson and Venkatraman (1989) argued that companies needed to manage their IT in 'parallel' with the strategic management of the enterprise, and that strategic and functional integration provides the foundations for IT/Business alignment. Avison et al. (2004) set out the value claim for alignment suggesting that only if firms align their business and IT strategies can they be competitive and that through alignment improved IT effectiveness leading to improved business profitability results. A more recent meta-analysis of past alignment studies supports this view(Gerow et al., 2014). They concluded that even though there are some studies that do not find that alignment leads to improved firm performance, a conflict referred to as the alignment paradox, the evidence overall suggests the performance relationship is positive.

Alignment can be viewed as a dynamic process (Avison et al., 2004, Henderson and Venkatraman, 1993) and the challenges of achieving alignment are possibly becoming more demanding due to increasing business/market dynamics and complexities (Prasad and Junni, 2017, ElTelbany and Elragal, 2014). This might suggest one explanation as to why the relevance placed on it has grown in recent years (Aversano et al., 2012). Furthermore, developing a strategy is 'messy' (Ciborra, 1997) and strategies themselves are a 'contested domain' (Lee and Myers, 2004). People rarely follow nice logical and connected steps set out in an abstract model (Avison et al., 2004). This lack of clarity, the need to respond to quickly changing conditions (uncertainty) and the assumption that if after a period of time an integrated set of plans could be viewed as aligned but often cannot (Ciborra, 1997), suggests another reason.

More recently the term "digital" is being used to convey the notion that technology in firms is playing a different role to the traditionally conceived role for IT and the CIO (Tumbas et al., 2018); that we should re-imagine how technology in firms is managed so as to better exploit the technology domain; and that the IT strategy should no longer simply play a supporting role to the business strategy but that the two should be fused (Bharadwaj et al., 2013). Historically, alignment studies have always advocated this integration or fusion, for example, Smaczny (2001). It has always been the theory, if not the practice (Bharadwaj et al., 2013). New roles such as the Chief Digital Officer, who are positioned on the interface of IT and the business would seem, in part, to be a response to this changing market environment and the need for firms to develop a focused response across the organisation to digital innovation (Haffke et al., 2016). This role directed response for securing alignment reinforces the view that achieving alignment is possibly becoming more demanding due to increasing business dynamics and complexities (ElTelbany and Elragal, 2014). Regardless of the historical perspective or practice, "digital" would only seem to exacerbate the need for business and IT
alignment. A strong link between business and IT in the digital era is even more important (Manfreda and Indihar Štemberger, 2018).

Strategic alignment comprises two dimensions (Reich and Benbasat, 2000): The intellectual dimension, where the focus is on plans and methodologies, and a social dimension, where the focus is on the people involved. The social dimension is more focused on the people who create the alignment through their understanding and commitment toward achieving the business goals (Reich and Benbasat, 2000, Reich and Benbasat, 1996). Together, the intellectual and social dimensions are interpreted as meaning an integrated set of plans exist between the business and IT, and where business and IT executives are committed to executing against them. The influential consequences of their research is that it allowed scholars to conclude that shared understanding is a key determinant of social alignment (Preston and Karahanna, 2009, Tan and Gallupe, 2006); that the social dimension is (a proximal) antecedent to the intellectual dimension (Preston and Karahanna, 2009) and that the social dimension is an under-represented area of research (Benlian and Haffke, 2016).

Eden and Spender (1988, p123) conceptualise a model where an individual's interpretation or sensemaking of a knowledge base is through the use of their personal mental model, or cognitive structures (Orlikowski and Gash, 1994). Where two individuals share the same interpretation, there is shared cognition, which implies shared understanding (Preston and Karahanna, 2009); and shared understanding is a key influencing factor in the social dimension (Reich and Benbasat, 2000, Tan and Gallupe, 2006). As an increase in shared cognition implies an increase in shared understanding (Preston and Karahanna, 2009), it follows that being able to reduce the degree of cognitive diversity between technology decision makers would improve the social dimension aspect of alignment. It then follows that through improved alignment there is improved IT effectiveness and firm performance (Byrd et al. (2006), Chan et al. (1997)). Given that a firm's technology decisions are often made by the senior management team (Rawstorne et al., 1998, Brown et al., 2002), this implies that by reducing the management team's cognitive diversity, the degree of social alignment is improved and value is gained through an improvement to IT effectiveness.

### 1.3.2 Personal Construct Theory

To explore the degree of shared cognition across a management team around a topic of interest requires an approach for assessing each team member's individual cognition on this topic. Tan (2002) offers a number of theoretical frameworks for exploring cognition in IT studies. One of these is Personal Construct theory (PCT), which is described by Simpson and Wilson (1999) as making 'the most comprehensive contribution to a theory on shared cognition'. Although this is a rare approach in IT research it is a valid way to study differences in perceptions and behaviours (Fernando et al., 2006).

PCT was developed by George Kelly (Kelly, 1955). He was a clinician whose aim was to be able to satisfy his practitioners desire to make predictions of an individual in a way that a large study might make generalised predictions about a population (Stewart et al. (1981), p3). He wanted to be able to make unbiased predictions about an individual patient in such a way that it allowed them to take ownership for their development (Stewart et al. (1981), p5-6). He moved beyond simply saying that people learn from experience to saying that a person's experiences shape that way they construe the world; and referred to this as a person's "construct system" (Stewart et al. (1981), p7) which is a person's perspective on the world (Fransella and Bannister (1977)), p2). Where constructs are held in common across individuals, i.e. when the same constructs are used by the individuals to construe an experience in the same way, it implies a level of shared cognition (Simpson and Wilson, 1999).

Personal Construct Theory (PCT) is operationalised by the Repertory Grid Technique (van Kan et al., 2010). A Repertory Grid (Rep Grid) is an established technique for exposing an individual's construct system (EasterbySmith et al., 1996, Alexander et al., 2010) to gain insight as to how an individual sees and interprets the world around them whilst minimising the degree of observer bias (Stewart et al., 1981, p5-7). Other scholars refer to this as a person's mental model (Daniels et al., 1995), and that Rep Grids provide a way to 'quantify peoples' attitudes, feeling and perceptions' (Easterby-Smith, 1980b).

Within the IS domain, Rep Grids have been used for a variety of purposes, for example, developing an evaluation framework for IS planning systems (Cho
and Wright, 2010), examining the traits of IS professionals in a team context (Siau et al., 2010), IT leaders' cognitive structures of IT business value (Wang et al., 2013) and factors affecting Enterprise Application Integration systems success (Wagner et al., 2015).

### 1.3.3 From cognitive differences to value

IT investment choices often involves senior management in a decision making process (Rawstorne et al., 1998) that can be viewed as a social interaction (Langley et al., 1995) where the different actors can have different perspectives of IT (Chan et al., 1997). Where different actors hold different views on a topic of interest, for example the CEO and CIO, disagreement between actors can result. Benlian and Haffke (2016) concluded that future IT cognitive research should specifically explore areas where disagreements are likely to occur, such as IT investment decisions. A structured literature search has confirmed this as a research gap at both a dyadic (e.g. CEO to CIO) and Top Management Team (TMT) level.

Disagreements, or cognitive conflicts, arise when there are cognitive differences between those involved in the decision making (Ensley and Pearce, 2001). At a team level this is particularly damaging as it is likely to result in lower team cohesion, reduced levels of trust, satisfaction, flexibility, problem solving capability and productivity (Ensley and Pearce, 2001). However, there can be a 'tension to both stimulate and repress cognitive conflict'; the difficulty is in the management of the conflict, (Eisenhardt et al., 1997). This means ensuring that team members can engage in the positive aspects of cognitive conflict, centred on the alternative courses of action and interpretation of facts, without triggering the negative aspects of affective conflict (Eisenhardt et al., 1997). In other words, there is value in teams approaching a topic from different perspectives but through negotiation and argument the team needs to be able to amicably reach consensus, i.e. reduce the cognitive differences. Doing this positively affects their performance (Chiravuri et al., 2011). Therefore, gaining an understanding of the cognitive differences would be a helpful step towards managing the conflict.

Consensus is important as effective implementation of a decision requires 'active cooperation' (Amason, 1996); that to survive the decision's
operationalisation team members must have a shared understanding and commitment to the decision, that is to say consensus must be reached (Wooldridge and Floyd, 1989). Commitment is important as it increases trust in team member integrity (Guth and MacMillan, 1986), reduces the likelihood of parochial behaviours that, for example might result in the creation of director fiefdoms (Hambrick, 2007); and may help combat any decision inertia (Mintzberg et al., 1976).

Understanding group level conflict can be approached by building an understanding of the shared cognition at the group level; and from an understanding of individual cognition it is possible to understand cognition at the group level, (Tan and Gallupe, 2006). Exploring where cognitive diversity could potentially occur between the CIO and other TMT members and then setting out an action plan to reduce this diversity, would appear to have benefit for a firm. Value would be delivered from an understanding of the attitudinal differences.

### 1.4 Research Aim and Approach

Social alignment is key to IT effectiveness and value, and yet is an under researched and important area (Benlian and Haffke, 2016, Tan and Gallupe, 2006). One aspect specifically highlighted as a research gap is around IT investment decisions, where disagreements are likely to occur (Benlian and Haffke, 2016). This disagreement or cognitive conflict is typically between a firm's senior executives (Rawstorne et al., 1998, Brown et al., 2002) but how can the cognitive diversity that is so damaging to social alignment and hence their commitment to the investment be revealed and explored? Responding to this question would address the research gap. If the nature of the response also assists the technology leader in securing alignment and hence value from the investment, it would also appear to address a real-world problem.

Consequently, the aim of this research is to explore whether a better understanding of the cognitive differences across IT investment decision makers and key influencers regarding the effectiveness of such investments can be used to develop an action plan in which the CIO has confidence and on which this technology leader is willing to act.

Addressing this aim requires number of research questions to be answered. These are being expressed in a manner that centres on the CIO who is typically the senior executive with responsibility for IT within a firm.

- RQ1: Can a CIO identify the key stakeholders involved in IT investment decision making?
- RQ2: Assuming the stakeholders can be identified, can their mental models regarding IT effectiveness be captured?
- RQ3: How might the stakeholders' mental models be analysed and communicated to the CIO in a simple and easy to understand way?
- RQ4: From the analysis, is it possible to create an action plan of 'practical adequacy' (Kanellis et al., 1999) designed to reduce stakeholder cognitive diversity?

To respond to the research questions an exploratory qualitative case study was conducted. The research was conducted within a regional operator of a global franchise business. This is a large firm that has a relatively complex IT estate and one where IT is central to the running of the business. It is also set in a particularly interesting context as not all the actors are employees of the firm, some are franchisees. This potentially makes IT investment decision making all the more challenging as different views will very likely be taken by the operator and franchisees.

Individual Rep Grids were used to generate a Standard Grid that can be used to compare cognitive diversity across the stakeholders (Easterby-Smith, 1980a, Phythian and King, 1992). The outputs from a series of Standard Grid comparisons were presented as heat maps. This may be the first time that such a format has been used to pictorially show the degree of cognitive diversity across a group of stakeholders. As a form of triangulation, the Standard Grid constructs were mapped to a highly contextualised set of themes generated from semi structured interviews with the participants $(\mathrm{n}=10)$ at the start of the study. Throughout the analysis process the CIO was fully engaged and for some aspects of the analysis an independent expert was used.

The implied changed management aspect of the research, creating an action plan of practical adequacy, is informed by 'collaborative practice' research
(Iversen et al., 2004) and will be shown to be suited to a pragmatic philosophy.

### 1.5 Structure of the thesis

This thesis is divided into nine chapters, each containing a number of sections:
Chapter 2 introduces the notion of business/IT alignment and the value claim from securing such alignment. It provides evidence that alignment and hence effective IT is seldom achieved, and that in part this is due to the dynamic nature of alignment. It then makes the case for the focus on social alignment, the important part that shared cognition plays in this, and introduces PCT and Rep Grids as a sensible approach for exploring cognition. It then identifies the research gap and the perceived real-world problem that it poses, and confirms the gap through a series of structured searches. In doing so it explains and confirms PCT and Rep Grids as being the preferred research method before examining more closely the value of managing cognitive diversity to improved social alignment. Finally, as a secondary objective, it introduces the concept of a strategic paradox as a possible source of frustration to social alignment that may be observed by the study.

Chapter 3 sets out the research paradigm. It discusses the research philosophy, the research aims and objectives, the rationale for an exploratory case study approach and how the use of Rep Grids in a variety of forms are wholly consistent with both. The two-stage data collection and analysis process is then detailed before concluding on how methodological quality for this qualitative study is demonstrated. Chapter 4 develops the more general description of Rep Grids from the previous chapter and explains how they are to be specifically applied to this study.

Chapters 5 and 6 present the data collection and analyses for each of the twostage process. Chapter 5 shows how the individual grids were captured and how the Standard Grids were formed. It also includes details of how the constructs were mapped to a respected alignment model and how a thematic analysis was conducted on responses to a semi structured interview and used to create a highly contextualised grid used in strategic planning. Chapter 6
explains the process used for creating and analysing the heat maps from which the action plan was created with the CIO.

Chapter 7 outlines the group level findings and those from the project level and member level heat map comparisons. This outline formed the basis of the action plan summary that was presented to the CIO in the case study. Chapter 8 discusses the findings and in particular reflects on the CIO's comments as to the outcome of the study, and Chapter 9 discusses the contributions made by this study. Chapter 10 concludes by reflecting on the research questions, limitations and implications for future research.

### 1.6 Research contribution and conclusion

This research contributes to the literature in three ways. Firstly, it addresses a recognised research gap, centred on the social dimension of alignment, by answering the research questions. Secondly, it suggests that some respected alignment models may benefit from being re-visited to better reflect this social dimension. Thirdly, studies on social alignment to date appear to focus on antecedents of social alignment (Preston and Karahanna, 2009), or factors mediated by antecedents (Nelson and Cooprider, 1996). By contrast, this study enriches the landscape by offering views on the practical steps to achieve it within a given context. It is the focus on the practical steps that ultimately provides the main contribution to practice from this research. The way in which the Rep Grid technique was deployed also provides a minor contribution to practice.

By reflecting on the limitations for the study, a practical approach to tackle an aspect of the dynamic nature of social alignment is suggested. It has also provided a number of other avenues that could sensibly be explored through a social alignment lens. At a practical level, it took a confident and competent CIO to engage in this study, and one who instinctively saw the importance of capturing the hearts of senior executives and not just the minds. It is hoped that from the output produced and the CIO's comments, this study might encourage more CIO's to consider the same or similar courses of action to help increase the value of the asset for which they are responsible.

## 2. Positioning this study in the Literature

The perceived real-world problem presented in the introduction is that despite IT being generally shown to be of high value, very few senior executives believe it is effective in their organisation. Given it is often the same executives that are involved in making or influencing the IT investment decisions for their organisations, this seems strange and highlights a potential area for investigation.

This Chapter, in identifying a research gap around IT investment decision making, requires connections to be made across various themes and concepts contained in the literature. To assist with making these connections some of the main stepping stones are signposted below. In the chapter sections that follow, these stepping stones are positioned in the literature and detailed.

- Alignment of business and IT strategy leads to improved IT effectiveness and firm performance. Unfortunately, alignment is hard to achieve and eludes many companies.
- Alignment comprises an intellectual and social dimension. Whilst both are required to secure alignment, the social dimension determines how the alignment is achieved and sustained. It is an antecedent of the intellectual dimension.
- A key determinant of the social dimension is shared understanding for which shared cognition is viewed as a measure. Consequently, a high degree of shared cognition implies a high degree of shared understanding and a low degree of cognitive diversity. Cognitive diversity is associated with conflict, poorer team cohesion and poorer decision making.
- By exploring shared cognition an insight into shared understanding may be gained. Cognition can be explored by exposing a person's personal constructs through a technique called Repertory Grids. Group level constructs can also be derived and associated with shared cognition.
- Cognitive diversity is likely in an area such as IT investment decision making. The implication is that by reducing cognitive diversity between team members responsible for IT investments, there will be an increase in shared understanding and an improvement in social alignment. This will result in improved IT effectiveness and firm performance.

This Chapter starts by presenting the linkage between business/IT alignment and improved IT effectiveness, and the important role of shared understanding. It then clarifies what is meant by share cognition and how this might be studied. Having established a sparsely researched area around shared cognition in the area of IT investments, a detailed account is provided for Rep Grids and a rationale for their use in this study. Finally, some secondary areas of interest to this study are suggested before concluding.

### 2.1 Strategic Alignment and Shared Understanding

### 2.1.1 Business and IT strategic alignment

There is no singularly agreed definition of the term strategy in the business literature and Mintzberg (1987) would suggest that we should not rely upon a single definition as strategy is multi-faceted and that not recognising this has led to confusion in this field. Chaffee (1985) concludes that consensus on a definition is unlikely due to the 'multidimensional and situational characteristics' of strategy. As regards IS strategy, it is therefore unsurprising that some confusion exists and definitions of IS strategy range from being outward facing towards the business to inward facing and focused on the IS function, and whether it should be focused at a functional level, business unit level or the organisation as a whole (Chen et al., 2010a).

It is against this backdrop that Henderson and Venkatraman set out their strategic alignment model (Henderson and Venkatraman (1989), Henderson and Venkatraman (1993)). They accept that strategy is a broad term and focus in their definition on business scope and the 'formulation and implementation choices' (1993, p.472) 'pertaining to the positioning of the business in the product-market arena' (1989, p.9). Recognising the emerging and important role of IT, they argued that companies needed to manage their IT in line with and at the same time as the strategic management of the enterprise and that strategic and functional integration lay the foundations for business/IT strategic alignment (1989, p3). In a practical sense, the study focused on how to position IT within a firm to gain maximum advantage. Smaczny (2001) questions the concept of alignment and opts instead for the term fusion and similar to Sauer et al. (1997) is suggesting that the IT function becomes an integral part of the business unit(s) helping shape
business strategies and responses. However, this perspective is not so different to Henderson and Venkatraman, who refer to a strategic alignment model, but mainly use the term integration in their text.

Avison et al. (2004) set out the value claim for alignment. They reason that the literature suggests that only if firms align their business and IT strategies can they be competitive and that through alignment improved IT effectiveness leading to improved business profitability results. Similarly, El-Telbany and Elragal (2014) provide evidence that alignment leads to improved firm performance and that firms achieving alignment will perform better than firms that do not. Though there are some conflicting findings in alignment studies (sometimes referred to as the alignment paradox) Gerow et al. (2014) performed a meta-analysis of past alignment studies and concluded that the alignment-performance relationship is positive across studies. There is not much of an alignment paradox.

Alignment has assumed a growing importance in recent years (Aversano et al., 2012), though it appears that alignment may be easier said than done. Yayla and Hu (2009) in their conclusions state that fewer than $10 \%$ of firms achieve alignment. Cragg et al. (2002) found that large firms struggle to achieve levels of alignment and that there are mixed views regarding small firms. Reflecting these findings Chan et al. (1997), who found a positive relationship between alignment and firm performance, concluded that alignment is a 'nebulous concept and difficult to understand' (p126), and is 'elusive' (Chan, 2002).

Many studies describe strategic alignment in terms of the congruence of a firm's business/IT goals and processes, with the IT processes being focused on optimising effectiveness (Aversano 2012). Effectiveness is the 'degree to which something is successful in introducing the desired results' (OED). IT effectiveness is positively associated with IT success which is often conceptualised in terms of its impact or contribution to net benefits, business performance or ability to meet business objectives (Chan 1997, Delone and McLean 1992, Baets 1992, Shpilberg 2007). Taken together this suggests that business value is derived from effective IT.

However, it would appear that IT effectiveness and value have some parallels with alignment in that it can be elusive. Shpilberg et al (2007) surveyed 500 senior executives worldwide and found that only $15 \%$ of respondents classified themselves as having effective IT. This is despite evidence suggesting that at an abstract level, senior executives believe IT has value (Grill and Spearman, 1990). Demonstrating value is a major issue facing CIOs (Nelson and Cooprider, 1996) and too many organisations fail in their communication efforts (Luftman, 2003). A study by Wright et al (2001) suggests that such failure results in differences in perceptions that manifest themselves in the misalignment of views of the IT function's strategic value.

Kanellis et al 1999 provide a clue as to why effectiveness like alignment might be elusive. They argue that performance is a value laden term and similar to IS success its explanation and measurement is a complex task, made the more challenging owing to the social context of IS in firms. They conclude that it is not possible to have a single version of success as it is determined by the perception of different social actors in their real-life context (p.66). Ciborra 1997 takes this social dimension one step further by interpreting alignment as the 'successful translation of the interests of one actor on the behaviour of another such that some equivalence between them exists'. This moves the debate from a more process driven and planning dimension to a more value driven social context dimension. This is a concept that ultimately lies at the heart of this study and is explored later in this Chapter.

Critics of strategic alignment would suggest that whilst the conceptual model surrounding alignment is appealing, it doesn't represent the real world and that strategy is a 'bricolage', meaning that often the development and implementation of strategy is more of a trial and error (iterative) and a bottom up process (Ciborra, 1997). Galliers (1991) presents evidence to suggest that happenstance has as much to do with the identification and deployment of strategic IS as formal strategy process.

Consistent with the bricolage view, Avison et al. (2004) questioned the use of a structured strategy process in an increasingly uncertain and fast changing world and then extended this to say that strategic alignment was imaginary, or at least not practical (Maes, 1999). An example of this is provided by Lee
and Myers (2004) where in the time it took for an ERP system to be deployed the strategic assumptions that had led to the decision were invalidated, the senior management team had changed and the ERP, together with the inscribed ways of working, no longer reflected the strategic objectives of the firm. Arguably, the pace of change is only accelerating for most firms.

Even those who have argued strongly in support of alignment accept that there are reasons why alignment persists as an issue and that there is no simple, follow this methodology, solution (Luftman and Kempaiah, 2007, Luftman, 2003). Consequently, alignment has been one of the top ten concerns for business-IT executives since 1980 (Gerow et al., 2014). In summary, as Ciborra (1997) reports, 'news from the field is that alignment is not easy to implement, awareness does not suffice, and actually the two main poles of alignment, strategy and technology, are drifting apart for one reason or another'.

### 2.1.2 Strategic Alignment: Static or Dynamic

Strategic alignment can be viewed as a dynamic process (Avison et al., 2004, Henderson and Venkatraman, 1993) with the challenges of achieving alignment possibly becoming more demanding due to the increasing dynamics and complexities of businesses (El-Telbany and Elragal, 2014). The literature is also inconclusive as to whether strategy is planned or emerges (Chen et al., 2010a). In practice, in the corporate environment, strategy is a contested domain (Lee and Myers, 2004), that developing a strategy is messy and that people rarely follow nice logical and connected steps set out in an abstract model (Avison et al., 2004, Ciborra, 1997).

This lack of clarity around the nature of strategy, the need to respond to quickly changing conditions (uncertainty) and the assumption that if after a period of time an integrated set of plans could be viewed as aligned but often can't (Ciborra, 1994); would be factors that the supporters of alignment viewed as a dynamic process would seize upon.

This strategic messiness could also account for increasing system complexity over time resulting in ineffective, poorly performing IT. System complexity can arise when specific divisional and tailored systems are prioritised over those aligned to the strategic focus of the firm and IT estate as a whole
(Shpilberg, 2007). The outcome is an overall system map that looks like a complex tangle of spaghetti. Others, such as Liang et al., 2017 and Fink and Neumann (2009), address this point but from the perspective of flexibility. Low system flexibility generated over time reduces the choice and reaction speed of a firm thereby inhibiting the ability to easily modify IT strategy to align to a change in business strategy. By contrast, high infrastructure flexibility is a source of business value. This could be thought of as a form of IT infrastructure 'drift', resulting from strategic 'tinkering' (Ciborra, 1997), which may be required for the business to be successful in a changing environment - reflecting the view of El-Telbany (2015). Three papers, each ten years apart, broadly describing the same problem.

Especially in environments where there is uncertainty and change, as is often the case surrounding technology investment decisions, to view strategy as a dynamic process makes sense. It suggests ambiguity exists and that strategy development and planning is not totally ordered - it is messy.

### 2.1.3 Alignment dimensions: Intellectual and Social

Strategic alignment comprises two dimensions (Reich and Benbasat, 2000, Reich and Benbasat, 1996). The intellectual dimension, where the focus is on plans and methodologies, and a social dimension, where the focus is on the people involved. The social dimension is more focused on the people who create the alignment through their understanding and commitment toward achieving the business goals.

Together, the intellectual and social dimensions are interpreted as meaning an integrated set of plans exist between the business and IT, and where business and IT executives are committed to executing against them. The influential finding of their research led scholars to later conclude that shared understanding is a key determinant of the social dimension of alignment (Preston and Karahanna, 2009, Tan and Gallupe, 2006).

Support for the importance of the social dimension of alignment, often simply referred to as social alignment (context implied), may be taken from Preston and Karahanna (2009) who concluded that social alignment is a determinant (proximal antecedent) of intellectual alignment. On reflection this comes as no surprise. If alignment was simply an exercise on the intellectual
dimension, most companies would be able to create a capability that could deliver alignment. That alignment is an elusive and a persistent problem suggests that the social dimension is the more helpful and informative dimension to study. It is also an under-represented area of research (Benlian and Haffke, 2016).

A simplified visualisation summarising these last aspects of the alignment debate, and showing where shared understanding features, is shown in Figure 2.


Figure 2: Simplified visualisation of alignment studies
As business/IT alignment has persistently been a high concern for senior executives over the last 30 years (Liang et al., 2017), it is maybe unsurprising that there have been a number of instruments developed to measure alignment. Belfo and Sousa (2012) posit that Luftman's model (Luftman, 2003) caters for the key factors of alignment very well, and subsequently use this model as the benchmark to compare six other highly cited instruments. In a summary table of their analysis, the Luftman model clearly outperforms all the other instruments, i.e. most strongly covers these important factors. Of particular interest is that they suggest the Luftman model is viewed as a useful tool by practitioners as well as academics. A reason for this is that the model follows a 'Capability Maturity Model' approach which lends itself to self or facilitated assessment. At the top level the model assesses alignment
against 6 practice categories comprising 38 practices. These practices are then rated against criteria in a five-level maturity alignment scheme, the outcome from which is then used as the basis for forming an assessment of the level of alignment. Later in this thesis, the Luftman model will be used to offer the CIO an initial sense check of the case study outputs.

### 2.2 Shared Understanding, Knowledge and Cognition in the context of this study

Shared understanding is a key determinant of social alignment. However, the IS literature reviews show that the terms shared knowledge, shared understanding and shared cognition are used interchangeably (Benlian and Haffke, 2016, Jentsch and Beimborn, 2014). Jentsch and Beimborn, themselves confusingly switch between shared understanding and shared cognition when describing an aspect of their study's methodology. As shared cognition is a measure of shared understanding (Preston and Karahanna, 2009), taking a position on one implies the position to be taken on the other. This might explain how these terms (incorrectly) become used interchangeably.

An Oxford English Dictionary (OED) definition of the root words in these key terms is shown in Table 1.

Table 1 Dictionary definitions of key terms

| Term | Oxford English Dictionary Definition |
| :--- | :--- |
| Knowledge | Facts, information and skills acquired through experience or <br> education. |
| Understand | Interpret in a particular way |
| Cognition | Mental action or process of acquiring knowledge and understanding |

Table 2 shows how these key terms are defined in some of the highly cited papers referred to in this study together with a commentary.

## Table 2 Definitions in journal articles of specific "shared" terms

## Article term and concept

Comment

## Shared Knowledge:

## (Nelson and Cooprider, 1996)

'Shared knowledge is an understanding and appreciation among IS and line managers for the technologies and processes that affect mutual performance'.
(Google Scholar citations, 1027)

This study focuses on antecedents to shared knowledge. Their definition implies that where there is shared knowledge there is also a shared understanding. This requires a meeting of minds and communication alone is insufficient. Swanson (1974) holds that to achieve shared knowledge deep interaction is required. One might conclude that deep interaction includes a form of communication (discussion, negotiation, argument) that facilitates a meeting of minds.

This implies that parties who have shared knowledge and an ability to understand each other's processes can achieve shared understanding if there is a communications process between them that shares the information. For knowledge to be shared implies the interconnected elements of motivation, opportunity to share and the nature of the knowledge being shared (Ipe, 2003).

Over time this can lead to shared understanding which would achieve and sustain alignment (i.e. social alignment). This Reich and Benbasat study suggests that shared understanding is a key determinant of social alignment (Tan and Gallupe, 2006).
being the level of mutual understanding of and commitment to the business and IT mission, objectives and plans'.
(Google Scholar citations, 1483)

## Shared Understanding

## (Reich and Benbasat, 1996)

'Shared understanding is defined as the level of understanding IS / business executives have of business / IT objectives and vice versa'. (Google Scholar citations, 1030)

The study's focus is on identifying factors to operationalise shared understanding. Measures for understanding current objectives and shared vision for IT between IT/Business executives are offered. It does not address,

## Chapter 2

Article term and concept

## Comment

"how" understanding is achieved or what comprises executive understanding.

Even though there may be an understanding between IT/business executives, the measure doesn't capture the degree to which the understanding might be shared. For this a more helpful yet simple definition is that 'mutual (shared) understanding is the degree of agreement between individuals on a topic' (Johnson and Lederer, 2010). This is consistent with the personal congruence approach used by Benlian and Haffke (2016).

## (Tan and Gallupe, 2006)

'Shared understanding is part of the social dimension, an extension of which is shared cognition'.
Executives' cognition is defined as 'the mental models, assumptions, expectations, values and beliefs held by business and IS executives. Cognition of the SMT determines the strategic direction of firms'.
(Google Scholar citations 161)
(SMT = Senior Management Team)

## Shared Cognition

(Orlikowski and Gash, 1994)
'Cognitive structures are mental models (Frames). They are the assumptions, expectations and knowledge (cognitive elements) that people use to understand technology. Understanding people's interpretations of technology is critical to understanding their interaction with it. Cognitive elements can be shared, i.e. held in common by individuals'.
(Google Scholar citations, 1772)

## (Preston and Karahanna, 2009)

'Shared knowledge enables the creation of shared understanding - through integration of respective knowledge and perspectives,

Uses Personal Construct Theory and Repertory Grid Technique to study commonalities and individualities in cognition between executives Rep Grids are used as they provide a way to assess shared cognition, p.226. Shared cognition is viewed as being consistent with interaction and a negotiated shared understanding position. Group level shared cognition is of increasing research importance (Tan and Gallupe, 2006)

Orlikowski and Gash use the concept of technology frames to explore the topic. Sensemaking is another cognitive process approach that 'facilitates the aggregation of multiple informational cues into a single overarching view' (Tallon, 2014).
Shared cognition can be described as 'thinking at the group level' (Ensley and Pearce, 2001). It requires knowledge, understanding and interpretation to be shared.

The authors appear careful with their definitions and do not appear to conflate terms.

| Article term and concept | Comment |
| :--- | :--- |
| Shared domain knowledge is viewed as an <br> antecedent to shared understanding'. | Their definition of shared knowledge <br> addresses the comment made in the Reich and <br> Benbasat, (2000) study, by suggesting that |
| 'Shared understanding is a cognitive element. |  |
| Shared understanding defined as the degree of |  |
| shared cognition between the CIO and TMT on |  |
| the role of IS in the organisation'. |  |$\quad$| knowledge enables understanding but that |
| :--- |
| another act is required - which could be |
| construed as interpretation. |

Jentsch and Beimborn, 2014a concluded that there is no general agreement on the meaning and definition of shared understanding and confusion exists in the literature (Bittner and Leimeister, 2013). Maybe it is these differences and confusion that creates the basis for the onward interchange of terms.

Eden and Spender (1998), p123 set out a conceptualisation that can be helpful in untangling this confusion. Their model conceptualises an individual's interpretation or sensemaking of a knowledge base through use of their personal mental (i.e. cognitive) model. Where two individuals share the same interpretation, there is shared cognition.

The conclusion reached from Table 2 is that assuming the nature of the knowledge between two parties can be understood and that the motivation and opportunity exists; knowledge can be shared. When communicated successfully and interpreted similarly, shared understanding can result. The degree of shared cognition, for example between technology investment decision makers, is a measure of the degree of shared understanding. It then follows that shared cognition can provide an insight as to how to drive Top Management Team (TMT) shared understanding and by extension IT effectiveness. Tan and Gallupe (2006) view group level cognition, for example shared cognition at the TMT level, as a key area for research, hence it merits further exploration.

### 2.3 Approaches to researching aspects of the social dimension

The studies cited in section 2.2 surface three common approaches that are seen in the IS literature when studying cognition. These are outlined below.

### 2.3.1 Repertory Grid

A Rep Grid is a long established technique based on Personal Construct Theory (PCT) that exposes an individual's construct system (Easterby-Smith et al., 1996). By exposing and understanding this construct system, insight can be gained as to how an individual sees and interprets the world around them on a particular topic or situation and consequently anticipate how they might behave (Stewart et al. (1981), p7). A person's construct system is developed from personal experiences that have been interpreted, tested and modified over time (Fransella and Bannister (1977), p5). Rep Grids are a valid way to explore an individual's IS understanding within the context of a firm and improve organisational action (Tan and Hunter, 2002). They can not only be used to assess individual's constructs but also constructs held in common between individuals (Simpson and Wilson, 1999) and hence can be used to explore constructs across team members (Phythian and King, 1992, Latta and Swigger, 1992). In a group, where similar constructs are held by individuals, it implies a level of shared cognition (Simpson and Wilson, 1999); i.e. two people will represent an event using the same or similar constructs and apply them similarly. This will later be referred to as the Commonality Corollary.

The other two approaches highlighted, technology frames and sensemaking, are both underpinned by cognitive constructs.

### 2.3.2 Technology Frames

Kelly depicted 'man as a scientist' who uses constructs to construe themselves and the world around him (Fransella and Bannister (1977), p4). Other scholars set out how people construct mental or heuristic models which then function as a frame of reference for action and interpretation of the world (Eden and Spender (1998), p212). These frames of reference can evolve over time, similar to personal constructs, and can be enabling or restrictive (Orlikowski and Gash, 1994).

Orlikowski and Gash (1994) develop the concept of frames in the context of technology. According to them technology frames can be powerful in shaping how technology is positioned within firm. They use the term technology frame to denote the element of a person's overall frame of reference used to understand their firm's technology. Frames tend to be a more general concept than a construct and are determined in a different way (Lin and Silva, 2005). However, one might argue that they could be better compared with a specific form and application of a construct system.

Technology frame congruence, for example between TMT members, implies a similar view between them as to how technology should be positioned within a firm. An incongruence indicates important differences, possibly conflict. At the group level this is under researched, but frame differences are not a problem as long as it motivates the TMT members to negotiate shared frames (Young et al., 2016). Applying the thinking from technology frames to decision constructs may provide a helpful mechanism to express and/or explain alignment of management cognition and decision profiles.

### 2.3.3 Sensemaking

Sensemaking is the 'interplay' between how meaning is given to information and action (Thomas et al., 1993, Weick et al., 2005). It is the 'process through which various information, insight and ideas stick together in a meaningful way' (Dougherty et al., 2000). The framework for sensemaking is formed by an individual's constructs (Simpson and Wilson, 1999). Strategic decisions, such as technology investment decisions, are 'driven by senior managers' cognitive structures for making sense of complex situations' (Cron et al., 2014). These cognitive structures are revealed through Rep Grids.

Many studies examining antecedents (Nelson and Cooprider, 1996, Preston and Karahanna, 2009) and drivers (Yayla and Hu, 2009) of alignment rely on management perceptions, that is to say, how for different social actors different social realities exist. Tallon and Kraemer (2007) apply sensemaking theory to conclude that there is value in using perceptions to assess the performance impacts of IT as they are more 'fact than fiction'. They also suggest that perceptions are good grounds for executives to make investment decisions and are sufficiently accurate to judge past investments. Perceptions
are important as differences between parties/individuals can result in severe impacts to a firm (Griffith, 1999). Within a firm, differences can manifest themselves in the misalignment of views between [IT] functional and line executives on the [IT] function's effectiveness and strategic value (Wright et al., 2001). Perceptions can't replace objective measures, but objective measures in themselves are not without their challenges (Tallon and Kraemer, 2007), a view supported by others (Ward et al., 1996, Lee and Myers, 2004).

If sensemaking is how meaning is given to information and action, then such information understanding can be provided or distributed by organisations' actors through a process known as sensegiving (Gioia and Chittipeddi, 1991). Through this process an actor(s) is actively trying to change the way others' make sense of a phenomenon (Gioia and Chittipeddi, 1991). In their paper Gioia and Chittipeddi (1991) set out a sensemaking/sensegiving (cascade/ripple effect) process that that shows how strategic change can be brought about in an organisation. Tallon (2014) draws on the notion of sensegiving to suggest how a CIO can promote IT and build consensus toward a particular course of action by telling other actors 'not what to think but how to think' about IT. Jenkin et al. (2019) explore the cognitive activities of sensegiving and sensemaking on project planning and control mechanisms to provide insights into how shared understanding and project success among project stakeholders can vary over time and across projects.

### 2.3.4 Conclusion

For strategic issues it is likely that the TMT members' views will matter the most, and their past experiences of technology will affect future decision making motivations (Thomas et al., 1993). Cognition and past experiences are central to PCT and, given the focus on cognition, this preliminary narrative review suggests that there are strong grounds for choosing Rep Grids as the primary approach to this study. That said, technology frames and sensemaking might provide a helpful additional mechanism to describe or more generally comment on any findings concerning the degree of shared cognition across senior decision makers. For example, if constructs are used to set out how an individual might frame their view of technology then frame congruence might offer a way to think about how a group might choose to position technology within a firm. If there is knowledge about a person's
decision constructs, sensemaking may provide a way to articulate how a TMT member's experience of technology is translated into action regarding an investment decision.

### 2.4 Research gap: A starting point

Clearly, shared understanding and shared cognition are viewed as important areas of research but following their literature review Jentsch and Beimborn (2014) concluded that there has been a degree of superficiality in the research to date.

Benlian and Haffke (2016) also performed an IS literature review and concluded that mutual understanding between CEOs and CIOs and how differences in their perspectives can affect their relationship was an under researched area. Given that the CEO-CIO relationship is likely to have a bearing on how to best position IT to improve firm performance, suggests another reason for focusing on social alignment. On reflection, their finding may come as no real surprise. Past research has shown that technology decisions often involve people in a decision making process where the different actors, for example the CEO and CIO, hold different views about the effectiveness of their firm's IT (Chan et al., 1997). It has also shown that a decision making process can be viewed as a social interaction with decisions viewed as 'issue streams' (Langley et al., 1995), suggesting the ongoing importance of the relationship.

In their conclusion, Benlian and Haffke (2016) suggest that future cognitive research should specifically explore areas where disagreements are likely to occur, such as IT investment decisions. They suggest focusing on the dyadic relationship between the CEO and CIO, though it is reasonable to assume that their suggestion for investigating dyadic investment conflicts apply equally to group level conflicts. Understanding group level conflict can be approached by building an understanding of the shared cognition at the group level. Rep Grids can reveal individual cognition through personal constructs and from this it is possible to understand cognition at the group level (Tan and Gallupe, 2006). According to Fernando et al. (2006), past research exploring how to improve social alignment and relationships between the business and IT groups have incorrectly focused on behaviours without understanding the way
people's cognition influences such behaviours. They conclude that using PCT to study differences in perceptions and behaviours of the business and IT is a valid yet very rare approach in IS research.

As firms become increasingly dependent on IS, the tendency is for organisations to mandate the use of selected systems (Rawstorne et al., 1998, Brown et al., 2002). In practice this mandate will come from the TMT members accountable for the investment decisions (Xue et al., 2011). Therefore, understanding how this group of people construe IT effectiveness when making investment decisions is crucial.

Disagreements, or conflicts, occur because of cognitive differences between those involved in making the decision. Reducing cognitive differences positively affects performance of such a group (Chiravuri et al., 2011). Exploring where cognitive diversity could potentially occur between the CIO and key stakeholders, i.e. TMT members and key influencers specifically around technology investments, adds further impetus to engaging in a cognitive study.

Such an investigation fits perfectly with the concept of social alignment as if there is a difference of opinion amongst TMT members as to what is required for IT to be viewed as effective, it is unlikely that IT can be tightly integrated, alignment will not be achieved and IT will not have the associated positive impact on firm performance.

### 2.5 Focused literature search - Part 1 (Research Gap)

To supplement the narrative searches and to help further position this study an extensive structured search was targeted on the identified research gap. The aim of this search is not to provide a synthesis of cognition studies contained in the IS literature but to provide a degree of confidence as to the specificity of the research topic being considered.

Following their research into the CEO-CIO understanding of key business and IT topics, Benlian and Haffke (2016) suggest that future research should investigate the CIO-CEO perception biases in the area of IT investments that are due to [role] stereotype. This is a two-part suggestion: (a) Investigate
the CIO-CEO perception differences of IT investments, and (b) Can these differences be explained by role stereotype?

The practical importance of a study along these lines lies in the potential to improve firm performance. The rationale for this statement is based on an assumption that both the CEO and CIO wish for any investment in IT to be perceived as effective and for there to be a high degree of commitment to the investments. For this to occur there must be a high degree of shared understanding regarding what makes the investments effective. If an investigation could provide insight as to the nature and extent of any cognitive diversity, then it may be possible to take steps to reduce any disparity.

If this is a research gap at the CIO-CEO level, then it will likely be a gap at the CIO-Management team level. The management team level is important as investment decisions can involve these stakeholders either directly in the decision making or indirectly during their implementation and operation. Their involvement and use of systems can positively impact the attitudes of those in their domain (Börekçi, 2009, Jarvenpaa and Ives, 1991).

A systematic literature review can be used to identify the existence of a research gap (Dani et al., 2019) and sets out to achieve this using a repeatable and auditable process (Tranfield et al., 2003). Such an approach allows a large body of literature to be reviewed efficiently and in a high quality manner (Tranfield et al., 2003). In this instance, a gap has already been suggested, but to separately confirm it, a broad systematic literature search was devised. This search aims to identify papers in a corporate setting that depict shared understanding/cognition studies in IS between business and IS executives. The ultimate aim being to identify studies that may have already addressed the identified research gap. This initial search does not limit returns based on specific journals (Webster and Watson, 2002) nor does it focus on investments only; and recognising the potential for different approaches, does not privilege one research methodology over another.

The approach to this systematic search is adapted from Dani et al. (2019), who followed Kitchenham and Charters (2007). They set out a process that links the search aim and search questions to the search activity; sets out how
the studies are selected; and how the findings are presented in a report phase. These steps are mirrored in the following sections.

### 2.5.1 Method

The overall aim of the search is to identify papers that depict shared understanding/cognition studies in IS in a corporate setting where the actors are IS and business executives. Therefore, the search questions (SQ) that then shape the selection process are:

SQ1: Which are the studies that are a combination of decision making/other dynamic of senior actors/groups in the broad context of shared understanding?

SQ2: Which of the SQ1 papers place the focus on IT investment decisions at either the project (phase or attribute) or portfolio level, or in a related specific strategic decision/positioning?

SQ3: Which SQ2 papers are focused on assessing shared cognition or present/measure the differences in cognitive biases between executives or senior management?

An initial search was run directly against four key databases/platforms: EBSCOHost Business Source Premier, Scopus, ProQuest and Web of Science. The search was restricted to scholarly articles and conference proceedings, in English language, from 1989 to June 2019. This date range was chosen based on it being both (a) early enough in the modern IT industry lifecycle to capture all relevant articles that shape the use of technology in firms today and (b) able to capture any studies that could possibly have stemmed from the time of the Henderson and Venkatraman (1989) IS/business alignment paper.

The search returns of interest are those that are most likely to provide insight centred on (a) The nature of shared understanding/cognition studies in the IT investment studies, that are (b) Centred on decision making by senior executives in IT and the business.

The resulting search string for the search comprises three components:

1. Ensuring the search is centred on IS/IT:

String component: ("information technology" OR "ICT" OR "information systems") AND
2. Focusing on the actors of interest with whom the CIO interacts: String component: (actor $O R$ executive $O R$ "management team" $O R$ leader OR stakeholder OR "steering group") AND
3. In the specific area of shared understanding and decision making: String component: (decision OR cognit* OR perception OR sensemaking OR alignment OR construct OR "shared understanding")

The returns from each database search were loaded into a separate tab on an Excel spreadsheet ready for review. The review process is shaped by the search aim and search questions and these guide the setting of exclusion and inclusion criteria used for selecting the papers of interest (Dani et al., 2019). At this stage the returns from each database were reviewed separately, i.e. the returns were not merged. The rationale for this being that if there was inconsistency in the reviewing, working on the databases separately would more likely result in a (cautionary) false inclusion, rather than exclusion. The Exclusion Criteria (EC) used to filter the search results, which are not mutually exclusive, were:

- EC-N: The study is not set in a corporate context or related to the topic of interest. For example, studies that are at the level of society, focused clinical / medical trials, deal with government, public data or policy making, examining phenomena found in the education sector or are urban/smart city commentaries.
- EC-S: The study's primary focus is on operational system use/development or management models/practices (including generic cloud/outsourcing decisions/measures). Studies focused on end user system adoption are also filtered out by this criterion. Following the initial search, this category was specifically re-examined to capture studies where a shared cognitionoriented approach was taken to the executive technology investment decision making. This was done as part of an SQ3 inclusion double check.
- EC-D: The study is not focused on a dynamic of a senior executive and/or senior management team member. For example, investigations into

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aspects of middle management or users, or more generalist papers such as those on strategy frameworks. Studies focused on senior executive system adoption or the executive role in investment governance are not filtered out at this stage.

The exclusion criteria were applied by analysing the title and in many cases the abstract for each article.

The papers from each of the databases that have not been excluded then have the following inclusion criteria (IC) applied.

- IC1: The paper is focused on decision making or other interaction between senior actors/groups.
- IC2: Shared understanding/cognition is central to the paper.

The inclusion criteria were applied by analysing the title and abstract for each paper.

The inclusion criteria are also not mutually exclusive, and the retained papers were then examined to identify which had a combination of both inclusion criteria. In a number of cases this required the literature review, research design and discussion sections of the paper to be read. This step identifies papers that meet the first of the search questions (SQ1), and at this stage the papers from each database were merged and de-duplicated.

The SQ1 category papers were then analysed to ascertain which papers fell into the other two search question categories. For this step, the literature review, research design and discussion sections of the papers were read. All of the SQ2 and SQ3 papers were read in full.

The summary view of the search process, adopting the same commonly used process symbols as Dani et al, 2019, is shown in Figure 3. It shows the total number of papers reviewed by data source and the papers remaining after each filter is applied.


Figure 3: Literature search selection process \& the number of papers remaining after each step

### 2.5.2 Findings overview part 1: Initial search

Before trying to summarise the search findings, it is helpful to step back and gain a high-level perspective of the papers it contains. As all of the SQ1 papers have a focus on shared understanding/cognition, they were mapped onto the business/IT shared understanding framework set out in (Jentsch et al., 2014). In this model there are two broad categorisations of Task and Team, each comprising three elements: Task which comprises vision of the role of IT, attitude towards the role of IT and the processes of business/IT; and Team which comprises vision of partnership, attitude towards the partnership and technical language.

Table 3 provides a brief description of the framework's categories together with the distribution count across the papers of which framework elements are being addressed. The full distribution is provided in Appendix 3.

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Table 3: Mapping of SQ1 paper distribution count to the Jentsch et al., (2014) categories

| Jentsch et al <br> Category | Short Definition | Distribution <br> Count |
| :--- | :--- | :---: |
| Vision of role of IT | View on the potential of IT and how to employ IT | 14 |
| Attitude towards <br> IT | The degree to which it is seen that IT can be used to <br> improve process performance <br> IT understanding how systems support business <br> Business/IT | lace <br> process and the business' understanding of the process <br> of IT projects. IT / Business work environments. |

Table 4 lists the papers returned by the searches that are classified against the SQ categories listed in Appendix 3. For these papers it shows:
a) The perspective taken by the paper, for example whether it is focused on the dyadic relationship between the CEO and CIO, or on the TMT as a whole.
b) The Jentsch (2014) task/team category that the paper addresses
c) Whether the study's focus is at the project level of more broadly the firm level, and
d) An indication of the method used by the paper, for example more qualitative interviews or more quantitative surveys.

From Table 4, it is clear that across the SQ papers, Task overall receives more attention. Maybe this is understandable in the context that investment decision making, which can often be studied in process terms, is part of the search criteria. Certainly, in the SQ3 papers, a Task focus dominates. It is also interesting to note that the methodologies used to investigate the project level papers are predominantly qualitative, which is unusual for IS studies. Even an overall count across all the SQ papers that specified a method, only 57\% are considered quantitative. Given the previously mentioned positivist
approach more usually taken to IS studies, this again might be considered unusual.

Looking closer at Table 4, in terms of the perceptions explored in the literature, roughly $30 \%$ of the 41 studies provide a view from across a broad group of employees $(n=5)$ or a view from a single class of informant ( $n=9$ ). Neither of these perspectives are the current focus of enquiry. The largest single grouping, is formed of studies exploring various comparisons between the CIO and other executives ( $\mathrm{n}=14$ ), with most of these studying investigating an aspect involving the CIO and CEO ( $\mathrm{n}=8$ ). However, the studies investigating dyads involving the CIO, whilst of general interest, are not focused on perception biases pertaining to investments. They are all of a general nature focused on either an aspect of the firm or on role relationships and communications. Consequently, they too are not of immediate interest.

From an actor perspective only the senior management and TMT groupings remain. Tegarden et al. (2009) is the only study in Table 4 focused on the TMT as a complete team. Even though this paper does not have a focus on investments it is of interest as cognitive diversity is used to explain their position on decision making. Understanding the dimensions of TMT diversity could be used to develop an action plan designed to beneficially reduce cognitive diversity and increase consensus. Building consensus across the TMT builds support for IT and Rag-Nathan, (2004) sets out a model that links this support to better positioning of IT within the firm and the onward benefits of improved IS performance. Consensus in the context of a shared understanding study is clearly important and is examined further in section 2.8. It also seems reasonable to assume that such conditions would increase the CIOs level of strategic decision making authority, which is directly linked to increased contribution of IT to the firm (Preston et al., 2008). Other papers offering a TMT perspective provide it through reliance on either a single informant of the TMT, the CEO, for example Reinhard and Bigueti (2013), or a

| Author | Perspective Taken | Level | Jentsch (2014) Shared Understanding categorv | Search Question category | Snapshot of the Paper | Year | Method |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Oppenheim C., Stenson J., Wils | Senior Mgt | Project | Task | SQ3 | To enable senior execs to identify eight information types of importance to their business | 2003 | RGT, Elements Supplied, $\mathrm{n}=5$ |
| Liu S., Zhang J., Keil M., Chen T. | Senior Mgt | Project | Task | SQ3 | Compares risk perceptions of execs and PMs | 2010 | Delphi, PM $=34, \mathrm{SE}=30$ |
| Mhlungu, NSM; Chen, JYJ; Alke | Senior Mgt | Project | Task | SQ3 | Senior mgt perceptions of successful digital transformation [projects]. | 2019 | Survey, $\mathrm{n}=95$ |
| Ow, TT; Morris, JG | Senior Mgt | Project ${ }^{\text {² }}$ | Task | SQ3 | Exploring difference of execs "thought vs actual" key to decision | 2010 | Survey, $\mathrm{n}=99$ (UET) |
| Vermerris, A; Mocker, M; van + | Senior Mgt | Project | Team | SQ3 | Aimed at linking business value with alignment practice studies (SU and Commitment) | 2014 | Interviews, $\mathrm{n}=17$ |
| Ryan, SD; Harrison, DA | Senior Mgt | Project | Task | SQ3 | Sociotechnical considerations used in decision making | 2000 | Interviews, $\mathrm{n}=50$ Execs |
| Orlikowski W.J., Gash D.C. | Groups | Project | Task | SQ2 | Frame analysis to analyse perceptions by role to system deployment > Notes example | 1994 | Interviews, $\mathrm{n}=91$ |
| Lehong S.M., Dube E., Angelop | Group | Project | Task | SQ2 | Q-card derived understanding of the benefits of EA | 2013 | Q-Methodolgy, $\mathrm{n}=23$ |
| Pan, GSC | Group | Project | Task | SQ2 | Develops a stakeholder developed project abandonment framework | 2005 | Interviews, $\mathrm{n}=28$ project stakeholders |
| Young, BW; Mathiassen, L; Dav | x-Group | Project | Task | SQ2 | AR case study - How frame incongruences shape outcomes of IT enabled change | 2016 | Frames: Interviews, $\mathrm{n}=32, \mathrm{~W} /$ shops, $\mathrm{n}=9$ |
| Hsu, CW | Group | Project | Task | SQ2 | Frame analysis of key stakeholder groups regarding security compliance | 2009 | Frames: Five key grouping/30 meetings |
| Cho, V; Wright, R | CIO only | Project | Task | SQ2 | CIO evaluation framework for strategic IS planning and implementation informed by RGT | 2010 | RGT - Elements supplied, $\mathrm{n}=17$ |
| Tegarden D.P., Tegarden L.F., S | TMT | Firm | Task | SQ1 | TMT cognitive diversity regarding strategy factors > causal maps > better decisions | 2009 | W/shop + Member ranking, $\mathrm{n}=13$ |
| Amoroso D.L., Brancheau J.C., | Senior Mgt | Firm | Task | SQ1 | Not available to researcher - Exec perception of IT, use of IT and role in project lifecycle | 1991 | Not Known |
| Hedelin, L; Allwood, CM | Senior Mgt | Firm | Task | SQ1 | Investigated the Presidents' and Top managers' views on ICT use in SDM | 2002 | Survey, $\mathrm{n}=41$ |
| Tan, F B, Gallupe, R B | Senior Mgt | Firm | Task | SQ1 | $C M>$ Cognitive commonality positively effects alignment | 2006 | RGT > Develop Survey, $\mathrm{n}=80$ execs |
| Blaize Horner ReichBlaize Horr | Senior Mgt | Firm | Both | SQ1 | Shared domain knowledge > Long term influence | 2000 | $10 \mathrm{BUS}, \mathrm{n}=37$ |
| Krotov V. | Senior Mgt | Firm | Both | SQ1 | CEO/TMT/CIO actions to bridge distrust gap | 2015 | Commentary |
| Reich, BH ; Benbasat, I | Senior Mgt | Firm | Both | SQ1 | Shared understanding of objectives and technology vision > best social dimension measures | 1996 | Interviews |
| Gupta Y.P. | CEO/CIO | Firm | Task | SQ1 | CEO/CIO partnership and relationship | 1991 | Commentary |
| Johnson, AM; Lederer, AL | CEO/CIO | Firm | Task | SQ1 | CEO/CIO misaligned in views of what drives IS contribution | 2013 | Survey, $\mathrm{n}=202$ pairs |
| Johnson, Alice M., Lederer, Alt | CEO/CIO | Firm | Task | sQ1 | CEO/CIO assessed (STROBE) for mutual understanding and key factors | 2010 | Survey, $\mathrm{n}=202$ Exec pairs |
| LA Tai, R Phelps | CEO/CIO | Firm | Task | SQ1 | CEO/CIO perception differences of IT. Value of CEO/CIO realtionship | 2000 | Survey, $\mathrm{n}=156$ |
| Kearns, GS; Lederer, AL | CIO/Exec | Firm | Task | SQ1 | IS/business execs lack shared understanding on BP-ISP alignment > prevents performance gain | 2000 | Survey, 107 exec pairs |
| Martinho, JL; Gomes, CF; Yasin | CFO/CIO | Firm | Team | SQ1 | Examines perceptions of CIO and CFO on aspects of social alignment | 2016 | Survey, CFO=114, CIO=77 |
| Schobel K., Denford J.S. | CFO/CIO | Firm | Team | SQ1 | Highlights CFO/CIO relationship importance | 2013 | Interviews, $\mathrm{n}=6$ |
| Benlian, A; Haffke, I | CEO/CIO | Firm | Team | SQ1 | CIO understanding of CEO more important to CEO/CIO partnership | 2016 | Survey, $\mathrm{n}=102$ pairs |
| Teo, TSH; King, WR | CIO/B's Planners | Firm | Team | SQ1 | Roles > education gap > differences in perception between IT \& Business execs | 1997 | Survey, $\mathrm{n}=157$ pairs |
| Enns, HG; Huff, SL; Golden, BR | CIO/Exec | Firm | Team | SQ1 | How CIOs influence TMT members regarding initiation/implementation of projects | 2001 | Interviews, $\mathrm{n}=26$ \& survey, $\mathrm{n}=69$ pairs |
| Karahanna, Elena, Preston, Da | CIO/Exec(s) | Firm | Team | SQ1 | How firms can develop CIO/TMT social/structural/Cognitive capital > performance | 2013 | Survey, $\mathrm{n}=81$ firms |
| Reinhard, Nicolau; Bigueti, José | CIO/CEO | Firm | Team | SQ1 | Formal comms better for developing shared mental models CEO/CIO | 2013 | Survey $\mathrm{n}=62$ pairs |
| Jarvenpaa S.L., Ives B. | CEO/CIO | Firm | Both | SQ1 | Exec involvement influenced by CEO participation/context | 1991 | Survey, $\mathrm{n}=55$ |
| Johnson, AM; Lederer, AL | CEO/CIO | Firm | Both | SQ1 | Frequency of comms, CIO to CEO, more broadly effective than richness | 2005 | Survey, $\mathrm{n}=202$ |
| Grill G.P., Spillman R.D. | CEO only | Firm | Task | SQ1 | 10 measures to indicate CEO consistency towards IS planning | 1990 | Quant survey, $\mathrm{n}=42$ |
| Tallon, Paul P., Kraemer, Kenne | B's Execs only | Firm | Task | SQ1 | Sensemaking: SMT perception is realty as regards IT impact on firm | 2007 | Survey, $\mathrm{n}=196$ business execs |
| Ragu-Nathan, BS; Apigian, CH; | IT Execs only | Firm | Task | SQ1 | TMT support for IS helps make it performant | 2004 | Survey, $\mathrm{n}=231$ IT Execs |
| Khandelwal, VK | CEO only | Firm | Task | SQ1 | CEO/CIO: CSF > shared domain mgt understanding | 2001 | Survey, $\mathrm{n}=212$ CEOs + survey data |
| Tallon, PP | B's Execs only | Firm | Both | SQ1 | CIO led sensegiving drives SMT consensus > valued IT | 2014 | Survey, $\mathrm{n}=133$ buiness execs |
| DS Preston, E Karahanna | CIO only | Firm | Team | SQ1 | Examining KE mechanisms to build $\mathrm{CIO} /$ TMT shared understanding | 2006 | Survey, $\mathrm{n}=206 \mathrm{ClOs}$ |
| Jablokow, K W, Jablokow, A G, | IT Exec only | Firm | Both | SQ1 | Identifies CIO-TMT cognitive gaps as a difficult yet important problem to solve | 2010 | Interview, $\mathrm{n}=26$ IS Execs |
| Preston, David S., Karahanna, | CIO only | Firm | Both | SQ1 | Social alignment is a proximal antecedent of the Intellectual dimension | 2009 | Survey, $\mathrm{n}=243$ pairs |

combination of this and some of the TMT, for example Karahanna and Preston (2013).

Consequently, only 6 papers meet the final criteria of SQ3 where the paper has a cognitive focus across a management body that includes the CIO at a project or portfolio level. Even within these papers there is no paper that clearly provides a cognitive comparison at either a dyadic or group level that is specifically focused in IT investments. This can be seen from the outline of the SQ3 papers provided in the following paragraphs.

Oppenheim et al. (2003) uses Rep Grids to understand which attributes of 'information as an asset' are anticipated to be of particular business value to senior executives. As an example, product and customer data is seen as being very important. Though this is not a study of an investment decision, it could be understood if the richness of specific types of data produced by a new system under consideration influenced some executive's decision making.

Liu et al. (2010) use a Delphi approach that allowed the researchers to elicit project risk factors from key stakeholders and then present back to them in a group with the view of reaching a consensus of opinion. A relaxed view of the actors involved has been taken in that the project manager has liberally been viewed as possibly being at executive level. Again, whilst not a perfect fit to the perceived research gap, it suggests that there is value in aiming to minimise cognitive diversity amongst stakeholders at an investment level. From an investment perspective, project risk profiles might easily be another area for disagreement when making an investment decision.

Mhlungu et al. (2019) focuses on organisational digital transformation. The view taken during the search review process was that IT investment(s) could very likely lie at the heart of such a transformation. The focus of this paper is to compare the IT and business executive perceptions of the underlying success factors of digital transformation. The previous two studies elicit their 'factors' from the executives, a research design that they perceive as a strength. By contrast, Mhlungu et al. (2019) derive their success factors from the literature.

Ow and Morris (2010) examine 'What decision makers are doing with the information available' in an attempt to explore whether decision makers act
rationally or on gut feeling. The study is in part motivated by Hambrick and Mason (1984) who suggest that strategic choices, for example an IT investment decisions, reflect the personal biases of the senior managers and influence their decision making. They saw themselves as being pioneers of experimental methods to capture executives' cognitions. By addressing the research gap, it may be possible to contribute to this pioneering approach.

Vermerris et al. (2014) examine alignment at the project level through the lens of four alignment practices. Three of these practices, communication, shared understanding and commitment, have been shown to be antecedents to each other. They argue that alignment is key to whether IT investments deliver business value and that projects are a critical point of interaction for IT and the business. They do not explore the research gap even though the fourth alignment practice they explore is IT investment evaluation. Their interest here is whether an investment should be re-evaluated after each phase. It is not an investigation that compares executive biases around investments.

Ryan and Harrison (2000) respond to calls for further research into the 'hidden' costs and benefits that drive IT decision making. This call is based on the belief that typical cost benefit analyses are too limited to guide such decisions. They take an inductive approach to their research and examine the costs and benefits that arise from employees' expert decisions and activities. They establish a framework that examines the topic across different investment types (using the Swanson (1994) tricore model). This suggests that to gain maximum value when addressing the research gap, cognitive biases across different types of investments should be explored.

A high-level comment of the SQ2 papers is that their nature is similar to those in SQ3 but that the stakeholder group being considered is much broader. Consequently, they are moving further away from the targeted research gap. The relationship between the CIO and the CEO or TMT features strongly in this category. According to Krotov (2015) a good CIO/CEO relationship contributes to strategic alignment which leads to improved firm performance (Johnson and Lederer, 2010) but that there are few studies that investigate the convergence of this relationship (Johnson and Lederer, 2005). This is an
important theme for this study to explore as consensus or convergence of perceptions between the CIO and TMT members can have a very positive effect on IT effectiveness (Tallon, 2014).

Given the interest expressed in Rep Grids, Cho and Wright (2010) employ Rep Grids to develop an evaluation framework for IS planning and implementation but it is not included in SQ3 as it only takes the perspective of the CIO and doesn't cover the activity associated with IT investment decision making.

Recalling the nature of the suggested research gap, there is strong evidence to confirm the gap identified at both the dyadic and group level. Given the scarcity of studies focused on shared cognition at the TMT level, this in particular stands out as a strong candidate for further research in its own right. Any focus on role stereotyping can be considered a secondary objective.

However, care is taken to say that simply because a paper from the search does not fall into a search question category (SQ1-3) does not mean that it doesn't have value to this study; it simply means that it is not directly addressing the research gap. For instance, the Jentsch et al (2014) framework analysis has few entries in the language category. Language, and more broadly communication, is important in building relationships, and good two way communication between the CIO and senior peers will build a perceptual consensus as to what issues in IS are important (Watson, 1990). Preston (2004) shows that [IT] knowledge exchange, facilitated by type of communication (formal/informal), and the degree of similarity in the nature of their backgrounds, are key determinants of shared understanding. Such shared understanding is characterised by shared cognitive capital (an element of social capital) where 'interpretations and systems of meaning' are shared between TMT members (Karahanna and Preston, 2013) and assist with reducing cognitive conflict.

Accepting that shared knowledge and understanding are closely linked, creating the conditions for this to happen is important. Han and Anantatmula (2007) investigated how willing employees were to share knowledge, and set out the conditions necessary for this to occur. Within the context of knowledge management systems, they show that employees are willing to share their knowledge but that they need to be appreciated and rewarded for
such action. In other words, they need to feel motivated to share. This is consistent with the findings of Ipe (2003) who goes further by showing how motivation, together with opportunities to share (which relates to Preston (2004) structural systems of knowing) and the nature of knowledge being shared (tacit or explicit), comprise the elements required for knowledge sharing to occur.

Corvera Charaf et al. (2013) are also interested in shared understanding but from the perspective of there being a shared language between stakeholders. Applying the idea from this paper to this study implies that IT/Business alignment will fail if there is poor communication between IT and business executives. Their paper suggests that the language used would need to be common to both, i.e. CIO to CEO and/or other TMT members, if the knowledge exchange is to be effective. Building on this theme, Johnson and Lederer (2005), found that the frequency of communication, CIO to CEO, is more important than the richness of the communication.

Consistent with Tan and Hunter (2002), Rep Grids may be used in this study to improve organisational action, and the papers cited highlight the need for the CIO in this study to be aware of:

- The conditions required within the specific firm context for communications to be effective.
- The language stakeholders are using, and any differences, when describing and communicating decision constructs
- The degree of expertise the business executives have in the IT domain and any consequential expectations they may have on shaping the nature of the IT deployed.

Being aware of executive perceptions of the business value of IT is helpful to a CIO. The evidence to date suggests that (a) the perceived executive value of IT closely reflects reality (b) executives in firms with a focused goal for IT perceive higher value from their IT, and (3) practices such as strategic IT investment evaluation contribute towards higher perceived IT contribution to a firm (Tallon et al., 2000, Tallon and Kraemer, 2007, Tallon, 2007). For this study there are some general background questions that are incorporated into the interview process to assess TMT members' perceived view of the corporate
strategy and the role of IT. These are discussed later (in the narrative supporting Table 18).

### 2.5.3 Summary of findings overview - Part 1

In short, the focus suggested by Benlian and Haffke (2016) on cognitive differences around technology investment decisions does not appear to be addressed at either a CIO or executive group level.

Specifically at the executive team level, or TMT, cognitive diversity is raised as an important contributory element in supporting team effectiveness (Tegarden et al., 2009) and can lead to high quality decision making (Amason, 1996). This would be helpful when making technology decisions.

However, value comes from identifying, discussing and consolidating the cognitive differences (Tegarden et al., 2009, Amason, 1996). The notion of identifying and discussing cognitive structures and being able to stand in 'someone else's shoes', lies at the heart of the Repertory Grid technique (Stewart et al. (1981), p5, Fransella and Bannister (1977), p5). Related to this, and interestingly from a practitioners perspective, Kanellis et al. (1999) conducted a Rep Grid study with the intention that it should assist a group's understanding of the phenomenon being studied. They concluded that cognitive understanding can be used as the basis for action and judged by its `practical adequacy'.

Rep Grids can provide a solid foundation for exploring cognition and can be supplemented with the concepts of sensemaking and technology frames to aid explanation and interpretation. However, before finally committing to a Rep Grid approach, section 2.6 briefly explores some alternatives.

### 2.6 Relevant Theories for IS Cognitive studies

Personal Construct Theory (PCT) is the theory that underpins the Rep Grid Technique (Kelly (1991), p152). However, for cognitive oriented IS studies associated with Business/IT alignment, Tan (2002) suggests that in addition to PCT, cognitive categorization and social cognitive theories have relevance. Therefore, before committing to PCT and Rep Grids these other approaches are briefly considered. That said, Budhwar (2000) holds that broadly speaking, all `cognitive theories assume that individuals employ particular
schema/categorisation schemes to understand their world'. It would therefore appear that rather than deciding between conflicting theories it is more a case of selecting the most appropriate.

### 2.6.1 Cognitive Categorisation

Cognitive categorization theory contends that memory is fundamental to mental activity (Tan, 2002) and adaptive behaviour (Estes (1994), p4). Memory organisation, the essence of which is classification, allows experiences and lessons from the past to be applied to the present. (Estes (1994), p4); and that the concept of similarity plays an important part in both memory and cognition (Estes (1994), p15). This suggests the basis for the development of a mental model or heuristic.

Classifying an object to a category requires a criterion to classify against (Rugg and McGeorge, 1997), which would imply the need for something to be known about the object and category. This is presumably why (Estes (1994), p5) distinguishes categorisation from classification on the grounds that the former has a richer meaning. Daniels et al. (1995) surface three so called principles of cognitive categorisation concerning (1) how categories are formed around some objects they contain more than others (2) how allocating an object to a category can be influenced by context and (3) the importance of an object's features when it comes allocating it to a category.

The Visual Cards Sorting (VCS) technique is an approach based on cognitive categorisation theory (Daniels et al., 1995). The underpinning premise for the theory is that individuals use a particular schema to make sense of their world. This schema holds information and knowledge of concepts that are used to categorise objects (Budhwar, 2000).

The cards represent the objects of interest, for example IT investments, and can be elicited from the participant in a similar manner to Rep Grid elements. The cards are sorted by the participant into meaningful categories based on similarity of attributes (Budhwar, 2000). Rugg and McGeorge (1997) detail a number of variants of the VCS technique such as Q sorts, where the respondent is asked to arrange cards containing statements into a scale of strongly agree/strongly disagree following a rough normal distribution;

Hierarchical sorts, where the respondent is asked to group the cards in line with a taxonomy; "all in one" sorts, where objects are set out against an agreed $2 \times 2$ grid where the $x$ and $y$ axes each represent a high/low scale of a specified attribute, and; "Repeated single criterion" sorts, where the respondent is asked to repeatedly group the cards determined by a criterion they have chosen that is relevant to each sort exercise.

Accepting that there will be variations of these various methods, a brief comparison of each against the Rep Grid technique in the context of this study would be:

- Q-sorts would appear to rely on the researcher providing the categories. This is a more deductive approach than the study envisages. It is more akin to a special type of Rep Grid where the constructs have been predetermined by the researcher. This type of grid is explained later and is used as part of this study.
- Hierarchical sorts would be challenging. It would imply that the respondent has a clear a priori understanding of the categorisation system to be applied and that there is a clear and logical arrangement for this system.
- "All in one" sorts would appear unlikely to capture the variety of attributes/qualities associated with IT investments/activities. It would appear to restrict the research to two dimensions. It could be possible to run this exercise in a repeated manner with the positioning on the matrix representing a category weighting, similar to a Rep Grid ranking. In effect it could emulate a Rep Grid by repeating the exercise and using multiple grids to develop a pairwise comparison of all qualities. On balance this seems more cumbersome and time consuming than a Rep Grid.
- Repeated single criteria sorts may ultimately achieve the same as Rep Grid exercise but relies on the respondent being able to determine a discriminating factor and then sorting without any structural assistance, for example as provided by triading (described in section 4.1.2).


### 2.6.2 Social Cognitive Theory

Social Cognitive Theory (SCT) is a widely accepted model of individual behaviour (Tan, 2002) that in IS literature has been used to study individuals' reactions to computing alongside other theoretical perspectives including

Technology Adoption Model, Diffusion of Innovation, and Planned Behaviour (Compeau et al., 1999).

SCT is a causal model based in the interaction between environmental, behavioural, cognitive and other personal factors (Bandura, 1988) that places an emphasis on the concept of self-efficacy (Compeau et al., 1999). It is the aspect of self-efficacy in particular that Tan (2002) focuses upon when considering SCT in relation to business/IS alignment.

Self-efficacy is concerned with a person's self-belief in their capability to undertake actions that they believe will successfully address a forthcoming event (Bandura, 1988, Bandura, 1982, Compeau et al., 1999). A person's expectations of their efficacy will determine the amount of effort and degree of persistence they will expend on a task (Stajkovic and Luthans, 1998) and they will favour those where they believe the outcome will most likely be favourable (Tan, 2002).

In connection with this study and similar to Tan (2002), the type of question this raises is along the lines of whether similarities or differences in selfefficacy and outcome expectations of key stakeholders impact the prospect of alignment. Reflecting on this, under certain circumstances self-efficacy might offer a plausible explanation for where a CIO executes a plan based on their belief of what they can do well as opposed to what is seen by others as being optimum. This would potentially impact alignment. However, Rep Grids highlight this situation as highly ranked constructs would differ between the CIO and other decision-making stakeholders indicating a difference in view. A follow up question as part of an action plan developed with the CIO could explore the differences with this in mind. It is a delicate issue to address as it explores the CIO's competency, which is a combination of skills and self-belief in being able to use those skills (in the context the CIO finds themselves) (Bandura, 1988). These are valuable lines of research but not the primary focus of this study.

### 2.6.3 Personal Construct Theory

### 2.6.3.1 Introduction

Simpson and Wilson (1999) describe Personal Construct Theory (PCT) as making 'the most comprehensive contribution to a theory on shared cognition'.

Given this study's focus on the social dimension and shared cognition, PCT and Rep Grids would appear to offer the best approach for this research.

PCT was developed by Kelly, a clinician, with the aim of being able to satisfy his practitioners desire to make predictions of an individual in a way that a large study might make generalised predictions about a population (Stewart et al. (1981), p3). He wanted to be able to make unbiased predictions about an individual patient in such a way that it allowed them to take ownership for their development (Stewart et al. (1981), p6). He moved beyond simply saying that people learn from experience to saying that a person's experiences shape that way they construe the world. He referred to this as a person's "construct system" (Stewart et al. (1981), p7). A construct system is the hierarchical collection of constructs that a person uses to describe a phenomenon or object (Rugg and McGeorge (1997); Kelly (1991), p9). It represents a person's attitude towards something (Fransella and Bannister (1977), p2), and guides their decision making (Marsden and Littler, 2000).

Kelly (1991), p7 thought of a construct as a 'pattern or templet' that a person creates and uses as their way of construing events and which guides their behaviour. These patterns or constructs can have a range over which they prove useful and beyond which their degree of fit may reduce. They are said to have 'range and foci of convenience' (Kelly (1991), p9). How well a person's constructs fit reality is determined by how well it predicts or forecasts an event. A good fit will have good predictive powers and a poor fit may subsequently see modifications to the system so as to improve its fit in the future (Kelly (1991), p11). This notion of modifying a construct system lies at the heart the theory's philosophy and Kelly likens this act to a good scientist who tests his theory and modifies it based on the outcome of the test until the theory has good predictive powers (p10). Scholars also refer to a person's construct system as being a person's mental model (Orlikowski and Gash, 1994), cognitive structure (Curtis et al., 2008), their mental map or way of construing their world (Stewart et al. (1981), p5 and p7).

Through the notion of a construct system, Kelly (1991), p15 explains 'how a [person] can enslave [themselves] by their own ideas' (i.e. a fixed construct system) 'and then win freedom by reconstruing their life' (changing their
construct system); and that this theme was the basis for the book on PCT. This research adopts this theme. A CIO might construe an IT investment decision in a fixed manner and differently to his peers such that it causes a form of conflict. If left unchanged this conflict will persist. This might be expressed by the CIO's peers as "the CIO doesn't see eye to eye with the rest of us". By understanding the differences in how others construe IT investments, the CIO can choose to modify his construct system (or attempt to get his peers to reconstrue their view of an investment), change the outcome, and win freedom from the previous view of investments that was causing concern.

In summary, PCT is Kelly's attempt to explain how people become the people they are through a mechanism that he called a personal construct system. He suggested that a person's construct system is being continuously developed over time from their experiences and is the way in which they see and interpret the world around them. By extension it can also indicate how they might respond to a future event. The degree to which two people's construct system align or can at least be understood is a measure of the extent to which they can easily understand each other or at least understand each other's perspective (Stewart et al., 1981, Tan and Hunter, 2002).

### 2.6.3.2 Philosophical Positioning

That construct systems are subject to change led Kelly to take the stand that there are always alternative ways to construe the world. He called this philosophical position "Constructive alternativism" (Kelly (1991), p11). Kelly had no intention of proposing a philosophical system based on this position ( p 12 ) and makes few conclusive remarks. However, he is very clear that as a person can create alternative approaches to reality, the philosophical positioning is not commensurate with Realism (Kelly (1991), p12); implying that it is more in line with subjectivism. PCT is commensurate with interpretivist paradigm (Marsden and Littler, 2000, Curtis et al., 2008), and is operationalised by the Rep Grid technique that is rooted in grounded theory ${ }^{1}$ (Marsden and Littler, 2000). That the emphasis is on the testing of constructs

[^0]also implies a reliance on the principles of 'pragmatic logic' and 'empiricism' (Kelly (1991), p12). Taken together and combined with the research intention of developing an action plan using outputs developed from a Rep Grid exercise, it lends supports to this research's pragmatic philosophy positioning (section 3.2.1).

### 2.6.3.3 Basic Theory

In thinking about the foundations for his theory, Kelly (1991), p25-26 was clear that he wanted to avoid the concept of 'mental energy'. Kelly considered this concept as being a derivative of the 'construct of energy' taken from the physicists' domain where it is used to describe how objects can be moved. He believed that such a concept, which had lain at the heart of psychologists' thinking concerned with the question of what propels ideas or people, as flawed (or at least suspect). Kelly recognised that this went against the conventional thinking at the time which argued 'to avoid an animistic interpretation of man'; but, Kelly argued, this ultimately becomes troublesome for psychologists. This is because, in his view, psychologists have come to recognise that the notion of an external source of energy as being the psychological driver for human acts, and which is introduced through concepts such as stimuli and needs, often has a better explanation when argued from a more animistic perspective. This would seem to shift the debate away from discussing what is the source of this energy, towards a discussion as to what shapes this innate internal energy. This seemingly shaped Kelly's thinking when formulating his fundamental postulate (Kelly (1991), p32): 'A person's processes are psychologically channelised by the ways in which he anticipates events'. Kelly then examines each of the words in this postulate and further elaborates on it by means of eleven corollaries.

Possibly the more significant words/expressions in the postulate that Kelly examines are Processes and Psychologically Channelised. By using the term processes Kelly saw himself as side stepping the need for introducing the concept of mental energy. To Kelly, this term views a person as a 'behaving organism' and this in itself is a driving force that propels ideas or people (Kelly (1991), p33). Psychologically channelised is saying two things: (1) That Kelly is restricting his theory for explaining behaviour to the realm of psychology, as opposed to physiology or sociology, and (2) That a person's processes are

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operated through a network of flexible and modifiable pathways, and not aimlessly present in some sort of vacuum. More significantly, this network can both facilitate and restrict a person's range of actions (Kelly (1991), p33-34).

The fundamental postulate was then elaborated further through eleven corollaries, (p35-68):

Table 5: PCT Fundamental Postulate and supporting Corollaries (Kelly, 1991)

| Fundamental Postulate | A person's processes are psychologically channelised by the ways in <br> which he anticipates events |
| :--- | :--- |
| Construction Corollary | A person anticipates events by construing their replication |
| Individuality Corollary | Persons differ from each other in their construction of events |
| Organisation Corollary | Each person characteristically evolves, for his convenience in <br> anticipating events, a construction system embracing ordinal <br> relationships between constructs |
| Dichotomy Corollary | A person's construction system is composed of a finite number of <br> dichotomous constructs |
| Choice Corollary | A person chooses for himself that alternative in a dichotomised <br> construct through which he anticipates the greater possibility for <br> extension and definition of his system |
| Range Corollary | A construct is convenient for the anticipation of a finite range of <br> events only |
| Experience Corollary | A person's construction system varies as he successively construes <br> the replications of events |
| Modulation Corollary | The variation in a person's construction system is limited by the <br> permeability of the constructs within whose range of convenience <br> the variations lie. |
| Fragmentation <br> Corollary | A person may successively employ a variety of construct subsystems <br> which are inferentially incompatible with each other |
| Commonality Corollary | To the extent that one person employs a construction of experience <br> which is similar to that employed by another, his psychological <br> processes are similar to those of the other person |
| Sociality Corollary | To the extent that one person construes the construction processes <br> of another, he may play a role in a social process involving the other <br> person |

Wright (2008) brings these corollaries to life by neatly running them together over a few sentences:
'We anticipate events by construing their replications (Construction Corollary) based on experience (Experience Corollary) with each person being unique in the way they see the world (Individuality Corollary), even though it is possible
to view reality in similar ways to others (Commonality Corollary) embedded in a socially constructed world (Sociality Corollary). Constructs are always bipolar in nature (Dichotomy Corollary) with one preferred side reflecting an extension of our inner motivation (Choice Corollary). These constructs have a finite limit to their range of convenience or use (Range Corollary) and are characteristically arranged in a hierarchy for our anticipation of events (Organization Corollary) with some construct systems in conflict with others (Fragmentation Corollary) and some constructs being more permeable and open to new life experiences than others (Modulation Corollary)'.

### 2.7 Focused literature search - Part 2 (Repertory Grids)

Given the focus being placed on Rep Grids, a further review of the Rep Grid literature was conducted specifically in the area relevant to the research gap being explored. In a more general literature review of PCT and Rep Grids over the period 1998-2007 undertaken by Saul (2008), the majority of the journal articles were in the field of psychology ( $n=262$ ). Of the balance ( $n=206$ ), the fields of health ( $n=55$ ) and computer sciences ( $n=36$ ) returned the most articles.

This part 2 search was conducted against the same four databases as in part 1: Scopus, ProQuest, EBSCO Host and Web of Science (WoS). However, as the aggregated search returns were much lower than in part 1, an additional search was conducted on Google Scholar. This latter search was conducted using the Harzing software which is able to collate Google Scholar returns. The approach taken to the search was again based on Dani et al. (2019).

Focusing on the use of Rep Grids within IS studies, the Search Questions (SQ) for this part of the search are:

SQ1: How many of the studies explore a cognitive comparison across executives or projects

SQ2: How many studies explore a comparison of executive cognition across project

As these questions have a focus on both executives and projects, two search strings were used and are shown in the Table 6. Again, the search was restricted to scholarly articles (peer reviewed) and conference proceedings, in

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English language, from 1989 to June 2019 and across the broadest search field setting.

Table 6: Search strings used for the Rep Grid literature search

| Focus | Search String 1 (SS1) | Search String 2 (SS2) |
| :--- | :--- | :--- |
| Domain of interest | "information technology" OR |  |
| ICT OR "information systems" | "information technology" OR ICT |  |
| OR "information systems" |  |  |

The Google Scholar advanced search features, reflected in the Harzing software, is not as refined as those in the first four databases and the search string has to be set out differently. The search strings used, again intending to cover the different subjects of interest, were:

- SS1: All the words ("Information Systems", CIO, executive, repertory) AND Any of the words ("Information Technology, "Rep Grid").
- SS2: All the words (investment, "information systems", repertory) AND Any of the words (portfolio, "Information Technology", Rep Grid).

For all search returns the same Inclusion and Exclusion criteria were used as part of the search return analysis. For this exercise the criteria used were:

Inclusion Criterion (IC)

- IC-C: Papers that are centred on measuring/comparing mental models/cognition of individuals. This excludes elicitation of a system's functional requirements.


## Exclusion Criteria (EC)

- EC-R: Papers where the focus is on the attributes of a role. For example, what makes an "excellent" systems analyst or project manager.
- EC-M: Papers that are mostly focused on method.
- EC-PE: Papers that concentrate on an attribute of a project, for example, political risk; or where the study is not at the senior manager or executive level (or cannot be construed as such).

For the original four databases the Inclusion criterion was applied by analysing the title and in some cases the abstract for each article. For the Exclusion Criteria, the title and abstract for each paper was read, and in most cases the method section of the paper. For the Google Scholar search, only the article titles are returned. All the SQ1 and SQ2 papers were read. A summary of this Rep Grid search exercise is shown in Figure 4.


Figure 4: Rep Grid search selection process \& the number of papers remaining after each step
Table 7 shows the search question (SQ) returns sorted by focus/year, with the three SQ2 papers shown at the top of the table. In any practical sense, there are only 8 papers as the last paper by Tan is essentially a pre-cursor to the much longer paper by Tan and Gallupe, (2006). A more detailed analysis of these papers, together with a small collection of other papers aimed at showing the variety of running a Rep Grid exercise is shown in Table 14; by which time Rep Grids have been introduced and more fully explained.

Table 7: Summary of the Rep Grid papers meeting the search questions categories (SQ) criteria

| Author(s) | Title | Focus | Year |
| :---: | :---: | :---: | :---: |
| Desai, Sahu | CRM Change Management in an Emerging Country Context: An Exploratory Study in India. | Exec and Project | 2008 |
| Tan F.B., Gallupe R.B. | Aligning business and information systems thinking: A cognitive approach | Exec and Project | 2006 |
| Kanellis P., Lycett M., Pau | Evaluating business information systems fit: From concept to practical application | Exec and project | 1999 |
| A Benlian, I Haffke | Does mutuality matter? Examining the bilateral nature and effects of CEO-CIO mutual understandi | Exec (Not RGT) | 2016 |
| EJ Murray | Bridging two solitudes: An examination of shared understanding between information systems anc | Exec (Not RGT) | 1999 |
| Alexander, Patricia;van L | (The Use of the Repertory Grid for Collaboration and Reflection in a Research Context | Exec (adapted RGT) | 2010 |
| Cho, V; Wright, R | Exploring the evaluation framework of strategic information systems using repertory grid techniqu |  | 2010 |
| K Peffers, CE Gengler | Understanding internal IS customer models of firm performance to identify potential high-impact p | Project | 2000 |
| FB Tan | Exploring business-IT alignment using the repertory grid | Exec and Project (=2006) | 1999 |

Of the eight remaining papers, two of the papers, Benlian and Haffke (2016) and Murray (1999), do not use Rep Grids to explore cognition; and neither are
focused on investments. Peffers and Gengler (2000) take a cognitive look at what represents a high impact project, which could be construed as being an effective project, but do this from a very broad internal customer perspective, not an executive perspective.

Alexander et al. (2010) aim to adapt the Rep Grid process focus and develop a form of grid to assist team collaboration. They call this a "Reflection Grid", or "Ref Grid", and it is designed to help team members develop newly formed joint concepts. The study is focused on the Executive Committee and explores the committee's views on development methodologies. The study gathers the executives' views via a Rep Grid and then the researchers test the concept of the Reflection Grid by running the Ref Grid exercise on themselves. The study is not focused on investments and does not address the research gap.

Cho and Wright (2010) employ the use of Rep Grids in a study designed to develop an evaluation framework for IS planning and implementation. As previously noted, it only takes the perspective of the CIO and doesn't cover the activity associated with investment decision making or the evaluative views of other senior execs.

Desai and Sahu (2008) do focus on the executive level and on a specific Customer Relationship Management (CRM) project, but on the change aspect of the project within an Indian socio-cultural context The study draws on executives from across a range of industries, but does not focus on the cognitive aspect of their decision regarding investment effectiveness.

Kanellis et al. (1999) first run an exercise to assess how Business Unit managers at three sites assess the degree of fit of an information system. They reason that "fit" can be measured with reference to three processes decision making, innovation and information acquisition and distribution. Having first run an exercise that assesses the level of disappointment across the processes, Rep Grids were used to better understand what was perceived as being 'wrong' with the system and therefore understand what action should be taken to overcome this perception. The study can only loosely be considered to have been conducted at the executive level, and is not particularly centred on investment decisions.

The Tan and Gallupe (2006) study uses Rep Grids to explore the linkage between the level of cognitive diversity between IS and business executives at six banks and their perception of their bank's level of business and IS alignment. In part, it achieves this by asking executives to rate various systems against a set of alignment factors taken from the literature. The nature of this study probably comes closest to addressing the research gap as one may feel able to deduce the degree of an investment's effectiveness based on the executives' perception of its rating against the alignment factors and their overall perception of their bank's degree of alignment. However, in Tan and Gallupe (2006), also cited by Benlian and Haffke (2016), a different direction is taken and they neither specifically explore executive cognitive diversity around investments nor make any deductions of this nature.

### 2.8 Cognition, Cognitive Diversity and Consensus

While this study is not a study in cognition or cognitive diversity, it does draw on these concepts. Therefore, they are discussed below in the context of PCT and to the extent that the study's focus warrants.

### 2.8.1 Cognition

Cognition is the mental act of acquiring knowledge and understanding (OED) and a person's cognitive structure is how they think about an issue in question (Jankowicz (2005b), p19 \& 54).

Cognitive structures held in common between individuals implies a shared cognition between those individuals (Tan and Gallupe, 2006). It can be thought of as 'thinking at the group level' (Ensley and Pearce, 2001) or a collective mental model (He et al., 2007). This study focuses on the cognitive structure at the individual and team level within a specific firm context and adopts the He et al. (2007) definition of team cognition: 'a state where members of a group share the same mental model'. Team cognition is a powerful mechanism for explaining effective team interactions and positively associated with frequency of communication (He et al, 2007); that can be developed from an understanding of the individuals' cognitive structure comprising that group (Tan, 2002).

In PCT terms, team cognition would mean that the CIO and key stakeholders share the same construct system. The Commonality Corollary is helpful here in setting out the implication. Though an identical construct system is not viewed as realistic, the extent to which they are similar may be high (Kelly, 1991, p64). It implies that the manner in which two people arrive at their predictions of IT effectiveness from a given expenditure/activity is similar. Kelly is careful to explain that PCT does not require two people to have experienced the same event(s) in order to act alike, simply that there is similarity in their construction of events; regardless of the experiences (Kelly 1991, p63-64).

Shared cognitive structures emerge from a 'social process marked by negotiation, argument and [...] triggers for change' (Walsh, 1995). Kelly's fundamental postulate together with the Sociality Corollary provides a basis for thinking about such a process and interaction. It states that 'a person can play a constructive role in a social process with another person if they can effectively construe the other person's outlook'. Two people do not need to have identical construct systems for this to be possible, simply that to predict behaviours in a specific area they understand the relevant aspect of the other's construct system (Kelly 1991, p67). For this study it means that the CIO and stakeholders through discussion can improve their ability to construe the other's outlook in the specific area of IT effectiveness. In time, through negotiation and argument, this may lead to similar constructs and shared cognition being developed in this area.

When using PCT and Rep Grids Davis and Hufnagel (2007) refer to their work as drawing on socio-cognition research. They took their definition of sociocognition from Berger and Luckmann (1967) who claim that from past experiences individuals create mental models (which they term an 'internal cognition model') that enable them to organise and make sense of current events and build them into their understanding of the world. This definition is not dis-similar to how Kelly expresses individual cognition. While this study does not explicitly research socio/social cognition, it does recognise the 'socially situated' (Gasson, 2004) and contextual nature of the study.

It is also recognised that the study in its use of Rep Grids takes a snapshot of cognitive structures and does not assess how these may evolve over time. The concept of constructs changing over time is expressed in the Experience Corollary, the basis for which is arguably grounded in the philosophy of 'constructive alternativism'. It implies that a person will develop a personal construct system that provides them with the best predictive ability. As new experiences are gained a person's existing construct system is validated or, over time, modified to improve its predictive ability.

### 2.8.2 Cognitive Diversity and Consensus

Diversity can be thought of as the degree to which members of a team think differently about a topic (Harrison and Klein, 2007) and that commonly a distinction is made between task related (cognitive) and non-task related (demographic) diversity (Kearney et al., 2009).

Cognitive diversity can arise from attitudinal differences across team members borne out of the members' different functional backgrounds, which is important to this study. It can be decomposed into informational diversity, being the differences in team member's knowledge bases, and value diversity, being the differences in team member's thinking about the team's goals (Jehn et al., 1999). Applied to this study and with reference to PCT, it represents the difference in cognitive structures (construct systems) between key stakeholders when tasked with deciding what activity will result in an effective IT investment.

Demographic diversity can be thought of as being the attitudinal differences across team members borne out of the differences in the members' age, gender, tenure or education (Pelled, 1996). It is also referred to as social category diversity (Jehn et al., 1999). In considering PCT in this context one is drawn to the Experience and Choice Corollaries where demographic factors may have influenced a person's experience which in turn shapes their construct system.

Where there is diversity within a team there is potential for disagreement or conflict. Conflict can legitimately emerge between executives with different histories and experiences and consensus is determined by the degree of
agreement, or lack of conflict between them (Chiravuri et al., 2011). Such disagreements or conflicts can take different forms. Jehn et al (1999), and others (Pelled et al., 1999, Tegarden et al., 2009, Amason, 1996) speak to two dimensions of conflict - cognitive and affective (i.e. emotional) conflict.

Similar to other scholars, Chiravuri et al. (2011) would broadly define cognitive conflict as arising from member differences of opinion about a task. Jehn et al. (1999) are more granular in their definition and differentiate between task conflict (being the differences regarding task content) and process conflict (being the differences in how the task is to be done).

Affective conflict is focused on the emotional aspect of conflict, where member disagreement is driven not by the task per se, but by anger or frustration, for example (Pelled et al., 1999).

For this study, cognitive conflict can helpfully be expressed in terms of PCT thus: Assuming that stakeholders would intend any expenditure in IT to be effective, the different histories and experiences of stakeholders can result in different construct systems being used to predict whether an IT expenditure will produce this desired outcome. These differences can create the platform for cognitive conflict. Though not expressly explored in this study, cognitive conflict left unmanaged can lead to affective conflict.

Scholars offer evidence both for and against the benefit of conflict as regards team performance leading Kearney et al. (2009) to conclude that there is no generalisable statement that can be made about the effect of diversity (and the associated conflict) on team outcome. The case for encouraging conflict is that it can be shown to have a positive effect on decision quality and team performance (Eisenhardt et al., 1997, Amason, 1996). However, these scholars appear to make these statements with a caveat, or express it as a paradox. Conflict can improve decision quality yet can obstruct a team's ability to reach consensus on a decision (Amason and Schweiger, 1994, Amason, 1996). There can be a 'tension to both stimulate and repress cognitive conflict' (Eisenhardt et al., 1997). Taking a lead from Eisenhardt, it would seem that the difficulty is in the management of the conflict, ensuring that team members can engage in the positive aspects of cognitive conflict, centred on the alternative courses of action and interpretation of facts, without
triggering the negative aspects of affective conflict. More colloquially this is similar to the management maxim that team members should attack the point and not the person. Amason (1996) makes a similar point in a different way by talking about functional and dysfunctional conflict: 'conflict only has a positive effect if (a) members' views are identified, extracted and synthesised' (functional conflict), and (b) 'it does not sacrifice consensus and affective acceptance' (failure would represent dysfunctional conflict). In PCT terms, consensus would imply a negotiation leading to the individuals concerned having more constructs in common and similarly rated, i.e. they would construe an event similarly (Commonality Corollary).

According to Amason (1996), consensus in decision making is important as to implement a decision effectively requires 'active cooperation'. That to survive the decision's operationalisation team members must both understand and commit to the decision, that is to say consensus must be reached (Wooldridge and Floyd, 1989). Commitment is important as it increases trust in team member sincerity (Guth and MacMillan, 1986), reduces the likelihood of team members seeking advantage for themselves only and/or possibly creating director fiefdoms (Hambrick, 2007); and may help in overcoming resistance to the decision (Mintzberg et al., 1976).

Ambrosini and Bowman (2003) do not go as far as Wooldridge and Floyd (1989). They would agree on the importance of commitment but would take the view that consensus regarding an investment decision could be reached without their being a commitment to the decision. Having said that, they would argue that a lack of consensus would strongly indicate that a team do not have a shared understanding of the decision. By extension, if decision makers do not have consensus on IT effectiveness they could not agree on how IT can deliver the best outcome. Jehn et al. (1999) show that for a team to be effective it needs high information diversity (differences in knowledge bases) and low value diversity (differences in perception of the group's real goal) across its members. They imply that to be effective, team members need to think about the investments and their outcomes in the same way. This point is developed further in Chapter 3 when explaining the positioning questions that form an opening element of the participants' first interview.

Consensus and ultimately the commitment towards an IT investment decision lies at the heart of the social alignment. Taking the earlier mentioned social view of shared cognitive maps in Walsh (1995), consensus would imply a trigger for construct system change marked by negotiation and argument. Tegarden et al. (2009) suggest this can be achieved by exposing the attitudinal differences of team members regarding an investment's effectiveness resulting in increased shared understanding and social alignment. However, developing shared cognition, and hence consensus, will not be instantaneous, it takes time to develop (Tan and Gallupe, 2006).

The question becomes one of how to get the benefits of cognitive diversity without sacrificing affective acceptance and consensus. Tegarden et al. (2009) posit that to get the benefits of cognitive diversity it is necessary to explicitly reveal the differences and similarities of views and beliefs.

Eisenhardt et al. (1997) suggest that can fail to happen if team members don't have clarity of their own views and those of their team members. Interaction, or negotiation of views and preferences, is critical to developing a shared understanding required for effective conflict. An action plan based on the differences revealed by a Rep Grid is one approach to responding to this question.

### 2.9 Conflict and the social dimension of alignment

A team in a state of high conflict is unlikely to be cohesive. By managing the conflict, a team is both more likely to be cohesive and, according to Eisenhardt et al. (1997), should also be effective. Furthermore, cohesive teams, moderated by group context, outperform non-cohesive teams. They exhibit higher levels of trust, are more versatile, responsive and productive, and are more sophisticated in their approach to tackling problems (Ensley and Pearce, 2001).

Versatility and responsiveness are characteristics of agility, a characteristic that is helpful when considering IT activities (Liang et al. (2017), Leffingwell (2007), p11-13). Social alignment is positively associated with agility as it improves business-IT coordination and also weakens the negative impact that the intellectual dimension has on organisational inertia (Liang et al., 2017). That social alignment has this positive effect is another reason to place a focus
on it. Furthermore, whether strategy is realised as intended or emerges (Mintzberg and Waters, 1985), it is seldom fully documented, and the finer details of the strategy and its implementation plan only become clear over time (Amason, 1996). Therefore, it seems reasonable to assume that there will be benefit from the improved business/IT coordination arising from social alignment. As plans become clearer, and team member perspectives are better understood and discussed, so the nature of any conflict evolves. It is dynamic (Eisenhardt et al., 1997).

The conclusion reached over the last two sections is that conflict, when managed, and social alignment can be viewed as having the following in common: (a) both are dynamic, (b) both have shared understanding as an important feature, and (c) both are positively associated with agility and performance.

### 2.10 Personal Construct Theory and Stereotypes

In the context of examining the chronically persistent challenge of business/IT alignment, this study is focused on the social dimension of alignment and explores the similarities and differences in the CIO and key stakeholder's construct systems in the potentially contested area of IT investment decisions. Benlian and Haffke, (2016) specifically suggest that this area be investigated with reference to perception biases (construct differences) by stereotypes, though provided no guidance as to what they meant by stereotype. Given that their study looked at the personal congruence between the CEO and CIO, they may simply be suggesting that in exploring investment decisions, the roles of those involved in the process be taken into account. This study will explore the construct systems by role.

The notion of stereotype in PCT terms has a very specific meaning which is explained by Fransella (1977), p41 as being: `when we take a particular subsystem of constructs for granted and use them in a manner that is constellatory' (e.g. if the project investment is ineffective then it is also a lost opportunity to engage in transformation, reduce investor evaluations or drive profit ratios), 'or pre-emptive' (e.g. if the project investment is a failure then it
is nothing but a failure ${ }^{2}$. Fransella (1977), p41 also states stereotypical behaviour is associated with a 'deviant behaviour' that is construed as deviant by the public or experts and construed as the 'most important aspect of that individual'. For example, a stereotype of CIOs might be that they are all techies, more interested in the technology itself than applying it for commercial benefit.

A simplified definition of a stereotype, taken from Gonzalez et al. (2019) but using language already associated with PCT and construct systems is, a stereotype is an individual's mental model of a social group. They're often used to simplify a complex world by associating a person with a social group rather than developing a specific mental model for that person, and, in the absence of any other information are used by managers in the workplace to make judgements or assessing situations.

Stereotyping tends to attribute generalized and simplified labels or traits to these social groups that can impact a person's behaviours towards those groups, sometimes referred to as profiling or labelling (Leidner et al., 2013, Gonzalez, 2014).

Though a stereotype being used maybe incorrect, they are hard to change once created, they tend to stick (Johnston, 1996). They can also be very damaging. For example, Hirschheim et al. (2003) suggests that senior management stereotyping of a highly performing IT organisation at Texaco created a series of negative perceptions that resulted in a restriction of IT's role (to focusing on cost control), its downsizing and ultimately a reduction in the firm's source of IT-enabled value.

A common role stereotype of an IT professional is that they are 'technology geeks' (Moore and Love, 2011), with poor communication skills (Willcoxson and Chatham, 2006). Consequently an IT group, if perceived as comprising such people, will often be perceived as a lower functioning group (Leidner et al., 2013). Gonzalez et al. (2012) cites a previous study by the co-authors, Tu and McKeen (2011), that examined student perceptions of the profiles for professionals in the fields of IS, Marketing and Finance using bipolar scales of

[^1]adjectives. Their perceptions were, that of these three professions, the IS profession was the most risk averse, and the least trendy, interesting, dynamic and expressive. Little wonder that the IS course at this college, where studies suggest that students will select professions based on their stereotypical views, was only attracting a small number of students.

Gonzalez (2014) extends the above 2012 study. The 2014 study compares the CIO stereotype content to that of a general C-level executive; and the stereotype content associated with specific lead roles in organisations: CIOs, CMOs (Chief Marketing Officers) and CFOs (Chief Finance officers). Responses were gathered from two separate samples, students and senior managers. The latter sample is included as they have greater work experience than students, a recognised limitation of the 2012 study. The role stereotypes were derived from the sample groups from the traits and behaviours associated with each role in response to two types of surveys. The first being responses to a given list of traits and the second being a free response where respondents were asked for the traits they associated with each role. Broadly speaking the responses of the students and senior managers were found to be similar.

As this research is focused on firm level IT investment decisions of senior stakeholders, the perspective of senior managers from the Gonzales (2014) study has the greater relevance. The main findings from the trait list analysis ( $p 47-48$ ) for the senior managers were that the stereotype content reflected that CIOs compared with C-level executives were more introvert, task oriented and technical; with the C-level being labelled as more charismatic, strategic, confident, driven, ambitious and polished. One might be tempted to simplistically characterise the CIO role stereotype as being back of house, operationally focused whilst other C-level executive roles are more front of house, big picture focused. Gonzales conducted a factor analysis that characterised C-level executives as providing leadership, with CIO's providing problem solving capability (p51).

The free responses were subject to a 'discriminant analysis' (p57). According to Gonzales, this can create dimensions against which the roles and elicited characteristics can be mapped. This would appear to have some parallels with
a Rep Grid followed by a PCA exercise. The senior manager's self assessment of their familiarity with the CFO, CMO and CIO roles were $80 \%, 53 \%$ and $50 \%$ respectively (p64). The role in which the respondents have familiarity often happens to be a role that leads a function with which most senior executives are uncomfortable (Heller (2016), p2). This might offer one explanation for why CIOs might report to CFOs ( $80 \%$ familiarity) even if the firm is not cost focused (see 2.13.1). Gonzales concluded that the roles could be differentiated on the basis of 5 concepts mapped to two dimensions. On the social dimension, CFOs were perceived as being marginally more sociable and better communicators than the CIO, but with both roles being easily eclipsed by the CMO. On the "taking charge" dimension the CIO was seen as less assertive and less dominant than the other roles.

The findings above may be good generalisations, but they are not true in all circumstances. For instance, other surveys cited (Gonzalez et al., 2019, Gonzalez, 2014) would estimate that roughly a quarter of CIOs are, or perceive themselves to be, actively involved in the strategic decision making of their companies. Some scholars may refer to this as sub-typing, where this disconfirming information is treated as an exception to what normally characterises the general CIO population (Richards and Hewstone, 2001).

Incidentally, Richards and Hewstone (2001) list three types of intervention to address stereotyping. One of these, and arguably the most relevant for this study, is based in this notion of disconfirming. The intervention is aimed at effecting a change in attitude towards the role category of CIO, though could be extend to consider the IT function as a broader social grouping. The desired outcome is a business manager that recognises the CIO as a being a disconfirming member of their view of CIOs but that they still are a CIO (i.e. they are still part of the "CIO" social group).

It should also be noted that just because someone may be aware of a stereotype of a group, does not mean that they will apply it to a person. Scholars refer to this as stereotype activation and application (Kunda and Spencer, 2003). A person may be able to individuate, i.e. view someone as an individual in their own right and not associate them with a particular group, i.e. not stereotype them.

In a Rep Grid exercise the potential exists to find applied stereotyping. Applied stereotyping, if it exists in a firm, might be identified in one of two ways. Firstly, the CIO may identify what he perceives as being the stakeholder's role stereotype being surfaced by the manner in which that stakeholder expresses themselves. Secondly, through the same means, the CIO may be able to identify stakeholder's applied stereotype of IT. As will become clear, it is the CIO's understanding that is especially important to this research, the output of which needs to demonstrate the provision of practical knowledge.

### 2.11 Rationale for Rep Grids

Chiravuri et al. (2011) suggested Rep Grids as a good way to reveal cognitive differences and similarities. They reason that a source of conflict between executives arises because of their different mental models (and hence cognitive differences) and that a cognition-based approach was wholly appropriate. Their study concluded that a Rep Grid approach is a viable technique for reducing conflict for the reason that it developed shared understanding and led to increased consensus. Taking an Eisenhardt et al. (1997) perspective, Rep Grids could also be used to improve team performance by stimulating discussion. This could be achieved through an action plan developed with the CIO for revealing and discussing cognitive differences in a controlled manner. This might be especially valuable for teams where "group think" exists (where team members value each other's friendships to the extent that they don't critically question each other's views or opinions) or where the views expressed by a particular stakeholder are overly dominating. In PCT terms this would be a situation in which individuals' diverse construct systems are maintained, and the required negotiation or argument that would result in constructs being held in common are overridden by a need to preserve friendships. There would be no consensus: Everyone at the meeting would be saying "yes" and appearing to agree, but would actually be thinking "no". Though different in nature, the outcome is not dissimilar to the Abilene paradox where there is only an 'illusion of agreement' (Browne et al., 2018).

Rep Grids could highlight deep rooted differences of opinion and ideas that are not usually surfaced. They might help explain why there might be a lack of consensus (i.e. lack of understanding and commitment). With an associated action plan developed with the CIO, they could provide a vehicle to negotiate differences and synthesise views of team members without developing, or at least minimising, the negative effects of inter-personal (affective) conflict. In so doing it would appear to satisfy the conditions as set out by Amason (1996) and accord with Eisenhardt et al. (1997) by offering a way for managing conflict such that the team performance benefits are realised.

Unlike individual cognition, team cognition requires a communication process to share information and build a shared cognitive model (MacMillan et al., 2004). Reducing the 'overhead' associated with the exchange of ideas required to achieve this shared (team) cognition is a benefit (MacMillan et al., 2004) and a Rep Grid approach may assist with this ambition by accelerating the process required. MacMillan shows that communication is key to achieving shared cognition and jargon free language is important to this process (Jentsch et al., 2014, Kearney et al., 2009) - something for which IT staff are historically not well known.

Interestingly, the concepts around shared understanding and a reduced communications requirement would also appear to be embedded into working practices and culture outside of the corporate world. Mission command or mission leadership, adopted by all NATO troops, relies on team members having a shared understanding of the mission's goals, the "why" and the "what" of the mission, without dictating the "how" (Watter, 2002, Stewart, 2009) . It allows, as Amason (1996) might express it, 'a common understanding that allows individual team members to act independently' in the fog of war with limited communication 'yet in a way that is consistent' to the mission's goal.

### 2.12 Contextual influences regarding decision making

Avgerou (2001) suggests that all IS studies can be reasoned as being contextual as they are shaped by organisational setting. Consequently, context will play an important part in shaping constructs. Reports from companies such as KPMG talking about IT project failure (Whittaker, 1999) or
any number of news feeds that report on system outages ${ }^{3}$. This will influence executives' views of their firm (Tallon, 2014). The example provided by Lee and Myers (2004) of an ERP project that no longer fulfilled corporate requirements as a result of a change of senior management team and strategy may be interpreted as an IT project failure, even though the technology per se may not have failed. In a corporate environment where the technology and business strategies are fused and there is no inherent sense of a leaderfollower relationship between the business units and IT department (Smaczny, 2001), the IT function's and CIO's status and performance may be positively impacted. Conversely, where IT infrastructure flexibility, a source of sustainable competitive advantage (Chung et al., 2003) does not or is perceived not to exist and a firm's technology estate is seen as an inhibitor, a context is created that may negatively influence the environment in which the IT must operate.

Comments from studies capturing statements such as 'IT is seen as a necessary evil' are indicative of executives who view IT as a 'cost of doing business' (Henderson and Venkatraman, 1993). Similarly dismissive is where the executives see 'IT as a tool' (Kalling, 2003). Such views are likely to be present in firms where value from IT is not delivered and/or not recognised. Culture and beliefs are influential as they can make it difficult to change the status quo of currently trusted views and related practices even if their relevance has diminished (Kalling, 2003). Such mindsets would be consistent with the view discussed by Avison et al. (1999) who examined the paradox of the high value of IT to firms and yet the low status of the IT function. They conclude that a change in attitude is required in such firms if IT is to be fully exploited. This study, through its action plan, does attempt to change executive attitudes regarding IT effectiveness.

These examples demonstrate a particular type of context (arguably negative) surrounding the use of technology within a firm. The role played and the status of an IT function will be different in different contexts. Based on

[^2]context, behaviours and activities will vary and senior manager perception of the IS function and the firm's use of technology will be formed.

Defining success, such as what constitutes effective IT, is shaped by organisational context and will vary by individual (Kanellis et al., 1999). The use of Rep Grids to determine individuals' decision constructs would provide insight as to what decision making stakeholders think should be driving forward investment decisions to make technology in the organisation a "success". Pettigrew (1990) quotes the maxim, `one cannot change the past but the past can shape the future', and this multi-layered historical context and future ambition will also be captured in the constructs.

### 2.13 Secondary Objectives: Structure, Role Conflict and Paradox

Following the literature, these secondary focus areas may also be fruitful in generating insight when determining steps to improve the positioning of IT.

### 2.13.1 Structure

Reporting structures define power and control structures and these are associated with performance (Chandler, 1962). It follows that a CIO's reporting line is therefore important as it can help form and secure political partnerships that can lead to improved decision making authority (Preston et al., 2008). Banker et al. (2011) provide material that suggests (a) strong reporting lines for the CIO helps the CIO in setting an IT vision (b) incorrect reporting lines impede CIO effectiveness, and (c) a CIO reporting line that is distant from the CEO implies reduced CIO power.

Firms that have focused goals for their IT deliver more value than those without (Tallon et al., 2000). Where such a focus exists the CIO reporting line should be to the CEO if the focus is on strategic management of the firm, for example, product or service differentiation, and to the CFO if the focus is on cost leadership (Banker et al., 2011). Similarly the CIO should focus on a demand side leadership role if intending to impact growth and on a supply side leadership role if focused on impacting efficiency (Chen et al., 2010b); and this may best be supported through different reporting lines. More generally, Taylor et al. (2015) suggest that if a firm's focus is one of sales growth as
opposed to cost reduction, then inclusion of the CIO on the TMT can be beneficial.

Different perspectives borne out of different ambitions for technology for the firm may be revealed through an individual's decision constructs and during the interview process. Reporting lines may be an area to review depending on the level and nature of any organisational change attempted within a firm as a result of this study.

### 2.13.2 Role conflict and IT Consumerisation

Studies that focus on CIO reporting lines imply that the technology leadership resides with the CIO. According to Applegate and Elam (1992) most new CIOs do not have an IT background and the role of CIO is moving towards being more business oriented (Weiss and Adams, 2011). This suggests that the characteristics for and/or background of CIOs is changing, and consequently their relationship with the firm's senior leaders and reporting lines. Such shifts could change the dynamics and positioning of IT within a firm.

Overlapping roles and differences in managers' perceptions for the need for change can result in strategic role conflict between managers and managerial roles (Floyd and Lane, 2000). New roles are emerging, such as Chief Digital Officers, which are intended to link the IT and business worlds (Horlacher and Hess, 2016), suggesting a role expectation shift, or expressed another way, a shift in the leadership model. This is consistent with the findings of Weiss and Adams (2010).

The impact of cloud services allied with a move towards more agile application development practices, exploiting service based architectures, are changing this traditional leadership model (Rohmeyer and Ben-Zvi, 2012). Market leaders are delivering software products more quickly and iteratively to meet changing customer needs and new agile development methods are being introduced (Leffingwell (2007), p5). New ways of delivering products and services demand new ways of working between IS and the business. With more IT savvy business professionals, user satisfaction increases when IS and user departments combine their IT expertise (Davis et al., 2009). With XaaS ${ }^{4}$

[^3]as a delivery model increasing (Andriole, 2012), the extent to which historically internally supplied services are supplanted is only likely to rise. This is a form of outsourcing and where aspects of traditional IT operations are outsourced it may diminish IT power, especially if the move portrays IT in a less strategic light (Avison et al., 1999).

The XaaS delivery models could be viewed as a form of IT commoditisation. This occurs when IT solutions are perceived as being increasingly standardised and consequently increasingly less capable of delivering strategic and/or competitive value (Ricciardi et al., 2012). In their study they found that commoditisation of IT can be viewed differently by senior IT management and other users, which in turn can lead to disagreements and technology leadership issues.

Consumerisation of IT, when defined as being 'the use of privately owned technology in the workplace', can improve staff performance (Niehaves et al. (2013), Köffer et al. (2014)). Consumerisation and 'reverse technology adoption' as described by Andriole (2012) extends the consumerisation definition to include social media in the workplace.

IT consumerisation can create role conflict and Koch et al. (2014) examine the conflict created by the difference in the IT department's role expectation between the organisation's management and end users. They note that a type of role conflict, referred to as 'identity conflict' where end users challenge the IT department's role by adopting their own solutions without recourse to the IT department. These could include XaaS solutions ${ }^{5}$ which in turn, though not examined, could introduce another role conflict with software solution suppliers, creating a B2B role conflict. They also comment that few studies have investigated IT consumerisation's impact on the organisation. IT consumerisation in this context is taking on a broader definition where end users are, potentially independently, determining the technology and system(s) to be deployed in their functional area.

[^4]Technology can lie at the heart of strategic change (Benlian and Haffke, 2016). Differences in managers' perception of IT and how it should be led could result in cognitive conflict. Given this study's focus on decision constructs regarding technology investments and the investments' onward effectiveness; there may be good reason to examine the constructs to assess if the increase in the general knowledge of, or at least familiarity with, IT is reflected in the constructs and any CIO leadership dynamic.

### 2.13.3 Paradox

A paradox is often used to described 'conflicting demands, opposing perspectives or illogical findings' (Lewis, 2000). Smith (2014) defines a (strategic) paradox as 'contradictory, yet interrelated, demands embedded in an organisation's goals'.

The response of the TMT in an organisation facing a strategic paradox is critical to its success, and is an under-research area (Smith, 2014). Examples of paradoxes cited, and expressed here in an IT investment context, include (a) Investing in exploration such as trials and innovative solutions Vs Exploitation of existing systems and where the firm "sweats the assets" (b) Cost management where efficiency is sought and resources used sparingly Vs Differentiation where resources are invested to gain / maintain a competitive advantage (c) Central IT whereby investment decisions and investments are taken centrally and typically where investments are made in group wide systems, Vs Local IT where to be responsive to local market conditions, the investment is on providing and deploying local systems.

Based on Besharov and Smith (2014) a paradox could also be thought of in terms of compatibility and centrality of institutional logics. A strategic paradox could be thought of as being a consequence of logics that have low compatibility yet where both are central to a firm's goals. For example, standardise and centralise IT to control cost versus supporting market specific and locally preferred solutions for increasing regional competitiveness.

Paradoxes may exist in decision constructs at both individual and at group level, and some may be strategic in nature. How these paradoxes are viewed and managed by the CIO may help contribute to understanding in a relatively unexamined area. Other decision constructs may be paradoxical but more
operational in nature. For example, an executive may have a desire for a solution to be completed quickly whilst at the same time not wishing to commit the commensurate resource. Surfacing these issues provides an opportunity to determine a management action.

Strategic paradoxes are extremely challenging for a management team because they are seeking to make consistent decisions in the face of conflicting strategies. They are of interest to this study as they are a perceptual form of conflict based on cognitive constructs which in turn can be used to understand the situation (Lewis, 2000, Smith, 2014). By identifying the constructs that might cause this type of conflict, it may be possible to understand their impact more clearly and explore management choices.

### 2.14 Conclusion

The literature supports the view that effective use of IT can add value to a firm in a variety of ways (Manfreda and Indihar Štemberger, 2013, Bharadwaj, 2000). Improved IT effectiveness and firm performance is a way in which this value is realised and for which IT/Business strategic alignment is a strong antecedent (Avison et al., 2004). Unfortunately, such alignment is hard to achieve (Chan, 2002). According to Johnson and Lederer (2010) executives frequently state that they do not realise value from IT (Oz, 2005), largely view their firm's IT as being ineffective (Shpilberg et al., 2007), and yet they continue to invest (Burton-Jones and Grange, 2012). An intellectual response to alignment, for example aligning business and IT plans, does not suffice as alignment is more driven by the social dimension (Preston and Karahanna, 2009).

Shared understanding and by extension shared cognition is a key influencing factor in the social dimension (Reich and Benbasat, 2000, Tan and Gallupe, 2006) and where it exists there is an improvement in team harmony and decision making (Amason, 1996, Tan and Gallupe, 2006). Having an understanding and being able to reduce any cognitive diversity between technology decision makers would improve the social dimension aspect of alignment and lead to more effective use of IT and improve a firm's performance.

A cognitive study into IS investment decision making either at a dyadic (Benlian and Haffke, 2016) or at a group level addresses a research gap. Given the increasing importance of understanding shared cognition at the group level (Tan and Gallupe, 2006) and that a firm's technology decisions are often made by the organisation's senior managers (Rawstorne et al., 1998, Brown et al., 2002), the focus of this study is at the TMT (group) level. From the literature search one might conclude that IS decision making is less commonly researched from a cognitive perspective though outside this search there are references to decision making being viewed as a social interaction, for example Langley et al. (1995). Viewing a firm's technology decision making from a cognitive perspective can therefore potentially contribute to an under-researched area of IS literature.

As increasingly it is often the firms' senior executives that ultimately make the technology investment decisions, why is it that most hold a negative view as to its effectiveness? Attempting to understand their thinking when making these decisions, exploring what decision constructs were used and how they may have varied across the executive team such that a dissatisfactory outcome resulted; would provide some clues as to what might be done to improve the outcome in the future. Improving the perceived effectiveness of IT would, in line with the findings in the literature, improve firm performance.

Repertory Grids provide a sensible foundational approach for a study on shared cognition and decision constructs, particularly as both technology frames and sensemaking rely upon cognitive constructs (Orlikowski and Gash, 1994, Eden and Jones, 1984).

A Rep Grid generated by a person draws on the Construction Corollary. It surfaces how each person construes and anticipates the effectiveness of the IT expenditure decision (i.e. the event, which in time will be explained are represented by grid "elements"). Drawing on the Individuality Corollary, individuals can differ from each other in their construction of this event. However, the individual grids of the stakeholders can be used by the CIO to start to gain an understanding as to how others construe whether an expenditure will result in effective IT. Chapter 3 will make the argument to support the viewpoint for a case study methodology that embraces PCT and

Rep Grids. It will show how individual Rep Grids are to be generated for the CIO and key stakeholders and how from these a special form of grid can be developed to provide a comparison between the CIO and each stakeholder. Finally, it will outline how this comparison can be used to develop an action plan to reduce the cognitive diversity between the CIO and each TMT member. Atypically for IS studies in this area, it will provide insight as to why a shared understanding, that drives the influential dimension leading to IT effectiveness, is created - through reference to similarity of constructs and rating. It can also suggest how to achieve a shared understanding by highlighting the differences in constructs and ratings.

The action plan will ultimately aim to assist the CIO to do one of two things: (a) Lay the ground such that the CIO's and stakeholder's construct systems are modified such that they become more similar (an action guided by the Experience and Choice Corollaries), or (b) Where there is dissimilarity, to assist each person (CIO and stakeholder) to better construe the construction processes of the other, i.e. to better understand the other person's point of view (an action guided by the Sociality Corollary). Accepting that it is unrealistic to assume that the CIO's and all stakeholders' constructs systems will be identical, the principle behind the Sociality Corollary becomes important. This is the mechanism that facilitates the social process. It allows the CIO to see eye to eye with the stakeholder and an acceptance of the stakeholder and their way of seeing things (Kelly, 1991, p.66). As such it is a key aspect of the action plan.

The secondary focus areas of structure, role conflict and paradox are identified as potentially being of pragmatic value in helping explain some of this study's findings whilst at the same time potentially contributing to other under researched areas of leadership due to consumerisation of IT (Koch et al., 2014).

## 3. Research Paradigm

### 3.1 Introduction

The philosophical assumptions and beliefs, or worldview, taken by the researcher will inform and shape the research paradigm and research question (Creswell (2012), p15-18).

A research paradigm is the ontological, epistemological and methodological basis that sets out how a researcher is intending to conduct their research (Denzin and Lincoln (2011), p11; Terre Blanche and Durrheim (1999), p6). In a social science setting, a paradigm can be more simply expressed as being a 'way of examining a social phenomenon from which particular understandings of the phenomenon can be gained and explanations attempted' (Saunders (2009), 5/e, p118).

This chapter considers the relevant research paradigms in the context of the study's aim of taking a cognitive approach to exploring a specific aspect of technology investment decision making of senior executives. It will be reasoned that, underpinned by a pragmatist philosophy, an exploratory, qualitative and interpretivist case study utilising a specific application of a repertory grid, is an appropriate approach.

### 3.2 Philosophical Approach

Ontology is concerned with understanding how reality is construed, its nature (Creswell (2012), p20), what it comprises (Schwandt, 2001), or what it is considered to be (Patton (2001), p134); i.e. is it viewed as something constructed in the minds of people (i.e. is subjective) or something that exists independently of them (i.e. is objective) (Bryman (2008), p4).

Saunders et al. (2016) set out ontology in terms of an objectivismsubjectivism continua:

- Objectivism is often associated with natural sciences and ontologically embraces a realist ontology. This ontology holds that phenomena and their meanings exist independently of how people think of them (Saunders et al. (2016), p128, Bryman (2008), p696). Objectivism embraces the positivist


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paradigm which holds that there is a 'single identifiable reality' that can be verified and quantified (Lincoln et al. (2011), p102).

- Subjectivism is often associated with the arts and humanities and ontologically embraces a relativist ontology (Saunders et al. (2016), p129130). This ontology holds that reality is how it is perceived and constructed by people (Johnson and Duberley (2000), p180, Berger and Luckmann (1991), p13 and p33), and that the world and scientific laws are not "out there waiting to be discovered" but are created by people (Easterby-Smith et al. (2013), p23). Subjectivism embraces the interpretivist paradigm that Lincoln et al. (2011), p103 construe as implying that care must be taken to ensure that the knowledge captured reflects the participants' view of reality and not that of the researcher.

The implications to this study of an objectivist and subjectivist ontology is shown in Table 8.

Table 8: Implication of ontological approaches - adapted from Baines (2016)

| Ontology | Implications for the proposed study |
| :--- | :--- |
| Objectivist Ontology <br> (Realist) | Technology investment decision profiles and their <br> meanings exist independently of a firm's senior decision <br> makers (Patton (2001), p19) as concepts that the <br> researcher seeks to confirm (Saunders (2009), p110). |
| Subjectivist Ontology <br> (Relativist) | Technology investment decision profiles are phenomena <br> created from the stakeholders' perceptions and the <br> meanings they attach to them. They are created by <br> stakeholders interacting with each other and can change <br> over time (Saunders (2009), p.111; Patton (2001), p19). |

Epistemology is concerned with what can be considered as knowledge, how you know if you have it and that it is valid - i.e. 'how do you know what you know' (Patton (2001), p134); how is it differentiated from opinion (Thomas (2004), p36). It extends to cover the notions of the relationship between the researcher and the research topic (Creswell (2012), p20-21) and the truths sought by the researcher (Lincoln et al. (2011), p 103).

An epistemology associated with realism (objectivism) is positivism. This is defined in the Penguin dictionary as 'knowledge based on observable, measurable facts and that the observer is independent (detached) from what
is being observed' (Hill et al., 2000) from which generalisations can be drawn (Saunders et al. (2016), p134). This independent or value-free positioning of the observer is referred to as a detached axiology. This epistemology is consistent with a deductive line of reasoning, meaning that the researcher starts with a theory (or hypothesis) and then designs research to test it (Saunders et al. (2016), p51).

An epistemology associated with relativism (subjectivism) is interpretivism, also referred to as constructivism (Creswell (2012), p21). Unlike positivism, where the focus is on causal explanation, interpretivism focuses on understanding (Bryman (2012), p28; Creswell (2009), p6) where the researcher focuses on perceptions and interpretations (Saunders et al. (2016), p137). As research findings are created as a result of researcher/participant interaction (Lincoln et al. (2011), p103) it means that the research is value bound; sometimes referred to as a reflexive axiology (Saunders et al. (2016), p151 7/e). This epistemology is associated with an inductive line of reasoning, whereby firstly a rich set of data is gathered, and from these a broader meaning is inferred (Easterby-Smith et al. (2013), p24; Saunders et al. (2016), p147 7/e; Creswell (2009), p8).

The positivist and interpretivist philosophies have epistemologies by the same name (Saunders et al. (2016), p124). Applied to this study they would have the implications shown in Table 9.

Table 9: Implication of epistemological approaches - adapted from Baines (2016)

| Epistemology | Implications for the proposed study |
| :--- | :--- |
| Positivist Epistemology | The study would adopt an approach akin to a natural |
| sciences study, fact based. Only observable aspects of research approach) |  |
| decision making and alignment could derive knowledge |  |
|  | (Bryman (2008), p13). The purpose of the study would be to |
| develop law-like generalisations about TMT decision making |  |
| and perception of IT effectiveness with causal explanations |  |
| with strong predictive capability (Robson (2011), p21; |  |
| Johnson and Duberley (2000), p39; Tsang (2014)). The study |  |
| would adopt an approach that is consistent with a closed |  |
| system ${ }^{6}$. |  |

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$\left.\begin{array}{|l|l|}\hline \text { Epistemology } & \text { Implications for the proposed study } \\ & \begin{array}{l}\text { Research approach: A cognitive theory would be put } \\ \text { forward and from that a hypothesis would be developed and } \\ \text { tested (Bryman (2012), p28), with the expectation that the } \\ \text { findings would have predictive capabilities in a wider setting. }\end{array} \\ \hline \text { Interpretivist Epistemology } & \begin{array}{l}\text { Aspects of decision making would be evaluated through the } \\ \text { eyes of the decision makers (Creswell (2009), p8), and to } \\ \text { some extent by the researcher, in their real world context } \\ \text { (Creswell (2012), p25). The focus would be on the }\end{array} \\ \text { understanding, meaning and context (Myers (2013), 2/e p39; } \\ \text { Bryman (2012), p28) that the decision makers had of their } \\ \text { own and each other's decision constructs. The study would } \\ \text { adopt an approach that is consistent with an open system. }\end{array}\right\}$

### 3.2.1 Ontological positioning of this study

Schumacher (1995) sets out an ontology scheme for the chain of being that has four levels. It suggests that inanimate objects are different to humans as the latter has the capacity for self-determination and self-awareness, thus humans can be known in more ways. This is not to say that humans can't be studied similarly to a natural object (in a positivist manner) but suggests there are other socio-psychological ways to conduct such a study. More boldly, but for similar reasons Myers (2013), p39 reinforces this view.

Orlikowski and Baroudi (1991) show that up to 1990 behavioural IS research had been positivist in nature with limited interpretive studies, citing 96.8\% compared with $3.2 \%$ respectively. They went on to argue that philosophical assumptions that draw on natural science traditions are not always appropriate for such studies as they do not capture the social processes and context of people and technology in organisations. They cite Burrell and

[^6]Morgan (1979) and Weick (1984) amongst others as advocating that the positivist perspective should be augmented with other research perspectives. Though from the 1990s qualitative research was being published in major IS journals (Trauth, 2001), positivism still remains the dominant philosophical perspective for IS studies (Tsang, 2014).

The focus of this study is on aspects relating to shared understanding and cognition between members of a decision-making body. The view being taken is similar to Orlikowski and Baroudi (1991) in that this is a social world not "out there waiting to be discovered", it is formed in people's minds based on their experiences and interactions with it. As the study follows a line of human inquiry, it seems a reasonable starting point to explore these phenomena through a more subjectivist lens.

Adopting this interpretive approach a researcher would explore the phenomena of interest in its usual context and environment in an open minded manner without imposing any preconceived understanding on it (Orlikowski and Baroudi, 1991).

Ontologically, interpretivism emphasises the importance of subjective meaning which is important as it reveals a decision makers state of mind and suits a field study approach (Orlikowski and Baroudi, 1991). However, by aligning to a specific paradigm, a researcher is placing a methodological restriction on how a research question may be addressed. For a researcher investigating real world practice, this may feel like an artificial restriction, and there may be benefit from considering a method separate from its paradigmatic source (Robson (2011), p27; Morgan (2007)). Such an approach is supported by a pragmatic philosophy.

### 3.2.2 Pragmatism

Pragmatism means that the researcher does not need to be tied into operating at one of the end points on the objectivist- subjectivist continua (Edwards et al. (2014), p3), or at any single specific point on this paradigm spectrum. Pragmatism is non paradigmatic (Feilzer, 2010).

Table 10 sets out a summarised philosophical positioning for pragmatism and the implications for the proposed study.

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Table 10: Summary for pragmatism as a research philosophy - adapted from Saunders et al. (2016)

| Axiom | Implications for the proposed study |
| :--- | :--- |
| Ontology <br> 'The researcher's view of the <br> 'nature of reality' <br> (Saunders (2011), p240) | The study would not be committed to any particular <br> ontology. The focus would be on addressing the research <br> aim in the context of the TMT setting and not on addressing <br> questions of reality (Creswell (2012), p28; Robson (2011), <br> p28). Reality for such a study would be determined by what <br> contextually works in practice (Creswell (2012), p37). |
| Epistemology <br> The researcher's view as to <br> 'what constitutes acceptable <br> knowledge' <br> (Saunders (2011), p140) | In the context of the firm's senior management, it would <br> focus on the TMT practices that can help to improve overall <br> IT investment effectiveness (Saunders et al., (2016), p152). <br> The study would not be committed to any particular <br> epistemology (Patton (2001), p136) and can therefore accept <br> knowledge based on both direct observation (positivism) <br> and/or as evaluated through the eyes of the TMT <br> (interpretivism), for example. |
| Axiology |  |
| The researcher's view of the |  |
| 'role of values' | The study would be value-driven as the researcher is driving <br> the line of inquiry and action plan production. This is <br> acceptable as long as the researcher is self-reflexive, i.e. <br> (Saunders (2011), p140) <br> reflects on the impact their involvement may have and how it <br> might be managed (Saunders et al. (2016), p137; Robson <br> (2011), p29). |
|  <br> Case study | In summary, the study would adopt the philosophical axiom <br> that best supports the aim of improving TMT practice. <br> (Saunders et al. (2016), p143. This could mean a mixed <br> methodology approach could be employed (Creswell (2009), |
| p11). |  |

In the pragmatist's world, the methods used are reasoned and decided upon by their ability to explore what is happening in the TMT setting and their epistemological origins are not important (Patton (2001), p136-7) Pragmatism's non paradigmatic positioning (Feilzer, 2010) doesn't place restrictions on the researcher and thus gives scope to combine methods. Mingers (2001) suggests combining several methods in order to gain a
richness that is only open to this more holistic approach and that to conform to a specific paradigm is 'epistemic fallacy'. Unlike the isolationist approach of Burrell and Morgan (1979), this complementarist positioning takes the view that there isn't a single superior paradigm but that where a specific paradigm is selected its axioms should be observed (Mingers, 2001). This pluralism is supported by Landry and Banville (1992) but they stress that such an approach needs to be disciplined, else it could lead to anarchy. A pragmatic philosophy approach can support the interpretivist nature of this study.

The aim of qualitative research can be thought of as seeking to enrich the understanding of an organisational situation by exploring the perceptions of people in the context in which those perspectives are formed (Kaplan and Maxwell, 2005). For this study a pragmatic qualitative research approach would focus on exploring each individual TMT member's understanding and meanings of their own and others' investment decision constructs within the context of their organisation. It would support an appropriate level of probing to help generate richness of understanding and in seeking some explanation that would be of practical help to the individual and organisation. This could be accomplished by means of an action plan. In accentuating the practical help from the research, pragmatism also supports forms of action research (Baskerville and Myers, 2004, Baskerville, 1999). On balance, pragmatism would appear to provide the most appropriate philosophical foundation for the study.

Given the intended qualitative nature of this proposed study, any outcome would be an interpretation, an evaluation as to how sense is to be made of a situation (Kaplan and Maxwell, 2005). For example, interpretation will be introduced when probing decision constructs, when conducting any content or thematic analysis around individual or group decision making interview activities, and in any collaboration with the CIO when discussing any plans designed to improve alignment. For this study, a strength of qualitative interpretive research is its ability to help build an understanding of the decision makers actions and thoughts in their natural social and organisational context. It creates the opportunity to gain a deep insight into IT investment decision making (Klein and Myers, 1999). However, challengers of a qualitative approach often focus on the perceived weakness of its ability to
demonstrate quality (Golden-Biddle and Locke, 2007). Qualitative researchers acknowledge this and attempt to understand and address this perceived weakness. The steps proposed for this study are discussed in section 3.6.

### 3.3 Research Aim

The research gap identified from the literature targets an exploration of the cognitive diversity between the CIO and CEO in the area of IT investments. The literature search confirmed that this gap exists at both the dyadic level and TMT level. In the context of business/IT alignment, reducing cognitive diversity between the CIO and other TMT members would be beneficial to a firm. Consequently, the aim of this research is to explore whether a better understanding of the cognitive differences across IT investment decision makers and key influencers regarding the effectiveness of such investments can be used to develop an action plan to reduce any cognitive diversity. In practice, any such action plan would usually need to be adopted by the CIO, being the TMT member with overall responsibility for IT within a firm.

To address this aim it would be necessary to ascertain whether:

1) Is it possible to gain an insight into the nature and extent of the shared cognition across these stakeholders regarding IT effectiveness, and
2) Whether it is possible, from an understanding of any cognitive differences, to develop a plan designed to improve the social alignment across these stakeholders and hence value gained from IT.

A study of this nature is exploring the discriminating qualities/dimensions in the minds of key stakeholders for whether an IT investment is likely to be effective. It is surfacing the different attitudes expressed by key stakeholders as to what drives the effectiveness of the firm's IT expenditure. With the focus being on understanding how different stakeholders construe the effectiveness of IT expenditure this research is taking a cognitive approach to the social dimension of IS/Business alignment. Decision making around IT expenditure is potentially a contested area in management (Johnson and Lederer, 2013, Benlian and Haffke, 2016) with measurement and demonstration of value from such expenditure being a challenge to both
researchers (Oz, 2005, Poon et al., 2007, Wagner and Weitzel, 2007) and practitioners alike (Chan, 2000, Luftman, 2003, Manfreda, 2014).

The research objectives and questions that would support this aim are shown in Table 11.

Table 11: Research objectives and questions supporting the research aim

| Research Objective | Research Question |
| :--- | :--- |
| Capture each decision makers perception of IT <br> investment effectiveness and views on <br> business/IT alignment | Can a CIO identify the key stakeholders <br> involved in IT investment decision making? |
|  | Assuming the stakeholders can be identified, <br> can their mental models regarding IT <br> effectiveness be captured? |
| Assess the degree of cognitive diversity of the <br> stakeholder group as regards IT investment <br> effectiveness | How might the stakeholders' mental models <br> be analysed and communicated to the CIO in a <br> simple and easy to understand way? |
| Develop an action plan designed to increase <br> the degree of shared cognition across the <br> group. | From the analysis, is it possible to create an <br> action plan of 'practical adequacy' (Kanellis et <br> al., 1999) designed to reduce stakeholder |

Given that business/IT alignment requires IT investments to be integrated with the organisation's goals, any cognitive diversity regarding IT investment effectiveness might indicate the presence of an underlying strategic paradox (Smith, 2014). This can be a problem as it is challenging to remain committed to conflicting goals (Smith and Tushman, 2005). Consequently, in order to assist the CIO, a secondary objective would be to assess whether a strategic paradox can be identified from the improved understanding of any TMT cognitive diversity

Where value is realised from an IT investment one can reasonably conclude that the investment has been effective as it has met the needs and/or requirements of the business (Chebrolu and Ness, 2013). It would also be reasonable to conclude that where an IS investment is ineffective, value from the investment is improbable. By aligning IS and business strategies, firms aim to improve IS effectiveness (Henderson and Venkatraman, 1989, Avison et al., 2004, Chan and Reich, 2007) and thereby realise value from IS (Johnson and Lederer, 2013). However, business and IS alignment is rarely
achieved (Yayla and Hu, 2009, Chan, 2002) and remains a top priority for firms (Liang et al., 2017). Measuring effectiveness and value may be challenging, but perception is a good indicator of actual (Tallon and Kraemer, 2007). Therefore, an understanding of the degree of shared cognition, exploring how the CIO and key stakeholders construe IT effectiveness, can be used to generate an insight for improving the degree of shared understanding and hence the social dimension of IS/Business alignment. This study will show how differences in stakeholders' cognition of effectiveness can be mapped to a highly regarded alignment model; and how this can assist a technology leader whose ambition is to improve IT effectiveness and hence value delivered.

Factors that affect the mutual understanding and commitment between business and IT executives should be analysed (Martinho et al., 2016). Studies on social alignment tend to investigate antecedents of the social dimension of alignment and relationship to the intellectual dimension. They tend to focus on the process of alignment as opposed to content (Wu et al., 2015). The aim of this study is focusing on content in that it identifies contextual cognitive factors that might realise social alignment and sets these out in an action plan. It investigates content and identifies cognitive differences that succeeds in motivating the CIO to take action; justifying the identified variables (Martinho et al., 2016). Again, drawing on Martinho et al. (2016), this plan promotes communication between IT and other senior stakeholders in the firm, which is important for the convergence of opinions; and should improve Business-IT relationships. Improving these relationships should also promote IT-Business alignment and hence improve firm performance.

This study is taking a practical approach to a real-world challenge. Rather than aiming to create and understand a general multi-faceted alignment model against which a company is assessed, typically via survey instrument, for example Belfo and Sousa (2012); it is generating a highly contextualised view of how (a loosely coupled team of) stakeholders' construe effective IT expenditure. It is then exploring whether it is possible to develop an action plan that addresses the differences and reinforces the similarities. If this is
possible, the study will be addressing the specific alignment conflicts perceived by the stakeholders. Unusually for an alignment study, it would provide procedural knowledge regarding contextualised cognitive differences for a CIO and the TMT to act upon.

### 3.4 Research Method

The method chosen for this research is a case study that uses a combination of semi structured interview questions and Rep Grids. The techniques being used are a combination of thematic analysis and a specific variant of the Rep Grid. Section 3.4 outlines the method being used and Section 3.5 outlines the data analysis and collection steps. Chapter 4 sets out how this method is being applied to this research.

Kaplan and Maxwell (2005) describe qualitative research as a suitable research method when investigating users' perspectives in depth, and to explain contextual behaviours which are not usually known prior to the start of the research. Creswell (2012), p4-p8, reinforces this view by referring in his description to exploring a social problem in its real-world context, and compiling a comprehensive picture by analysing participant's views.

This study is concerned with human enquiry and is to be viewed through a largely subjectivist and qualitative lens. A qualitative case study allows the researcher to explore and build a detailed understanding of the different roles and decision constructs of the various actors within a specific firm context.

### 3.4.1 Case Study

A case study is used to 'investigate a contemporary phenomenon in depth within its real-life context where the contextual conditions are highly pertinent to the phenomenon of study'. Case studies can be singular or multiple (sometimes referred to as comparative) and support qualitative, quantitative and mixed method forms of research (Yin (2009), p18 and p19). Mapping aspects of this definition to the proposed line of research is shown in Table 12.

Table 12: Aspects of the case study definition mapped to the proposed study

| Definition Term | Application to the study |
| :--- | :--- |
| Phenomenon to be investigated | Technology investment decision constructs <br> (Primary unit of analysis in the study). |
| Context and real-life setting | Unique firm - bounded system of the firm(s) being <br> studied. Investment decisions typically captured in <br> the firm's documented operating plans. |
|  | Social Unit to be the focus of the study are the <br> technology decision makers, for example the TMT <br> members, and the CIO |

Case studies are often applied to exploratory studies where "how" or "why" questions are to be answered Ghauri and Grønhaug (2005), p171-p172. This suits the exploratory nature of the research aim: "How" might the CIO assess the degree of shared understanding and use this to improve the social dimension of alignment, or, to help understand "why" the TMT members are socially aligned well or not.

Yin (2009), p14 and p15, cites four main challenges levelled at the case study approach which reflect the more positivist position for which he is commonly known (Gibbert and Ruigrok, 2010):
(1) Case studies lack rigour. Procedures for assessing rigour in qualitative studies can take a different form to those used to assess quantitative studies (Gibbert and Ruigrok, 2010). A widely recognised set of qualitative criteria, even if not unanimously agreed, have been set out by Lincoln and Guba (1985), p290. They proposed assessing the rigour of qualitative research against four criteria: Credibility, Transferability, Dependability and Confirmability. The research actions to demonstrate rigour against the Lincoln and Guba criteria and are applied to the study's methods and are set out in section 3.6.
(2) Case studies provide little basis for generalisation. Such a statement largely adopts a positivist view that studies should be nomothetic (i.e., provide universal laws) and provide the scientific grounds (associated
with the natural sciences) to be able to claim validity or generalisability. However, interpretivism holds that the goals of universal law are inappropriate for the study of social units and that such studies should be idiographic (i.e. context specific). Consequently, generalisability is not the priority of such studies (Lee and Baskerville, 2003). They cite Geertz (1973) saying that interpretivists do more than simply capture the facts and thick descriptions of the topic under observation, as through a reasoning process they move beyond a pure descriptive portrayal of the instantiation (e.g. an investment decision) and thereby to a form of generalisation. The aim of theory building in this instance is not to 'generalise across cases but generalise within them'. Gibbert and Ruigrok (2010) refer to this as 'analytical generalisation' explaining what has been observed and what would likely be observed by another researcher if they were to repeat the study. For this study analytical generalisation could be interpreted as being able to state that there does appear to be value in understanding the degree of cognitive diversity across IT investment decision makers. This becomes not unlike generalising to the level of a theoretical proposition (Yin (1981), p21). More emphatically Stake (1995), p38 holds that the real focus of a case study is 'particularisation' as opposed to generalisation, an expression also used by Yin, p21; and places an emphasis on taking the case study at face value. This is also consistent with a pragmatist perspective, where the study's focus is on what works and is of practical use, and not generalisation.
(3)Case studies take too long. By taking a repertory grid approach it is hoped that the length of any interview can be controlled through management of the elements being considered, and that the overall interview length will be no longer than an in-depth interview. Purposeful sampling (see section 5.2 for explanation) of participants by the CIO is intended to target the few key decision maker/influencers. Taken together it is hoped that the time taken on any individual case is reduced to an appropriate minimum. For this research the case study is completed when a plan is developed that the CIO is willing to execute
against.
(4) Case studies are not able to establish causal relationships. Causal relationships are often associated with the natural sciences and quantitative methods. In the social sciences, Sayer (1992), p245-246 implies that a case study interview, being more interactive in nature, is more likely to provide a rich understanding of a situation than a more quantitative oriented questionnaire survey. The pragmatic epistemological positioning of this study implies that the focus is on improving practice as judged by its practical adequacy (or 'warranted assertability', Robson (2011), 3/e p28) and ability to provide a reasonable explanation (Kanellis et al., 1999). It aims more to meet the criteria: an explanatory case study that has merit as its conclusion provides the most plausible explanation given the facts and possible alternatives (Yin (1981), p142-143).

### 3.4.2 Repertory Grid Technique

Rep Grids can be used to assess the structure and content of a person's 'construct system' (Walker and Winter, 2007), i.e. their perspective on the world (see later in this section for a fuller description ). They are an operationalisation of PCT (Reger, 1990), help express a person's perceptions explicitly and how they think about an issue (Jankowicz (2005a), p337). They are so named as they aim to help understand how a person's system of constructs are used to make sense of a 'repertoire' of elements (Eden and Jones, 1984). Rep Grids are adopted for this study as they are a cognitive approach for uncovering decision makers' personal constructs (Alexander et al., 2010) surrounding technology investment decisions. Such an approach allows a researcher to capture a mental map as to how the decision makers view investments with the minimum amount of observer bias (Stewart et al. (1981), p7-9). Rep Grids are commensurable with a case study approach, can be viewed as idiographic in nature, and can support a qualitative research perspective (Tan and Hunter, 2002).

The exploratory and interpretive nature of this proposed study will seek to gain an insight into the meanings behind the decision makers' constructs and their view of the similarities/differences of other investment team member's
constructs and meanings. Decision construct commonality (alignment) will imply a shared cognition and will result in team cohesion and better decision making (Tan and Gallupe, 2006). Constructs can be revealed though open interview techniques but such an approach is not as efficient for this purpose as the Rep Grid technique (Tan and Hunter, 2002, Siau et al., 2010). By comparison, Rep Grids offer a more structured method for interviewing (Cron et al., 2014, Cho and Wright, 2010) and collecting data (Siau et al., 2010). Olsson (2015) refers to Rep Grids as being a 'systematic interview'.

Table 13 gives an overview of the rep grid research design proposed for this study.

Table 13: Proposed Rep Grid research design - adapted from Schmidt and Rosenkranz (2015)

| Research Aim | Explore whether a better understanding of the cognitive <br> differences across IT investment decision makers and key <br> influencers regarding the effectiveness of such investments can <br> be used to develop an action plan to reduce any cognitive <br> diversity |
| :--- | :--- |
| Research perspective | Predominantly Qualitative - Pragmatism / Grounded theory |
| Nature of Rep Grid | Idiographic |
| Element Selection | Elicited from questions, supported by investment maps |
| Construct identification | Triadic process |
| Linkage mechanism | Rating, Scale 1-5 |
| Results Analysis | Heat maps supported by thematic analysis |
| Sample Size | Purposeful sample selected by the CIO: Entire top management <br> team and influential franchisees ( $\mathrm{n}=10$ ).. |

A Rep Grid comprises three essential components (Easterby-Smith, 1980a):
(1)Elements: These are the entities being examined and considered to be of importance to the researcher and research participants (Rogers and Ryals, 2007, Tan and Hunter, 2002). In this study the elements will be technology investments. These will be used by shareholders to generate their own constructs.
(2)Constructs: Constructs are the dimensions or "qualities" that a person uses to differentiate between, discriminate between or interpret the elements being examined (Rogers and Ryals, 2007, Tan and Hunter, 2002, Easterby-Smith et al., 1996, Fransella and Bannister, 1977). Through contrasting pairs of words or expressions they reveal how a person makes

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sense of the elements (Eden and Jones, 1984, Simpson and Wilson, 1999). In this study the constructs are the investment decision dimensions that individuals use to determine whether an investment is likely to be effective.
(3)Linking mechanism: This is the way that an association is made between the elements and constructs (Tan and Hunter, 2002).

As the name Rep Grid suggests the output is in the form of a grid, where typically the columns are elements, the rows are constructs and the cell values are a rating of how well the construct applies to the element. A fictitious example that uses cars as elements and their discriminating factors as constructs is shown below, Figure 5. The numbers in the grid cells are the linking mechanism, in this instance a $1-5$ rating scheme. If an individual links (i.e. associates) an element more with the Left-Hand Pole (LHP) dimension then a rating of 1 is entered in the cell; conversely, the Right-Hand Pole (RHP) a rating of 5 . In the example below, the individual associates a super car with high performance, high maintenance cost, poor off road capability and small boot capacity.


Figure 5: An example of a Rep Grid
How elements and constructs are provided depends on the situation being examined and there are guidelines as to how they are selected (Fransella and Bannister (1977), p13-20, Tan and Hunter (2002)). Both elements and constructs can be elicited from the participant or supplied, see Figure 6.

|  | Partial Rep Grid <br> Elements are elicited, constructs are supplied Partial grid comparison possible | Full Rep Grid <br> Elements and constructs are elicited from participants <br> Elements and constructs are more personally meaningful to the participants Direct comparisons between grids is usually severely impacted |
| :---: | :---: | :---: |
|  | Standard Grid <br> Researcher provides the elements and constructs Elements and constructs may have less personal meaning for participants Comparisons across grids possible | Partial Rep Grid <br> Constructs are elicited, elements are supplied Partial grid comparison possible |
|  | Supplied Constructs Elicited |  |

Figure 6: Types of Rep Grids - adapted from Edwards et al. (2009)
Where the elements and constructs are elicited a Rep Grid can be thought of as being predicated on grounded theory (Rogers and Ryals, 2007). The manner in which elements and constructs are provided in this study are set out in Chapter 4, but it will make use of Standard Grids that have been derived from Full Rep Grids.

### 3.4.3 Standard Grids

Comparison between two grids to identify their differences and similarities is only possible where the elements and/or the constructs are the same in both grids (Easterby-Smith, 1980a). In this study Standard Grids (see Figure 6) are used to compare the shareholders' construal of the effectiveness of IT investments and the outputs are presented in the form of heat maps.

As the constructs being used in a Standard Grid are no longer strictly "personal constructs" it can be argued that the Rep Grid technique is being used in a manner deviating from Kelly's stance (Cassell and Walsh (2004), p66). They along with Birdi (2011) acknowledge this conflict but argue that from a pragmatic perspective this course of action is justified. Phythian and King (1992) adopt the same pragmatic approach but in so doing take the view that any knowledge gathered from subsequent analyses of grids represents a descriptive knowledge only of participants' beliefs in that firm, suggesting that quantitative analysis should not then be used. Armstrong and Eden (1979) also comment on the pragmatic use of Standard Grids claiming that they
retain the grid methodologies' benefits but that they have the added benefit of being able to provide direct comparison between participants. Similar to the others, they too recognised that the grids were becoming increasingly less idiographic (i.e. the constructs are no longer "personal"), and sought to reduce this effect by not using Standard Grid elements and constructs developed solely by the researcher. Such is the position in this study. In summary, it would appear that for many scholars in the business field, sensible pragmatism and simplicity overcome the theoretical conflict raised. The use of ratings, aggregation of constructs and Standard Grids are all common practice (Eden and Jones, 1984).

### 3.4.4 Thematic Analysis

Thematic Analysis is a method that involves a process for identifying and categorising into themes patterns of meaning surfaced following an analysis of a data set (Braun and Clarke, 2006, Joffe, 2012, Fereday and Muir-Cochrane, 2006). It is an appropriate method for analysing interview data to surface and highlight the key decision making dimensions being used by the stakeholders (Joffe, 2012). As will become clear, themes are the units of analysis and codes are labels that capture the essence of individuals' responses to a series of funnel questions asked as part of the stage 1 interview process. Thematic Analysis is not tied to a particular theory or philosophical positioning (SavinBaden and Howell Major (2013), p440) and is therefore commensurate with the study's philosophy of pragmatism.

As will be described in section 5.2, these funnel questions are intended as a way to understand how each stakeholder describes what is important for their business and IT together to achieve. By doing so, it tangentially captures what each person believes is required to achieve business and IT alignment. A thematic analysis of the funnel questions is therefore seen as adding value in two ways:

1. By serving as a form of corroborating evidence from an alternative method for the views captured through the Rep Grids; a technique known as triangulation (Jick, 1979).
2. By providing an opportunity to explore the feasibility of creating a simplified grid that can be contextually framed using the main themes emerging from the individuals' responses to the funnel questions. The purpose of this simplified and contextualised grid is to deliver a tool that would be helpful as part of the firm's governance process when planning IT investments. This grid, referred to in this study as a Governance Grid, is explained in section 6.2.5.

### 3.4.5 Examples of Rep Grids

Table 14 shows the Rep Grid papers from the part 2 literature search (Table 7), together with a selection of other papers found during the narrative review. The purpose of Table 14 is in part to show the variety of ways in which Rep Grid studies are conducted, the use made of the constructs and the nature of the analysis performed. The studies range from being very numerically driven, referred to in this table as quantitative, through to more qualitative approaches such as content analysis, a term that includes Thematic Analysis. It is also intended to show that the use of Rep Grids in this study fall within the boundaries found in other studies. Section 5.4.1 and Table 20, provide a sharper focus on and discussion of examples where Standard Grids are used.

| Author Reference | Rep Grid usage | Elements | Constructs | Construct Laddering Emphasised | Quantitative Analysis | Qualitative Analysis |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  | Analysis Focus | Participant Interpretation | Grounded Theory Ref |
| Tan and Gallupe (2006) | Full | Elicited | Supplied | No | Yes | - | - | - |
| Kanellis et al. (1999) | To develop the study's initial findings | Supplied | Elicited | No | No | Content analysis used to enrich understanding of initial findings | No but implied as a next step | No |
| Desai and Sahu (2008) | Full | Elicited (via Workshop) | Supplied (Literature) | Yes | $\begin{aligned} & \text { Yes } \\ & \text { (PCA) } \end{aligned}$ | Content - no process details given | No | No |
| Peffers and Gengler (2000) | Partial - used to develop w/shop inputs | Supplied (Subset of group ideas) | Elicited (as chains not contrasts) | Yes | No | "Qualitative clustering" and creation of "success chains" | Yes to seed solution workshops |  |
| Alexander et al. (2010) | Adapted for Action Research (REF Grid) | Supplied (Workshop) | Supplied (Workshop) | Adapted | No | Group discussion of ratings (Works hops) | Yes Action Research | No |
| Cho and Wright (2010) | Full | Supplied | Elicited | No | No | Content + independent expert categorisation | No | No |
| Almusharraf et al. (2015) | Adapted | Participants in the study | Supplied | No | Yes | - | No | No |
| Fassin et al. (2015) | Full | Supplied | Elicited \& Supplied | No | Yes | - | No | No |
| Huang et al. (2008) | Partial - used to develop survey tool | Elicited \& Supplied | Elicited | Yes | Yes | - | No | No |
| Ashleigh and Nandhakumar (2007) | Full | Supplied | Elicited | No | Mixed Method | Content + independent expert categorisation | No | Reference to a "Grounded Perspective" |
| Schmidt and Menth (2016) | Full | Elicited | Elicited | Yes | No | Content + independent expert categorisation | No | No |
| Davis and Hufnagel (2007) | Full | $\begin{aligned} & \text { Elicited } \\ & \text { (Tasks) } \end{aligned}$ | Elicited | Yes + Rich Descriptions gathered | Mixed method reference | Themes identified from participant grids \& across grids | Yes for own grid (not cross-grid) | No |
| Eschenbrenner and FuiHoon (2006) | Full | Elicited + supplied categories | Elicited | Yes | No | Content <br> (Stewart, 1981) Researcher analysed | No | Strauss \& Corbin (1998) coding |

### 3.5 Data collection and analysis

### 3.5.1 Process Overview

The stages of the data collection and analysis process are set out in Figure 7.

| Rol |  | Participant | Researcher | CIO |
| :---: | :---: | :---: | :---: | :---: |
| Preparation |  |  | - Develop briefing pack <br> - Build the investment heat maps <br> - Create the linkage diagram | Select and brief the study participants |
| Stage 1 | Part 1 | Interview 1 <br> (90 Minutes) <br> - Funnel questions <br> - Personal Rep Grid | - Create the personal grids with participants <br> - Provide real-time and written feedback/analysis of individual grids to each participant |  |
|  | Part 2 |  | - Develop categorisation and Standard Grid with an independent expert | Agree Standard Grid based on Researcher \& independent expert input |
| Stage 2 | Part 1 | Interview 2 (45 Minutes) <br> - Standard Rep Grid | - "Talkback" of participant's personal grid <br> - Complete Standard Grid |  |
|  | Part 2 |  | - Analyse the Standard Grids and generate the heat maps <br> - Thematic Analysis of the funnel questions. Develop Governance Grid | Engage senior IT management team (Optional) |
| Develop Action Plan |  |  | - Discuss the format of the action plan with the CIO <br> - Create first cut action plan for discussion | - Review the Standard Grid and Thematic Analysis \& Governance Grid <br> - Review and develop action plan with researcher |

Figure 7: Overview of the process to produce an action plan
The Stage 1 process includes providing participant feedback using analyses specific to the Rep Grid technique. Ideally this is done at the end of the interview, essentially in real time, to help further engage the participant in the process and to provide a means to sense check their output. There are a number of software programmes that can help with providing these analyses, for example FOCUS, PLANET, PEGASUS (Shaw and Thomas, 1978, Shaw, 1982, Shaw, 1980), INGRID (Slater, 1977), Idiogrid (Grice, 2002) and GRIDSTAT (Bell, 2009). However, RepPlus (Shaw and Gaines, 2018), a recent development of the WebGrid software (Gaines and Shaw, 2010) released in January 2018, was chosen because unlike any of the other packages it can (a) more easily be used to build a grid in real time with the participant (b) provide helpful displays during the interview to check understanding and accuracy, and (c) provide the basis for analyses used later in this study, see section 6.2.4.

The proposed data analysis approach is shown in Figure 8. It sets out 3 main steps that revolve around the proposed two stage interview process. Like the studies shown in Table 14, this study uses a form of content analysis to gain

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an understanding of cognition at the group level. In addition to the approaches shown in Table 14, Honey (1979) and Green (2004) provide helpful advice with this analysis technique.

The Honey analysis noted in stage 2 of Figure 8, and explained in more detail in Chapter 6, identifies how similar a person's constructs are to a supplied construct (Easterby-Smith, 1980a). Here it is being used to gain an understanding at the group level as to which investments are viewed as being most effective. Stage 2 also mentions heat maps which are a 'graphical representation of data in which a spectrum of colours is used to represent the different values' (Collins Online Dictionary). They are widely used in a variety of forms across many disciplines, with the heat map colours being chosen to help highlight instances or clusters of data (Trame and Keßler, 2011). In this study, heat maps are highlighting clusters of perceptual differences regarding IT effectiveness.

The target outcome is to produce a simple visual depiction of the degree of variation in the cognitive structures of those identified by the CIO as playing a key role in IT decision making decision. The resulting profile is then used to create an action plan designed to develop increased similarity in the cognitive structures between the CIO and the identified actors.


Figure 8: Proposed data analysis stages
By introducing an action plan there is an aspect of this study that is informed by Action Research. Action Research aims to 'contribute both to the practical concerns of people in an immediate problematic situation and to the goals of
the social science by joint collaboration within a mutually acceptable ethical framework' (Rapoport, 1970). By addressing an immediate problem in this manner, the researcher is actively engaged in attempting to change the status quo of a situation and in so doing should recognise that they are making value judgements (Curle 1949).

Baskerville and Myers (2004) view action research as a form of research where the researcher is helping the client/community and is making IS research more relevant in the workplace. They illustrate the various forms of action research and suggest that pragmatism is the underlying philosophy. To the extent that this research moves into the realm of action research it is informed by the collaborative practice form. An IS example of collaborative practice is provided by Iversen et al. (2004) who examine a risk management approach to improve the effectiveness of software process improvement teams at a bank.

In a similar manner to Kanellis et al. (1999), the heat map representation and discussion with the CIO is intended to serve as the basis for action that will improve the effectiveness of IT in the firm. For Kanellis et al (1999), practical adequacy was envisaged as being where the researcher and the stakeholder are involved in discussions that result in consensus on how the outcome from their research should be interpreted. In this study it is visualised as being a collaborative plan that the CIO is willing to act upon. In other words, a plan that the CIO believes is workable (Denzin and Lincoln, 2008).

### 3.5.2 Rep Grid analysis

There are many ways in which to analyse and draw legitimate inferences from Rep Grid data (Fransella and Bannister (1977), p9). Two common forms of analysis seen in Rep Grid studies are Cluster and Principal Component Analysis. Both forms of analysis are performed on Rep Grids where ratings have been used. A cluster analysis groups similarly rated elements and constructs so that relationships in the grid are easy to visually identify (Jankowicz (2005b), p118). With this type of analysis the data from the original grid is used and thus the output can be relatively easily understood by a participant (Stewart et al. (1981), p65). Principal Component Analysis (PCA) is concerned with the total variance of the grid data (Fransella and

Bannister (1977), p74), it decomposes the grid (Tan and Hunter, 2002) with the outcome being a (small) number of statistically invented components (Jankowicz (2005b), p129), i.e. hypothetical independent variables. These components are then used as orthogonal axes for a graph on which the constructs and element are plotted. The nature of the plot informs the reader as to how well the component reflects the construct (angle of the line with respect to the axes) and how much of the grid variance is being accounted for by that construct (length of the line) (Jankowicz (2005c), p129).

Both these forms of analysis are shown at the end of the first interview. The cluster analysis in particular being used to check with the participant that the outcome of the exercise appears sensible. Thereafter, the cluster analysis is used only as a "check and balance" during the action planning process. The Principle Component Analysis may be of interest, but the participants' ability to connect the output to their grid data is essentially lost. It becomes a statistical exercise that is not fully understood by the participants.

This study is exploring whether an action plan of practical adequacy can be developed from the output generated from a particular use and application of the Rep Grid Technique. Consequently, it is important that the CIO is able to explain and discuss the output with colleagues in a manner that is easily understood. Complex statistical analysis is not helpful to management in this context (Eden and Spender, 1998) and not required when trying to help someone to understand their own environment (Easterby-Smith et al., 1996). The simplest form of analysis, where the participant can readily understand the connection to the base grid data, is favoured (Eden and Jones, 1984). Eden and Jones (1984) also sound a cautionary note concerning the statistical analysis of grids as providing a false sense of scientific respectability and Fransella and Bannister (1977), p3 warn that it can lead to an 'oversimplification of the overall construct network'. The intention in this study is to make results meaningful and not lose the audience. Therefore, the analysis very deliberately remains close to participants' original and recognisable/familiar data and formatting. As will be shown in Chapter 6, simple arithmetic only is used together with simple formatting techniques.

The above examples have focused on the quantitative approach to Rep Grid analysis. However, the ontological positioning for this human inquiry study has been argued to be best viewed through a subjectivist lens. This is consistent with the subjectivist ontology adopted by Hair et al. (2009) who argue strongly for a qualitative approach to analysing Rep Grid data, assessing its quality by means of credibility, dependability and transferability. This is explored further in section 3.6.

### 3.5.3 Thematic Analysis

Later in this study a thematic analysis of participant responses to a series of questions will be used to develop a highly contextualised Rep Grid that is intended to support the overall portfolio investment governance process. This will be called a Governance Grid.

Thematic analysis can be viewed as a subset of Content Analysis but as having a method in its own right (Joffe, 2012). Whilst agreeing that qualitative content and thematic analysis are both commonly used qualitative approaches, Vaismoradi et al. (2013) see a clear boundary between them. Consequently, they set out different data analysis phases and descriptions for each (Vaismoradi et al. (2013), Table 1). As there is no singularly agreed process for thematic analysis (Savin-Baden and Howell Major (2013), p439), the thematic analysis phases from Vaismoradi et al (2013) Table 1, drawn from Braun and Clarke (2006), are followed. This is viewed as preferable to following no process at all. This process is summarised below but its application to this study is set out in section 5.5 .
a) Data familiarisation: This involves transcribing the interview session, becoming immersed in the data by reading and re-reading the transcripts, and capturing initial thoughts.
b) Generating Initial Codes: From reading the transcripts pertinent features are noted and assigned a code. This study uses descriptive coding, meaning that the codes reflect the actual words used by participants.
c) Searching / Reviewing / Naming themes: Over time codes can be identified that naturally cluster into potential themes. These themes in turn are then reviewed and modified over time as the familiarisation and understanding of the data increases, and are eventually labelled.
d) Reporting: Normally this takes the form of a compelling account of the data that draws on a selection of coded material which is then related back to the research question. In this study the output takes the form of a specialised grid that is presented to the CIO.

### 3.6 Methodological Quality

Studies must be open to evaluation and traditionally this has centred on the criteria of reliability and validity (Long and Johnson, 2000). Together, these criteria are used to judge a study's quality or rigour (Edwards et al., 2009).

However, when it comes to qualitative research there are three schools of thought on quality that are unlikely to be reconciled. They range from those that argue that qualitative research should adopt the same scientific criteria as quantitative research (i.e. reliability and validity); through those that hold that different concepts apply as qualitative research addresses different issues; to those that believe there is little value in having a preconceived set of generic criteria (Rolfe, 2006). Although there may not be consensus across these schools, they do arguably agree that some sort of verification strategy is required to achieve it. In this thesis, an approach based on Morse et al. (2002) is adopted whereby the quality of the research is demonstrated with reference to a number of criteria that together provide the evidence. The combination of criteria selected is based on the focus of the study (SavinBaden 2003 p472 and p483).

A researcher adopting a pragmatist view is not bound by the epistemologies that underpin these different schools but mixing their associated methods is seen by some as poor practice (Thorne et al., 1997). However, Rep Grids and Thematic Analysis can be viewed as being qualitative research approaches and are viewed as such in this study. Consequently, the constructivist criteria
suggested by Lincoln and Guba (1985) are adopted as the components for the verification strategy. Their criteria replace the traditional (quantitative) quality criteria of validity and reliability with "trustworthiness", which in itself comprises credibility, dependability, confirmability and transferability.

Creswell and Miller (2000) specifically cite credibility as a key criterion for qualitative research. This will be demonstrated in this study by the jointly created and workable action plan that the technology leader is willing to act upon. Should such a plan be enacted by the CIO, it is reasonable to suggest that that in itself provides a prima facie indication that the research outcome is seen as trustworthy. By being willing to act on the plan the technology leader is placing sufficient confidence in the finding's validity to expect that there will be a net improvement to IT effectiveness (Denzin and Lincoln (2008), p73). In other words, the plan has credibility in the eyes of the CIO.

### 3.6.1 Rep Grids

Although this study is taking a qualitative case study approach, Rep Grids can be viewed as an interpretive framework that combines both qualitative and quantitative methods (Marsden and Littler, 2000, Curtis et al., 2008). With an emphasis on the former, the qualitative / quantitative evaluation criteria, taken from Bryman (2012), p390 and Thomas (2006), p137, and the implications for this study are discussed below:

- Criterion 1: Credibility / Internal Validity

Credibility focuses on the 'acceptability of the researcher's account of the findings and this is founded on ensuring that the research was conducted according to what would be considered as good practice' (Bryman (2012), p390). For this study the unit of analysis is a decision construct and this is elicited using a technique that has been widely used and accepted for 70 years (Easterby-Smith et al., 1996). Respondent validation (Bryman (2012), p390), or member checking (Creswell (2009), p191) is also a known technique for assessing credibility. In this study a grid analysis comprising a Cluster Analysis, Principle Component Analysis and Honey analysis is presented and explained at the end of the interview meeting. This is followed by a brief discussion to help secure the participants
understanding. A summary of the Rep Grid outputs, together with a transcript of the meeting is then provided to each respondent. The "talkback" process (Davis and Hufnagel, 2007) in Stage 2 provides the further opportunity for the study's participants to raise any objections, a member checking technique used by others (Cron et al., 2014, Birdi, 2011, Rogers and Ryals, 2007). It is accepted a limitation is that a respondent could be unengaged or overloaded by the data presented, but no respondent objected to the way in which the data were being portrayed. As previously noted, the use of supplied constructs in the Standard Grid, while counter to Kelly's stance, is common practice. For example, in Table 20, Tan and Gallupe (2006) used constructs generated from the literature to create the Standard Grid for their study. It might be argued that the Standard Grid generated for this study has some similarity (to Tan and Gallupe's questionnaire style) as the constructs potentially no longer have the same meaning for each participant. Marsden and Littler (2000) suggest that this criticism is overcome when the constructs are idiographic, as they are in this study, i.e. the constructs are developed from the individual grids of the participants and conducted within the context of the firm and known investments. This is the same point raised by Armstrong and Eden (1979) earlier. Where possible triangulation techniques, where data from other sources (for example, Thematic Analysis,) is used to corroborate interpretations.

Internal validity is concerned with 'whether there is a causal effect between one variable and another' (Thomas (2006),p132). This criterion is more usually seen in a positivist setting where a hypothesis is being tested, which is not the case in this exploratory study. More generally, it is a less often seen approach in Rep Grid studies though Oppenheim et al. (2003) use cluster analyses to draw "linkages" between similarly rated constructs and draw conclusions from these similarities that imply a cause and effect. Cluster analyses are simply a resequencing of a grid based on similarities of grid values, where unlike PCA, the underlying grid data is easily seen. Such linkages are not readily seized upon in this study though a form of cluster analysis it is used (and explained later) as part of the Honey analysis.

Researcher bias can be viewed as an obstacle to qualitative validity (Creswell (2009), p192). It is also viewed as a reliability threat (Saunders (2009), p156), and this is where it is discussed.

- Criteria 2: Transferability / External Validity (generalisability)

Transferability is concerned with whether the 'findings from one (case) study can be applied in a wider setting' (Thomas (2006), p137). As the nature of qualitative inquiry is that it is contextualised (Bryman (2012), p392), generalisation (external validity) is not a goal. Though such an unequivocal statement can be debated by scholars (Tsang, 2014), such a perspective can be accepted where the social research is grounded within a pragmatic philosophy (Creswell (2009), p193; Robson (2011), p19). This study is a pragmatic qualitative inquiry, that is conducted within the specific context of a firm and group of participants. As such generalisation is not an aim. However, this study can be viewed as being a representative case study (Bryman (2012), p70), where the study's approach (as opposed to findings) can be applied more broadly than the single instance of this case study firm? ${ }^{7}$.

Thick descriptions, where rich case study data are gathered, provide a platform on which experiences can be shared and others can reflect and judge whether the findings make sense or not in a wider setting (Creswell (2009), p191; Bryman (2012), p392; Denzin and Lincoln (2008), p74). The source of such rich descriptions might be the participants' transcripts. This is arguably one way in which the researcher's assertions or 'propositional generalisations' (Stake (1995), p 86) might be extended beyond the study. Alternatively, a propositional generalisation would be to claim that the approach taken is transferable, which could be supported by the notion of "procedural validity" (Yorke (1983b), p483) ${ }^{8}$. Though a

[^7]limitation of this study, cross case comparisons and patterns can be made (Yin 1981) which under the right conditions may result in broader theories.

- Criterion 3: Dependability / Reliability

Thomas (2006), p137 refers to dependability as being concerned with how much the research data might change over time. This leads scholars to consider a test-retest Rep Grid scenario, where for example an individual is asked to complete a ranked construct exercise and repeat the exercise a short time later. There are such studies where reliability is claimed as there is a high correlation between the outputs, for example Wright (2008), but it is not unanimously seen as being a conclusive measure (Yorke (1983b), p369-374). Rep Grid constructs and ratings may be expected to change over time to reflect participant's new experience, consequently a person's mind will not necessarily remain unchanged (Experience Corollary). This criterion is also challenging where action research or active management development is involved as there may even be a hope that constructs will change over time (Easterby-Smith, 1980b, EasterbySmith et al., 1996). With Rep Grids the focus is not whether a grid, if repeated remains unchanged, but what that change means (Fransella and Bannister (1977), p83). It does suggest that, to remain relevant to the CIO, the activities of this study should be repeated periodically to reflect possible changes in the stakeholder's attitudes, composition of stakeholders and/or business circumstances.

Reliability refers to the 'degree to which the data collection and analysis techniques will produce consistent findings' (Saunders (2009), p156). Producing consistent findings can be inhibited by researcher bias and such bias is to be expected given the reflexive axiology associated with interpretivism and a pragmatic philosophy. Rep Grids address many of these concerns as they (a) provide a structured approach with clear procedures that can be followed by any researcher and which minimise researcher bias (b) discover how participants view their world, as opposed to confirm a researcher's view of that domain, and (c) are transparent to the interviewee and delivers results that are meaningful to the interviewee (Curtis et al., 2008).

- Criterion 4: Confirmability / Objectivity

Confirmability is concerned with making sure that any findings are grounded in the real life contexts and participants (Thomas (2006), p137) and that the researcher has acted in a bona fide manner and not inappropriately manipulated the research and findings (Bryman (2012), p393). Objectivity is a similar concept, where in a manner more akin to a scientific experiment, aims to more completely detach the researcher from the participant. However, to some this detachment is seen as a major obstacle for exploring a human phenomenon in a social setting (Robson (2011), p92) and consequently objectivity is de-emphasised by some scholars (Robson (2011), p19), and consequently is not relied upon for this human inquiry study.

This case study is set in the real-life context for this firm whereby the study's participants are key stakeholders in the investment decision making process. The selection of the study's participants is determined by the CIO, not the researcher. The study has been conducted in a transparent manner by the researcher. Transparency in the findings has been ensured as (a) All data gathered and the initial Rep Grid analysis are conducted openly in face to face interviews and outputs explained and discussed (b) The CIO is actively engaged at all stages of the research, and (c) An independent expert has been used at key points in the research.

However, the researcher needs to be aware that Rep Grids are an interpretive method. Care is taken to check that the constructs are capturing the real meaning being espoused by the participants, by virtue of the research design. Similarly, any thematic analysis will introduce the need for researcher reflexivity. Reflexivity, transparency, (Bryman (2012), p193 \& p394, Creswell (2009), p177) and triangulation (Robson (2011), p93) are ways in which a researcher can seek to achieve a balanced account of the findings. A reflexive log was included as part of the DBA learning $\log$ and captured the researcher's thoughts on the challenges and observations faced during the research process and how personal experiences and background may influence outcomes. This is discussed in section 3.6.2.

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By adopting the approaches and techniques across the range outlined the quality of the study's research methodology (method and technique) is ensured.

Regardless of the measures used, scholars such as Yorke (1983b) have difficulty in applying measures of validity to Rep Grids in a way that totally satisfies them; even challenging any perceived usefulness from the research to the participants/researcher as being a measure (p428-429). However, as mentioned, one approach that Yorke does suggest, is to address the topic on the qualitative grounds of procedural validity ( p 430 ); a position supported and posited as demonstrating trustworthiness (Edwards et al., 2009). How Rep Grids are applied to this study, i.e. the procedures that were followed, are set out in Chapter 4.

### 3.6.2 Thematic Analysis

A practical limitation of this case study is that access to senior management is limited. This means not all quality criteria can be prosecuted to the theoretical maximum, but collectively the steps taken demonstrate rigour in ensuring quality. As many of the terms and concepts have already been defined, the response is set out in a simple, more condensed, table format, Table 15.

There are contradictory accounts in the literature as to exactly which method maps to which criterion, for example, audit trail and triangulation in Long and Johnson (2000), Schwandt et al. (2007) and Creswell and Miller (2000). In Table 15 below, the method is positioned where the cited author suggests along with their definition of the criterion.

Table 15: Actions taken to ensure Thematic Analysis quality

| Criterion | How to satisfy the criterion <br> (Method) | How it is achieved in the study |
| :--- | :--- | :--- |
| Credibility <br> (Int Validity) | Member checking: ‘Getting the <br> reactions from participants to the <br> investigator's interpretation'. <br> (Schwandt et al., 2007) | The CIO was asked to review his <br> transcript and confirm the coding and <br> categorisation suggested. NVivo was <br> Even though adopting a more <br> positivist stance, Morse et al. <br> (2002) appear to support this | | This criterion is viewed as a social |
| :--- |
| constructionist/constructivist |


| Criterion | How to satisfy the criterion (Method) | How it is achieved in the study |
| :---: | :---: | :---: |
|  | method for case studies. <br> According to Rolfe (2006), Guba and Lincoln (1989) strongly supported this criterion as a technique for establishing credibility. | (subjectivist) criterion (Patton (2001), p546). Even so, other scholars adopting such a subjectivist position argue that repeatability of the coding process is not essential (Sandelowski, 1993); placing instead the emphasis for rigour on the auditability of the process taken. |
|  | Peer debriefinq: 'Use of an external/experienced colleague or expert to support the credibility of the findings' (Houghton et al., 2013) | As access to senior management is restricted, the ClO was selected as an "experienced colleague" and asked to selectively review the coding and categorisation from the responses provided by his peers to the funnel questions. |
|  | Prolonged Engagement: 'Lengthy exposure to the phenomenon and data'. <br> (Creswell (2009), p191-192) | Conducting the face to face interviews, personally transcribing them, read/rereading transcripts and iterations of coding helps provide a high degree of data immersion. Being a collaborative study, regular contact was maintained with the CIO and, in the earlier stages of the study, with key members of his team. Also, access was granted to confidential materials which supplemented information gained from reading public documents such as the annual reports. The case study was conducted over the period of a year which also helped cement relationships and build the number of interactions over time. |
|  | CIO Adoption of findings: As with the main action plan resulting from the findings of the Rep Grid exercise, adoption of the output was used as a 'measure of [the CIO's] confidence in the output's validity and practical application' (Denzin and Lincoln (2008), p73). | The Governance Grid that encapsulates the themes and aggregated Standard Grid constructs was accepted by the CIO as a useful addition to the internal governance process for investment planning. |
| Credibility \& Confirmability | Triangulation: 'The use of more than one method to corroborate findings' (Jick, 1979) | Standard Grid constructs, being the aggregation of the individual's personal grid constructs were mapped to each theme/sub theme. This mapping was |

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| Criterion | How to satisfy the criterion (Method) | How it is achieved in the study |
| :---: | :---: | :---: |
|  |  | agreed with the CIO. Where there is a match, it is a point of triangulation. Where there is not, it is viewed as a "negative case". |
|  | Negative case: 'A search of the data looking for contradictory evidence, and a procedure that is closely related to triangulation'. (Creswell and Miller, 2000) | Four suspected negative cases, where the Standards Grid constructs could not be mapped straight-forwardly to the themes identified from the interview data, were identified and investigated. On close inspection each case added to the richness of description and were not disconfirming of it. The four cases were: Balance of portfolio FO/BO; Attract and retain the right skills; Be attractive to franchisees; Build a sustainable family practice. |
| Dependability (Reliability) | Audit trail: <br> 'Providing a means for an observer to make out how a researcher arrived that their interpretation' (Ryan-Nicholls and Will, 2009). | NVivo was used to organise and analyse the data (transcripts and codes) which can enhance the rigour of the research by providing a comprehensive 'trail' of decisions made during data collection and analysis (Houghton et al., 2013). The use of data driven descriptive codes helps in this process as the linkage between the text and coding is more direct and hence clear to see. |
|  | Reflexivity: Researcher 'Selfawareness' of their role in the study and providing a 'means for a researcher to acknowledge and integrate their personal experiences into their research'. (Lamb and Huttlinger, 1989) (Creswell (2009), p190-192, Patton (2001), p.65) | In order to acknowledge and integrate personal experiences into the research (Lamb and Huttlinger, 1989) a reflexive log was maintained as part of the DBA learning log. The reflexive log records the researcher's thoughts from the lengthy interviews where the funnel questions were asked, and where the personal Rep Grids were elicited. It also captures more general learnings and certain interactions with the CIO and his team. |
|  | Low inference descriptors: | This is not a criterion that is cited in this context as it is a reliability measure that is applied to a case study as a whole. |


| Criterion | How to satisfy the criterion <br> (Method) | How it is achieved in the study |
| :--- | :--- | :--- |
|  | 'Findings that contain little <br> researcher summarisation of the <br> data' (Gibbert and Ruigrok, 2010). | However, it would appear applicable to <br> this exercise. The use of descriptive <br> codes and more readily identifiable <br> connection to the text reduces the <br> extent of interpretive summarisation. <br> This reduces the reader's reliance of the <br> researcher's depiction of events. |
| Transferability <br> (Ext Validity) |  | As thematic analysis is highly contextual, <br> transferability is not a criterion normally <br> sought. It is not for example listed as a <br> relevant social construction / <br> constructivist criterion by (Patton (2001), <br> p544) or by any of the authors cited in <br> the Thematic Analysis Chapter. |

### 3.7 Method Review

Table 16 is intended to provide a simple mapping of the research question to the method to demonstrate how it attempts to gather the data required to address the research aim.
Table 16: Research question to method mapping
$\left.\begin{array}{|l|l|}\hline \text { Research Questions } & \text { How the method addresses the question } \\ \hline \begin{array}{l}\text { Can a CIO identify the key stakeholders } \\ \text { involved in IT investment decision making? }\end{array} & \begin{array}{l}\text { Decision makers and key influencers are } \\ \text { identified through purposeful sampling by the } \\ \text { CIO. Investments considered are taken from } \\ \text { across the IT portfolio through a mapping } \\ \text { process. }\end{array} \\ \hline \begin{array}{l}\text { Assuming the stakeholders can be identified, } \\ \text { can their mental models regarding IT } \\ \text { effectiveness be captured? }\end{array} & \begin{array}{l}\text { Individual Rep Grids are used to capture } \\ \text { personal decision constructs. These are then }\end{array} \\ \text { used to create a Standard Grid that can be } \\ \text { used to compare each stakeholder's mental } \\ \text { model to that of the CIO's. A thematic } \\ \text { analysis of a semi structured interview is used } \\ \text { as a form of triangulation. }\end{array}\right\}$

## Chapter 3

## Research Questions

## How the method addresses the question

From the analysis, is it possible to create an action plan of 'practical adequacy' (Kanellis et al., 1999) designed to reduce stakeholder cognitive diversity.

The production of an action plan with the ClO that is based on the analysis of the heat maps and on which the ClO is willing to act.

## 4. Developing the personal Repertory Grids for this case study

### 4.1 Repertory Grid design considerations

Figures 7 and 8 in the previous chapter outline the process and analysis stages involving Rep Grids that are intended to result in a workable action plan. This section sets out in more detail the steps taken to develop the personal Rep Grids used as the basis for this study. It references the use of Standard Grids but their development is not described until the next chapter. Table 17 acts as an overall summary of the sections that follow.

Table 17: Steps taken developing the Personal Rep Grid

| Grid Component | Steps Taken | Output |
| :---: | :---: | :---: |
| Elements | - Pre-work using secondary data to understand the past and present IS portfolio <br> - Investments are elicited from each participant and plotted on an investment map. | The capture of a number of investments, that are within each participant's range of convenience, and which provide good coverage of investment types from across the portfolio. |
| Constructs | - The triadic method, in conjunction with laddering, is used to elicit each participant's constructs based on the elements they have provided. | An arguably cognitively demanding task that captures the cognitive structures regarding IT effectiveness of each participant in the most straight-forward yet comprehensive way. |
| Linkages | - Rating scale 1-5 is used to link constructs to elements. <br> - Synopsis map used to check outer ratings assigned. | An indication as to the strength of each construct that each participant applies to the investments they have chosen. |

### 4.1.1 Element selection

There are four main strategies for selecting elements: They can be supplied by the researcher, or elicited from researcher provided groupings, through a free response or through questions and discussion (Stewart et al., 1981, Easterby-Smith, 1980a). The focus of this study is on technology
investments where ideally the participating stakeholder has been directly involved in the decision making; and for investments where they may not have been directly involved there is a degree of understanding and familiarity sufficient for them to take a view on an investment decision.

Regardless of how the elements are selected they should have the following characteristics. They must be (Fransella and Bannister, 1977, Stewart et al., 1981, Tan and Hunter, 2002, Easterby-Smith, 1980a):
(a) Representative of the domain being examined and not evaluative.
(b) Discrete and as specific as possible and not subsets of each other
(c) Within the respondent's 'range of convenience' of the constructs, i.e. the constructs to do with decisions must be applicable / have relevance to the elements selected.
(d) Homogeneous, i.e. 'all of a kind' (Jankowicz (2004), p29) or if heterogeneous they should fall within the participant's 'range of convenience' (Davis and Hufnagel, 2007)

Reasons offered for supplying elements include: There is a particular domain item that the researcher has a specific interest in learning a respondent's view (Stewart et al. (1981), p33); It helps create a Standard Grid which is useful if comparing across grids (Catania and Randall (2015), p105) or if the researcher is letting a theory guide the selection (Tan and Hunter, 2002).

This study proposes that, to the extent that the element selection criteria can be met, the personal Rep Grid elements will be elicited. This is based on the view that in Kelly's original clinical context, elements would be elicited from a participant (Stewart et al., 1981) and that eliciting elements reduces observer bias or imposition of direction (Stewart et al. (1981), Catania and Randall (2015), p105). It is also reasonable to assume that senior executives will engage with IT in different ways which means that, in a team context, some elements will likely be specific to an individual team member (Eden and Jones, 1984). The exception to this is where each individual is asked to consider an "Ideal" investment that they would most positively associate with IT effectiveness. Adding an imaginary or real Ideal element helps overcome a perceived weakness of Rep Grids by capturing what the stakeholders are
expecting and require from an IT investment both now and in the future (Curtis et al., (2008), p39). An element of this nature is said to be 'supplied'.

### 4.1.2 Construct selection

Constructs too can be suppled or elicited (Tan and Hunter, 2002), though findings generally support the idea that elicited constructs are more meaningful (Fransella and Bannister (1977), p106). While it is less common to supply constructs it can be helpful especially when combined with supplied elements, and where the study's focus is on comparing grids (Siau et al., 2010). Supplying constructs is sometimes seen as vital in clinical and educational fields (Fransella and Bannister (1977), p19) and can be seen in some IS studies (Latta and Swigger, 1992, Tan and Gallupe, 2006). For this study the constructs will be elicited with one exception. Every Rep Grid will be supplied with the construct "Overall more effective - Overall less effective". This is the focus of the study and will later be seen to be helpful as part of a Honey analysis (see section 6.2.1).

There are three main ways to elicit constructs (Tan and Hunter, 2002):

1) Triadic or dyadic sort method, sometimes referred to as the "minimum context form". Using this classical approach, the participant is asked how two elements are similar in some manner yet different to a third element (Triadic); or how two elements differ from each other (Dyadic).
2) Full context form. For this approach, all the elements are set out before the participant who are then asked to arrange them into various groups based on some criterion of their choosing and then assign the groups a short description. Alternatively, a question may be asked such as "in the context of the research question, how do any of these investments differ from any of the others" (Hair et al., 2009).
3) Group construct elicitation. With this method, all participants in the research first undergo a process to ensure the elements taken forward have meaning to all participants. Then, as a group, the researcher facilitates a group version of a minimum context form approach.

Laddering is a technique used in the elicitation process as a way of getting the respondent to elaborate on or clarify an elicited construct. By asking probing "why" and "how" questions, the researcher seeks to either break a large constructs into smaller component constructs or get under the skin of constructs to find out what is really important to the participant (Stewart et al. (1981), p23). Often referred to as "laddering up" and "laddering down", some authors talk about laddering as asking qualifying questions through 'different types of camera lens' (Fransella and Bannister (1977), p16). An elaboration of this metaphor might be to think of laddering as asking questions that allow the researcher to zoom in or out on a construct in order to gain the level of granularity required.

### 4.1.3 Element-Construct Linkage Mechanism

According to Siau et al. (2010), linking mechanisms can be created in three ways:
(a) Dichotomising, where the elements are marked by the participant depending on which pole of a bipolar construct is construed as being best associated with an element.
(b) Ranking, where the participant force ranks the elements between the poles of a construct, and
(c) Rating, where the participant scores an element on a predefined numerical scale to indicate the strength of the relationship between the construct and element.

Where a Rep Grid is used purely to identify constructs for onward use in a survey tool, for example, the linkages are not necessary.

The choice of elements, construct generation and linkage mechanisms depends on what you want from a grid. The choices proposed for this study are discussed in the sections that immediately follow.

### 4.2 Eliciting the Elements

Elements need to represent the domain being considered. Therefore, in this study the elements are IT projects/activities found in an IT portfolio. To
achieve this a mixed strategy adapted from one outlined by Stewart et al. (1981), p35, was adopted. This comprises 4 steps:

Step 1: Develop an investment map (A pre-interview activity)
An investment map (Peters, 1988) is a simple way to visually present the projects in a portfolio and can be used in studies where there is an interest to understand how well IS investments align to business strategy (Renkema and Berghout, 1997). The investment map devised by Peters (1988), with some suggested themes to help explain, is shown in Figure 9. Programmes of work or expansive projects can span more than one cell on the grid.


Figure 9: Annotated Investment map based on Peters (1988)
Working with the CIO's team, secondary data was used to develop an investment map for the firm. This data comprised working documents used to generate the operating plans for the last three years, materials detailing the Board strategy and the implications for IT, and recent annual reports. To the extent that the data allowed, an investment map for the current and previous two years operating plan was created. These three years represent a de-facto multi-year IT strategy (realised and intended), should it prove necessary to prompt participants later when eliciting projects.

Step 2: Identify "front of mind" elements using eliciting questions
Each participant (decision maker) in their individual interviews is asked to identify investments from across an IT portfolio, past and present, that they
consider have shaped their view as to the effectiveness of IT. These perceptions will be shaped by the decision makers experiences within their current firm and other external/previous factors and experiences. Requesting a type of activity, such as an investment activity, is a common technique for eliciting elements that cover the range of interest to a study, for example Hisrich and Jankowicz (1990) and Whyte and Bytheway (1996).

To cover this objective a series of questions were used, the exact nature of which being dependent on the participant's response:

Can you recall an IT investment(s) within your firm with which you're familiar that is important in shaping your view of IT effectiveness, favourably and unfavourably? (Easterby-Smith (1980), p.4).

Depending on the response, further questions acted as prompts:

1. Can you recall an investment(s) that you are in the process of making a decision upon?

An implication of the PCT fundamental postulate underlying the Rep Grid technique is that individuals are more focused on the future (Easterby-Smith, 1980b). When combined with the experience and choice corollaries the conclusion is that a good mental model is one that has good predictive powers. Comparing the CIO's and participant's construct ratings for planned activities, i.e. investments may provide an opportunity for a timely dialogue as part of an action plan.
2. Can you recall an IT investment(s) from the past with which you're familiar that has been important in shaping your view IT effectiveness, favourably and/or unfavourably?

Where the company is recently established or where the participant has been recently employed by the company, the past experiences of the participant will be used. This question draws on PCT and the individuality, choice and experience corollaries: Participants will


#### Abstract

differ from each other in their construction of events; they will choose that alternative in the dichotomised construct that best anticipates events; and their construct system will have been refined over time. Where a lack of company history or time in the company exists, perceptions gained from previous experiences will have importance to the participant when making decisions in their current firm.


3. If nothing is forthcoming, the investment map generated prior to the interviews can be used as a contextual prompt. Though not required for this study there are examples where scholars have indicated areas for the participant to consider, for example:

Can you recall an investment(s) that has or will have (a) strategic value, such as business expansion (b) informational value or helped manage perceived risks or (c) transactional value, for example productivity/efficiency improvements (Mirani and Lederer, 1998)?

The study does not aim to gain a respondent's perspective as to the benefit of the projects per se and therefore there are no questions that aim to directly elicit investment projects that the participant believes were "successful" or delivered large benefits. Explaining IS success (and failure) is a complex task (Kanellis et al., 1999), and is not the immediate focus of this study. Similarly, investment benefits as a measure has been specifically de-emphasised. This is because benefits are seen by some as being near impossible to quantify due to their often intangible nature and the related inability to provide an accurate financial evaluation (Stamoulis et al., 2002).

Step 3: Plot the respondent's elements on the investment map Explain the investment map and, with the respondent, plot the elicited projects. This identifies the domain range instinctively covered by the respondent and can be used as a guide to their immediate focus of engagement.

The aim however is to capture activities that cover the range of the IT portfolio as this better allows the participants' cognitive structure of the overall IT domain to be explored. Crudely this could be thought of as aiming for at least one example covering each investment orientation (i.e. a front office, back office and infrastructure project). Where this this did not naturally occur, the process continued to step 4.

The participant was also asked how they expected the overall IT portfolio budget to be distributed and what they believed was a realistic ideal distribution. This was intended to give an indication of the difference between the participants' estimated actual and realistic ideal. The intention is then to compare it with the actual distribution. This is an adaptation of the approach used by Peters (1988) to highlight the differences in business and IT focus.

## Step 4: Respondent consideration of suggested areas and projects

This step could be invoked where a participant's elicited elements gave poor coverage of the investment domain. In practice, most respondents had example investments in each of the orientation columns. The main exception to this was the CMO who tended to engaged only in market facing investments. This was not challenged for the purposes of eliciting constructs when developing his personal grid as 'rough coverage' will do (Stewart et al. (1981), p29); and the researcher had a high degree of confidence that over all participants there would be good coverage. This proved to be the case as will be seen later when the Standard Grid is developed. The Standard Grid asks all participants to consider investments across the portfolio but care is taken to ensure that they all fall within the participants range of convenience. The rationale for asking a functional executive decision maker to consider an investment type that they can understand but for which they may not have been directly involved in the decision making is to explore (a) whether such investments can still materially influence the participant's perception of IT effectiveness, and (b) develop an insight into the range of IT cognition and domain knowledge.

For the personal Rep Grids a minimum of six elements was targeted as this number should ensure that sensible constructs can be produced (Boyle, 2005). To avoid the overall grid size becoming too large and interviews becoming too
time consuming, Lemke et al. (2011) suggests no more than ten elements are used. This is the number of previously elicited elements used later in the Standard Grid.

### 4.3 Eliciting Constructs

Given the definition that constructs are the dimensions that a stakeholder uses to interpret the elements, gaining an understanding of construct ratings across stakeholders is important to the research aim. As supplied constructs will not reveal an individual's personal constructs, and hence their interpretation and sensemaking mechanism, constructs in this study are elicited. Additionally, where constructs are elicited it means that the person's cognitive structure is not biased by the researcher's perspective of the situation (Siau et al., 2010). In line with the research aim, a minimum context form elicitation is proposed as this method centres on stakeholders as individuals. It discovers how a stakeholder perceives IT investment decisions as opposed to confirming how the researcher understands them (Curtis et al., 2008). A triadic method is proposed on the assumption that stakeholders will not find this too complex a cognitive task (Fransella and Bannister (1977), p16). Saturation, the point where no further constructs are forthcoming from the participant, is often reached using 7 to 10 triads (Tan and Hunter, 2002). Triads are generally believed to elicit constructs, or more accurately construct poles, that are more cognitively complex compared with dyads (Curtis et al., 2008). This is because with triadic process requires a similarity to be found between two elements and then state the difference between this pairing and a third element; whereas a dyadic process simply identifies a difference between two elements. In the same vein more complex constructs are derived when elicited as differences as opposed to opposites (Neimeyer et al., 2005). These differences or contrasts are sometimes referred to as psychological opposites or opposites in meaning and are preferred to logical opposites (Eden and Jones, 1984, Easterby-Smith, 1980a). This preferred approach to eliciting construct poles was adopted for the study. Following the difference method, Rogers and Ryals (2007) suggest that more value based constructs, as oppose to descriptive, are elicited by asking "in what ways do you like these
[investments] and in what ways do you dislike them [with respect to delivering IT effectiveness]".

A less common method proposed for eliciting constructs is the Contrast method ${ }^{9}$. The method name should not be confused with or associated with the previous comments regarding contrasting poles elicited through the difference method. Neimeyer et al. (2005) believe this approach to have the advantages of the difference and opposite methods without the disadvantages. They claim it reduces the likelihood of "bent" constructs ${ }^{10}$ that can arise. In so doing, they posit that the contrast method is more faithful to the original Kelly concept of bipolar constructs. However, a downside is that there may not be a triad that in the eyes of the participant exactly fits the elicited bipolar. Overall this method was judged as being more confusing for a participant and of less use should a Rep Grid interview be interrupted part way through. Consequently, it was not used for this study.

Group elicitation is also a possible option, taking care to ensure that the elements are within the range of convenience for all participants. This approach is good for team building and is likely to be more time efficient (Tan and Hunter, 2002). Given that a research objective is to help develop an action plan for the technology leader, a team element for the study has its attractions. However, this approach does not elicit personal constructs and may be impacted by other group dynamics. For this reason, it is not the approach taken.

When eliciting constructs the participant needs to be provided with some context (Davis et al., 2009). For this study, the preamble to the triad question would be along the lines of: We are trying to understand what it is that makes you feel that an IT investment will be effective. The question will then be asked: "When making an investment decision, in what way do you feel that

[^8]two of these investments are / lead to an effective IT investment in a way that the third is / would not". To avoid repetitive phraseology as the triad process continues, and drawing on the Individuality corollary, alternative ways to express this might be: "What is similar about two of these elements that is different to the third in terms of how you anticipate which activities will secure an effective IT portfolio" or, "What influences your investment decision when predicting what will result in effective $I T^{\prime \prime}$.

### 4.3.1 Selecting the Linkage mechanism

It is possible to use the Rep Grid technique as a form of semi structured interview without a need for linking elements to constructs (Siau et al., 2010, Huang et al., 2008); or in this study if the only objective was to identify constructs contributing to the Standard Grid. However, obtaining ratings for the personal Rep Grids facilitates a better understanding of the individual participants and helps the participants' understanding of the overall process.

There are three main ways in which elements and constructs can be linked (Curtis et al., 2008, Tan and Hunter, 2002). According to Tan and Hunter (2002), rating is the most often employed method and Curtis et al. (2008) contend that on balance it is the best option.

Ratings give the participant a degree of discrimination (Davis and Hufnagel, 2007) that can be used to indicate the strength to which a construct might apply to an element, in other words its importance (Siau et al., 2010, Schmidt and Rosenkranz, 2015). Seven point scales are seen as being on the limit of people's ability to discriminate, and five point scales are easier to analyse visually (Stewart et al. (1981), p42). Because the intention of this study is, like Kelly, to engage the participant in interpreting the grid (Stewart et al. (1981), p5), and later collaborate with the CIO when categorising respondents' constructs; the simpler 5 point scale is proposed (Davis and Hufnagel, 2007). In rating the Rep Grid, the participants were asked to provide construct ratings in a row-wise manner. This results in fewer midpoint ratings (Fassin et al., 2015) and helps combat the problem of the 'vagueness of the midpoint' (Eden and Jones, 1984). Lemke et al. (2011) develop this point and suggests that participants should be asked to rate all the elements with the construct just elicited, and repeat this process after each newly

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elicited construct. This was done to a point, but not slavishly if the interview conditions dictated otherwise.

## 5. Case Study Stage 1 data collection and analysis

### 5.1 Introduction to the case

The researcher's network was used to identify a number of companies that may be interested in being a case study for this research, and approaches were made to a number of CIOs. However, gaining access to a company's complete senior management team in order to explore their cognitive differences regarding IT investment effectiveness was found to be challenging. This is not an unusual finding (AlQuatani (2014), p67). The main challenge being that, while the CIOs understood and were interested in the research, there was a degree of caution around making further demands on TMT members' time on a topic that is not directly focused on resolving a current issue. Also, the CIO, as someone closely associated with IT investments, almost certainly considers the potential personal impact arising from the output of such research.

Fortunately, one company CIO was prepared to both sponsor the research into their company and engage almost immediately. Other CIOs have since expressed an interest but not in time to meet the timescales and resources required to be included in this particular study.

The case study is being conducted within a (Master) Regional Franchise Operator (RFO) of a large listed retailing business. The RFO, which has responsibility for the UK and European markets, is based in the UK, which is their dominant market. The study engages all members of the TMT and two influential franchisees who sit on operating and advisory boards of the RFO. These franchisees are referred to by the RFO as a medium sized franchisee and a large sized franchisee. The RFO often reference franchisees in terms of their scale, both in terms sales and numbers of outlets. However, due to confidentiality, such information for the franchisees and that of the RFO cannot be included as part of this thesis.

The RFO has a relatively complex IT estate upon which the firm is dependant. The complexity primarily arises from the fast moving and innovative nature of their use of technology, the breadth of systems (both in terms of technologies employed and the range of business processes covered), the geographically
distributed nature of their systems and the relationship they require with their franchisees. This last point is of particular interest as not all the IT investment stakeholders or recipients of systems are employees of the firm, some are franchisees. Furthermore, in addition to the systems developed by the RFO for franchisee use, the larger franchisees in particular will invest in their own systems to help them run their business. Ideally a holistic systems strategy across the RFO and franchisees is required. This dynamic potentially makes IT investment decision making more challenging as different views will very likely be taken by the operator and franchisees.

Given the exploratory research aim and idiographic nature of the study, a single case study is used. This approach supports the highly contextual and deep understanding (Tyler and Gnyawali, 2009) desired from this study. It may also be considered as a representative case study in that it provides a concrete example of investment decision making which is a common scenario found in many companies, and is a suitable context for addressing the research question (Bryman (2012), p70).

For this study purposeful sampling was used. The CIO identified the actors from within the regional operator's senior management team ( $n=8$ ) and franchisees ( $n=2$ ) who are engaged in the IT investment decision making process. All of the participants have an in-depth knowledge and experience of their domains. The researcher has nearly 30 years of experience in IT management and advisory services and is working closely with the practiced and knowledgeable CIO of the firm.

As will be discussed in Chapter 6, during the study there were three changes to the composition of the management team, providing a reminder of the dynamic nature of businesses. For stage 1 the available management team comprised 6 members. By stage 2 this number had increased to 8 as two new members were recruited/became available to interview, and one of the original team members had been replaced following a reorganisation.

### 5.2 Participant selection and stage 1 preparation

During a preparatory meeting with the CIO, purposeful sampling was used to select participants that the CIO believed were best positioned to answer the
research question (Saunders (2011), p287, El-Telbany and Elragal (2014)). A CIO selecting a relatively small number of key decision makers in this manner is considered to provide focus and does not introduce bias (Patton (2001), p230). The CIO selected all the senior management team and, in line with Xue et al. (2008), extended this to two key influencers who in this case were franchisees. The owner of the medium sized franchise represents franchisees' interests on the RFO's Technology Advisory Board. This Board, chaired by the CIO, reviews technology trends and shapes the future direction of IT within the firm. The large sized franchisee, sits on the RFO's operations and marketing committees. These committees are chaired by the respective senior functional executive.

The participants in this study are all senior members of the organisation who have in depth experience and a high degree of competence in their field; and frequently worked with members of the IT function. Consequently, even the relatively small sample size can yield extremely accurate information (Schmidt and Rosenkranz, 2015). In the context of Rep Grids, they refer to four participants, though others, such as Siau et al. (2010) also in the context of Rep Grids, refer to ten participants. Given the homogeneous nature of the sample group and that it represents the entire TMT, this approach should yield accurate results.

Prior to the interview each participant was sent information that is required/approved by the University's ethics committee. This provided background information to the study (Appendix 1) and a consent form (Appendix 2). The latter was signed ahead of the first meeting and gives permission for data collected from the study to be shared with the CIO. Additionally, each participant was sent some questions in advance of the first meeting and asked to think about/prepare a summary level response. These questions are intended to (a) help get the participant focused on the meeting topic (b) start to paint a picture as to how they construe their business and the role of IT, and (c) get them thinking in advance about a selection of IT investments/activities from the IT portfolio. The questions and rationale are shown in Table 18.

## Chapter 5

Table 18: Questions sent to participants in advance of the first interview

## Question / Rationale

- What do you think the rationale and motivations are for your corporate strategy?

In part this question starts to understand a specific participant's perspective of their business.

- What do you think the role of IT is for your company?

How a participant interprets the corporate strategy will influence the role they see for IT.

## Reference base

Ambrosini and Bowman (2003) list 7 main rationales for corporate strategies: Portfolio planning, synergy, core competence, sticking to the knitting, growth, survival and reducing risk. Based on the work of Hambrick and Mason (1984) they suggest that managers' perceptions drive the firm's strategic direction and their perception of the strategy influences how they behave. For example, TMT members can act as a 'barons' (Hambrick, 2007) with their actions being more self-serving rather than being in the collective interest of the team/firm; and this can extend to middle management (Guth and MacMillan, 1986) More generally stakeholders may exploit situations to benefit themselves and/or limit value to others (Pouloudi et al., 2016)
Sabherwal and Chan (2001) adopt Miles and Snow's (1978) classification and suggest that alignment is more critical to business success in Prospector and Analyser companies as opposed to Defender companies. CEOs/CIOs and by extension TMT members can view IT's role and contribution in different ways (Johnson and Lederer, 2013, Johnson and Lederer, 2010), in part depending on the nature of the corporate strategy. Reporting lines (Banker et al., 2010) and support for CIOs (Jarvenpaa and Ives, 1991) can vary as a consequence.

- What do you seek from an expenditure on IT activity?

Anticipated to add more detail to the above question and possibly a sense of what is important to them personally.

- What does IT effectiveness mean to you?

Engages the participant in thinking about concepts that are likely relate to constructs - to be later captured through a Rep Grid.

A stakeholder's assessment of IT service delivery can vary considerably within an organisation (Worrall, 1998). An interesting finding in that study was the gap analysis that exposed the significant gap across a range of factors as to what stakeholders considered to be important to IT strategic success and their (under) performance on those factors.

## Question / Rationale

- Overall, how effective do you think IT is in your company?

A link and overall sense check of the supplied construct used later in the Rep Grid

- Can you select 6 investments/activities from across the IT portfolio that have shaped your view of IT effectiveness within this firm, both favourably and/or unfavourably.


## Reference base

IT effectiveness is an outcome of alignment (Avison et al., 2004) and is associate with improved firm performance (Chan et al., 1997). For this study the construct "Overall more effective - Overall less effective" will be supplied. It will be used as part of a Honey analysis, explained in Section 6.2.1.
The answer to this will be used as the starting point for the discussion on the Rep Grid elements.

These questions also create the basis of a semi structured interview that later will be used as a way to corroborate the output from the Rep Grid exercise, a process that will be referred to as triangulation.

To assist the researcher with contextualising and understanding of participants' responses to the above questions, secondary data sources were reviewed prior to the interview and a high-level linkage diagram was drawn. A linkage diagram, Figure 10, is a simple visualisation that outlines the main goals of the firm, the intended IT contribution for the achievement of these goals and the anticipated value of their attainment. The colour coding running horizontally in the figure is intended to help highlight the focus being placed on (1) Product, (2) Franchise network, (3) Operations and (4) Engaged staff respectively. This diagram was agreed with the CIO as reflecting a sensible high-level corporate perspective. In essence this is a simple visual representation of the intellectual dimension of alignment.

Chapter 5


Figure 10: Business/IT Linkage diagram - Adapted and genericised to preserve anonymity

### 5.3 Stage 1 interview - Data collection

The steps taken for stage 1 interviews are set out in Table 19. The Rep Grid process can take from as little as 45 minutes (Siau et al., 2010) to as long as 1.5-2.5 hours (Schmidt and Rosenkranz, 2015). For planning purposes, a duration of 90 minutes was used (Tan and Gallupe, 2006, Curtis et al., 2008, Whyte and Bytheway, 1996). Though some interviews were completed in this time, 2 hours was a more comfortable/typical timescale. However, one interview extended to 3.5 hours.

Table 19: Stage 1 interview plan

| Time | Step \& Purpose | Focus |
| :---: | :---: | :---: |
| $\begin{gathered} 5 \\ \text { mins } \end{gathered}$ | 1. Introduction: <br> Secure understanding and ownership for the study | - Overview of the raison d'etre and value of the study <br> - The approach and timescales planned <br> - The importance of their role and support <br> - Permission to audio record conversation |
| $\begin{gathered} 20 \\ \text { mins } \end{gathered}$ | 2. Participant Perspective: <br> Engage the participant in a "warm up" conversation | - Participant intro and background summary <br> - Responses to the questions as set out in Table 18 |
| $\begin{gathered} 10 \\ \text { mins } \end{gathered}$ | 3. Identify Rep Grid elements: Introduce Rep Grids and start the process | - Brief explanation of PCT and Rep Grids <br> - Elicitation and plotting of the elements on the Peters (1988) investment map |


| Time | Step \& Purpose | Focus |
| :---: | :---: | :---: |
|  |  | - If needed, prompt then suggest elements from the pre-populated maps |
| $\begin{gathered} 50 \\ \text { mins } \end{gathered}$ | 4. Elicit Rep Grid constructs: <br> Elicit construct and ratings | - Elicit constructs, supported by laddering <br> - Discussion to clarify / gain rich descriptions of constructs <br> - Rating of constructs to elements <br> - Present back the outputs of the Rep Grid exercise. After the meeting a documented summary is sent to the participant. |
| 5 mins | 5. Close: <br> Maintain commitment and support to next steps | - Outline next steps of the process and overall study communications plan <br> - Target timeframe for next meeting <br> - Re-iterate the importance of their continued support |

Towards the end of the Rep Grid exercise but during the interview three additional actions were taken. Firstly, the participants were asked to rank the constructs in order of importance to them. This activity very loosely resembles that associated with developing what is referred to as a "Resistance to Change" Grid. (If undertaken in full, such a grid would rank the constructs in the order that a participant would be most reluctant to switch from the preferred to the un-preferred side of a construct (Fransella and Bannister (1977), p45)). The purpose here is not to develop a Resistance to Change Grid but to encourage the participants to reflect on the constructs they've provided, and act as a sense check. Secondly, a synopsis analysis was conducted to ensure that all constructs had a score marking the extremes of the rating, (Alexander et al., 2010), in this exercise a score between 1 and 5. And thirdly, a cluster analysis was produced and displayed to check how well the elements are being differentiated and the degree to which constructs are specific/unique (i.e. to avoid what later may be considered as repetitious). An example of this is provided in Appendix 4 (interview feedback form). These two analyses were done during the interview with each participant as the software enabled this form of real time feedback. Any anomalies were discussed and actioned.

Following the meeting each stakeholder was sent a summary analysis of the Rep Grid data they produced, Appendix 4. During the Rep Grid exercise
construct descriptions are captured in the form of a pithy statement with such statements being displayed on a screen in real time so as to maintain the flow of the interview and the participant's engagement. These interpretations, whilst adequate for the immediate purposes of the grid interview, on occasion, do not capture the most precise short expression of what was actually said. Consequently, following the interview a transcript of each meeting is reviewed. Where necessary specific constructs are considered carefully and re-phrased slightly so as to better capture the participant's description and actual words. By allowing the researcher more time to consider the best expression for the construct, the aim is to create more accurate constructs. A copy of the transcript and suggested re-wording is sent to the participant. No participant raised an objection to any re-wording, and this was re-confirmed with each participant at the start of the second interview. This step is not normally reported in accounts of Rep Grid exercises but it is consistent with the interpretive nature of the activity and arguably strengthens the precision of specific constructs.

### 5.4 Stage 1 Analysis: Creating the Standard Grid

The stage 1 analysis focused on the generation of the Standard Grid and the mapping of the constructs from that grid to a respected alignment model. Additionally, a thematic analysis was conducted of the initial set questions. As part of the stage 2 analysis the Standard Grid constructs are mapped to these highly contextualised themes to form what will be termed a Governance Grid.

### 5.4.1 Outline of typical approaches taken

Altogether, across all participants, the stage 1 interviews generated a total of 76 constructs. Similar constructs were then grouped into categories. Table 20 refers to studies where this aggregation approach is used to generate a group perspective. Rojon et al. (2019), table 1, more generally set out a high-level classification of group level analytical aggregation approaches, one of which, termed generic content analysis, most closely describes the approach adopted in this study. Such an approach is justified as it is in keeping with a grounded theory approach (Cassell and Walsh (2004), p65). Categorisation is a form of content analysis where at some stage the researcher's judgement will be required (Rogers and Ryals, 2007), meaning that there will always be an
interpretive step in the process. Table 20 shows two forms of categorisation. The first is labelled grounded, where the themes emerge from the data, and the second is labelled model aligned where the constructs are aligned to themes defined by a relevant model. This study uses a combination of both. As will be become clear, the model approach was initially taken as it was thought it may be instructive in any forward action planning. However, the level of granularity sought was not possible using this approach and a more grounded approach was then taken to achieve this aim. It proved valuable as the grounded approach rarely combined constructs from across different model categories, thereby providing a degree of comfort in the initial model categorisation.

The last part of Table 20 provides further examples of the use of Standard Grids but where the categorisation process is not described.

Table 20: Examples of approaches taken to multi-grid aggregation (date ordered)

$\left.$| Approach / Reference | Outline Description / Comment |
| :--- | :--- |
| Grounded |  |$\quad$| Hisrich and Jankowicz |
| :--- |
| (1990) |
| VC decision making |
| content analysis performed together with individual grid Cluster |
| Analysis/PCA (axes labelled) to generate a group perspective. | \right\rvert\, | Hunter (1993) |
| :--- | :--- |
| Excellent systems |
| analysts |$\quad$| Research revealed 2727 constructs. A form of FOCUS program was |
| :--- |
| used to identify 12 themes. |

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Approach / Reference Outline Description / Comment

| Investigating gender bias for international assignments. | participants compared to Schein's Descriptive index (a 92 point inventory). |
| :---: | :---: |
| Cron et al. (2014) <br> Perceptions of sales performance to shape sales strategy. | 971 constructs elicited. Experts identified 37 construct lexicon categories, assigned the 971 constructs to them / confirmed with participants, and aligned them to Newbert's Resource Based Theory categories of resource. Ratings are calculated at the group level (performance indicators) but no detail on the calculation steps are provided. |
| Schmidt and Rosenkranz (2015) Investigation of IT outsource relationship quality | 273 constructs reduced to 104 through comparison/interpretation by experts initially working independently. Categorised further based on IT Outsource relationship model. Reliance on content analysis and expert interpretation. |
| Tan and Gallupe (2006) <br> Assess the shared understanding of alignment amongst IS/Business Execs | 15 factors enabling/inhibiting alignment were developed from a review of the IT/Business alignment literature. These factors were used as the supplied constructs in a standard grid. <br> [Strictly speaking this is not model aligned but the literature references provide a basis for alignment that is very similar to a model]. |
| Standard Grids |  |
| Armstrong and Eden (1979) <br> How local authority managers assess \& report on situations | A focus group of 4 people from a group of 11 participants were used to generate a standard collection of constructs that formed a standard grid used in an implications grid exercise. A simplified form of PCA was developed to help explain the results. |
| Rad et al. (2013) <br> How Loan Officers assess requests | Standard grid completed by 75 Loan officers. Multigrid software calculated a mean grid as if it were from a single person, citing Fällman (2003). PCA performed on mean grid and axes "interpreted" (assumed as meaning the axes were labelled). |

To support Table 20, a short commentary of the main categorisation techniques used to form a construct group view follows. Broadly speaking the categorisation process to derive a standard construct grid can be accomplished in three ways with this study adopting a combination of the first and last approach:

1. A "bootstrapping" approach where the researcher examines the constructs and places them into groups, assigning the groups a category name. The process is repeated by the CIO as another and
central expert. The researcher's and CIO's views are compared and through negotiation an agreement is reached on the classifications. Jankowicz (2005b), p163 suggests that once the discussion on classifications have taken place, and if there are still some minor discrepancies between scores, then the researcher should proceed with their categorisation. In this study the CIO's classification is taken as this is a way of transferring ownership for the action planning that will result from it.
2. An approach claimed to be a statistical analysis of multi-participant data (and semantically blind) is outlined in Fallman and Waterworth (2005) and described in more detail in Fällman (2003). In their study the process involves creating a "super grid" of all (elicited) constructs and (supplied) elements and performing (a) two rounds of cluster analysis to identify similarly rated constructs (Fällman, 2003) that are then placed into a group, (b) An interpretive description for these groups following a further rep grid cluster analysis of the constructs forming the group, (c) Generation of a median rating from these newly formed groups for each construct/element combination, and (d) Review the resulting clustering and select the main groupings.

The authors claim that this process relies less on semantic interpretation as the clusters are used primarily to determine the groupings, but ultimately these groupings are interpreted by the researcher. Also, the descriptions need to be broad enough to cater for similarly rated but potentially dissimilar types of constructs which could prove to be challenging. For this study it is hoped that the (semantic) interpretation can be well informed as a consequence of the interview process design that includes a transcription and feedback. Importantly, any construct grouping needs to make sense to the CIO as an action plan will be formed on the basis of these interpretations.
3. A preconceived idea of a classification can be used based on the focus of the study. For this study Luftman's (2003) alignment model was adopted. Belfo and Sousa (2012) see this model as being the most
complete model on alignment, taking into account the multi-faceted nature of alignment. Why do this? Constructs indicate the way in which participants think about IT effectiveness - how they interpret it, make sense of it, and inform their decisions (Rogers and Ryals, 2007). Overlaid onto a model intended to assess the degree of alignment and by extension effectiveness of IT, provides a social dimension perspective of an overall alignment model most impacted by key stakeholder's perspectives (in a specific case study firm, at that time). The model can act as a guide to help secure business/IT alignment and realise the full value from any IT investment. It may also resonate with the CIO when forming an action plan and help contextualise any actions (and existing activity). In this sense it is a relevant and pragmatic approach.

### 5.4.2 Deriving the Standard Grid constructs: Construct categorisation

 The categorisation of all participant constructs elicited from the first round of interviews and the subsequent development of the Standard Grid constructs has been undertaken in the stages outlined below.As part of this activity the services of an independent expert were engaged to improve the accuracy and trustworthiness of the categorisation process (Yaniv (2004), Pattinson (2012), p78). This expert leads the global strategy division for a large consultancy and reports to the CEO. He has a 25-year track record of building and transforming Fortune-500 and SME companies, holds a number of Board advisory positions, is a Chartered Director, and is a published author.

An important aspect of the categorisation process is being able to assess the degree of agreement between those asked to perform the categorisation. This has been determined by calculating a Kappa score. This provides a measure that accounts for the probable level of agreement that could occur purely by chance (a fuller description and worked example is provided in Appendix 11). Perfect agreement returns a Kappa score of 1. Any Kappa score above 0.8 is viewed as a near perfect match, and any score above 0.6 is viewed as a substantial match (Landis and Koch, 1977).

The steps taken in the categorisation process are shown below with the resulting output being captured using an Excel spreadsheet. This spreadsheet
(a) records each person's categorisation choice for each construct from each meeting, (b) shows which categories were ultimately presented and then changed by the CIO, and (c) provides the data to calculate the inter-rater comparisons of the categorisations made by the researcher, independent expert and CIO. The references to columns in the listing below relate to the spreadsheet. This spreadsheet is too large to be shown in its entirety in an appendix, but a number of extracts from this spreadsheet has been provided in Appendix 7 to aid understanding. The steps taken are:

1. All elicited constructs from the first round interviews were printed onto card and the researcher mapped these to the Luftman (2003) alignment model - a highly regarded model (Belfo and Sousa, 2012). Separately, an independent expert mapped the constructs to the Luftman model. These mappings are shown in Columns C \& D of the spreadsheet. The inter-rater agreement was very high, Kappa score $=0.93$.
2. While it was possible for both raters to map the constructs to the model categories, neither the expert nor the researcher found it possible/meaningful to map the constructs to the Luftman model subcategories. We believed that this was because (a) the Luftman model was structure/process dominant in its construction and didn't lend itself to well to mapping measures that are being expressed through a cognitive lens, and to a lesser extent (b) the style of IT development/management has, since the model was developed, become more collaborative in nature and this is not sufficiently well captured in the model.
3. However, without prompting the independent expert intuitively started to create their own sub categories following a bootstrap technique (Column E).
4. As a separate exercise, the researcher then categorised all of the constructs using a bootstrap technique. The descriptions of these grouping where sensible adopted the same/similar sub category descriptions as created by the independent expert. These groupings were then mapped to the Luftman model (Columns I-L, S and T).
5. At a second meeting the independent expert was asked to review these groupings and model category mappings. A discussion ensued and a
final mapping and sub-categorization (grouping) was agreed, with the unresolved differences being noted (Column G). Additionally, the Standard Construct wording (Columns $X$ and $Y$ ) that captured the essence of the constructs contained in the sub-category was agreed.
6. The researcher then presented this mapping and sub-categorisation to the CIO. The CIO then made a number of category and sub category changes. These were noted (Columns N-Q). At a third meeting with the independent expert, the CIO's changes were presented and the expert asked if he wished to alter his view - which he did not.
7. Consequently, the lowest inter-rater agreement in this whole exercise was that between the independent expert and the CIO at the combined category / sub-category level. Even at this most granular level the Kappa score was 0.85 , which is sufficient for the CIO's categorisation to be taken forward. Taking the CIO's categorisation forward helps to transfer ownership of an important aspect of the research findings at this point.

### 5.4.3 Deriving the Standard Grid elements: Portfolio review

The Standard Grid elements were drawn from elements captured from the stage 1 interviews and were decided upon with the CIO. A number of the stage 1 elements were common across the participants, and hence represent investments directly known to all of them. These were taken forward for consideration together with others that, though not used by all, would in the CIO's view be known to all. This ensured that the Rep Grid range of convenience criteria for elements was met. These investments were then examined and a sample was selected that gave a meaningful coverage across the IT portfolio.

In collaboration with the CIO, these were mapped to the Peters (1988) model and are shown in Figure 11. While these investments are supplied, they are drawn from the outcome of an earlier elicitation process. Nine such investment projects were selected, with a tenth being the "Ideal" investment. A brief description of these investments is given in the analysis Chapter 7. It should be noted that these investments are a combination of past (Delivered), present (In Progress) and future (Future Demand) projects. Maybe intuitively it can be seen how PCT caters for past and present activities based on the
experience corollary, where a mental model based on past experience is shaping a person's construct system. As regards future demand, a good mental model is one that has good predictive capability (Kelly (1991), p11), and it is this aspect of a person's construct system that is being exercised by this part of the Rep Grid activity. Perceptions of potential future investments are extremely helpful to the CIO for planning purposes.

| 1 | Order/Delivery tracking |
| :--- | :--- |
| (Delivered) |  |
| $2 a$ | $\begin{array}{l}\text { New Web/Mobile Platform } \\ \text { (In progress) }\end{array}$ |
| 2 L | $\begin{array}{l}\text { New Web/Mobile App } \\ \text { (In progress) }\end{array}$ |
| 3 | $\begin{array}{l}\text { MIS and Reporting } \\ \text { (Delivered) }\end{array}$ |
| 4 | $\begin{array}{l}\text { ERP Platform } \\ \text { (Delivered) }\end{array}$ |
| 5 | $\begin{array}{l}\text { Automated Supply Ordering } \\ \text { (Future demand) }\end{array}$ |
| 6 | Cyber Security |
| (Future demand) |  |
| 7 | Customer Order Management |
| (In progress) |  |
| 8 | $\begin{array}{l}\text { W10/O365 upgrade } \\ \text { (Delivered) }\end{array}$ |



Figure 11: Portfolio mapping of Standard Grid elements

### 5.4.4 The Standard Grid used in this study

The output from the stage 1 analysis is a Standard Grid, Figure 12. This grid is used in stage 2 to develop a series of heat maps that can be used to create an action plan for the CIO. The grid shown has the Standard Constructs mapped to the Luftman model categories following the process outlined earlier. The "case study descriptor" was the heading that the independent expert instinctively created when he first grouped the constructs. As they appear to be good descriptors they were retained.

Constructs were mapped to four of the six Luftman model categories. No constructs were mapped to the categories of Skills or Communications. This is commented upon, along with a more general comment regarding the Luftman model, in section 8.4.


### 5.5 Thematic Analysis

Chapter 3 set out the rationale for a thematic analysis of the questions asked at the start of the first interview, and the steps taken to ensure its quality. This Chapter outlines the balance of the process set out by Vaismoradi et al (2013). The themes derived from this will be used to shape a Governance Grid that is comprised of a reduced set of the Standard Grid constructs aligned to the derived themes. This will be explained further in Chapter 6, but outlined below are the steps involved in deriving the themes for that grid.
a) Data familiarisation

All the participants' responses to the opening interview questions were first transcribed. This was achieved using a mix of Siri software and the AWS transcription service. Transcription is 'an interpretive act of "(re)-presenting" original oral language in written text form' and an important part of qualitative research (Bird, 2005) These transcripts were then read multiple times as part of the process of becoming 'immersed in the data' (Braun and Clarke, 2006), a process that allows ideas to be formed (Savin-Baden and Howell Major (2013), p440). To assist with the thematic analysis the software package Nvivo was used. NVivo is often referred to as Computer Assisted Qualitative Data Analysis Software (CAQDAS) package that can help a researcher to produce efficiently a high quality analysis of the data (Bringer et al., 2004). All participant transcripts were then imported into NVivo.
b) Generating Initial Codes

This is concerned with coding interesting features of the participants' responses contained in the transcribed interviews. A code can be a short phrase that captures the essence of these features (Miles et al. (2014), p72) and for this study use was made of descriptive codes, that draw on the actual language used in the text. These can also be referred to as 'inductive codes' (Savin-Baden and Howell Major (2013), p422) or 'data driven codes' as they emerge from the text (Joffe (2012), Patton (1980), p306). This more Grounded Theory approach is consistent with Rep Grids. With this approach, codes are judiciously determined by the researcher (Braun and Clarke (2006), Miles et al. (2014), 72;), happening at an intuitive and creative level (Basit (2003), Bryman and Burgess (2002), p180, Savin-Baden and Howell Major (2013), p440) and lets the participant's data 'speak for itself' (Hennink et al.
(2010), p218). The processes concerning creating codes are being presented here as sequential steps. However, this process is iterative and requires the researcher to reflect on the role they are playing in the process (Fereday and Muir-Cochrane, 2006). Coding is considered by some as representing a significant part of analysis (Basit, 2003), and by others as analysis itself (Miles et al., 2014). To assist with the iterative process of coding, code collation and review, Nvivo was used.
c) Searching / Reviewing / Naming themes

This involves the collation of codes and their conversion into initial themes. This is an interpretive step that is grouping codes into broader themes (Braun and Clarke, 2006) that are important in the description of alignment. Similar to code generation, researcher reflexivity is important in this process (Braun and Clarke, 2006). These themes are then reviewed in the light of all the transcript material being analysed to ensure that they represent a good fit to the material and have relevancy to the intended purpose. Finally, the themes are refined and presented such that they form a helpful narrative and categorisation for the Governance Grid. Again, NVivo was used to assist with the iterative process of assigning codes to themes and theme reviews. Using NVivo, the codes together with the supporting evidence were presented to the CIO. The CIO reviewed the coding of his transcript, sample checked the CEO's and CFO's transcripts and sample checked the contents of codes. No objections were raised and no changes were made.
d) Reporting

Usually the nature of this report is a document that re-presents a large and mosaic dataset into a compelling account that clearly links to the research question and can be easily understood (Braun and Clarke, 2006). The report's narrative should be supported with extracts from the data. For this study a specific report is not produced as the intention is to provide a framework onto which the Governance Grid constructs (for which extracts from the data is used as support, Table 21) can be mapped. The resulting Governance Grid is presented in Chapter 6.

Items (c) and (d) make reference to drawing on evidential support from the data. In a similar manner to Eze et al. (2019), Table 21 displays the codes and a sample of the supporting NVivo analysed transcript evidence that shapes the themes used in Governance Grid. The less obvious abbreviations used in this table are: FM= Franchisee Medium; FL = Franchisee Large; SCD = Supply Chain Director; OD = Operations Director; CMO = Chief Marketing Officer.

Table 21: NVivo codes with sample of supporting evidence

## NVivo Node - Level 1 \& 2 Supporting Evidence

## Responsible Value Creation

Shareholder and customer value, \& citizenship

Web site, conversion and spend metrics
Build a sustainable
business
Brand \& Customer

Brand management

## Good customer

experience
experience

Innovation
[The rationale and drivers for the corporate strategy is] 'about shareholder value and corporate citizenship' (CEO); 'Delivering shareholder value in the broader sense' (COO); 'Making sure that we're returning value to shareholders' (CIO); 'Fundamentally it is about value creation ... create value for our owners' (CFO). 'Driving sales or getting those transaction conversions, getting the basket size higher ... it's about conversion and spend really' (CMO); 'The most important part of technology for this business is what I would call the client facing/customer facing technology' (CFO). 'We're in this business for a long term ... to make sure that the future generations have something to work/build on' (FL)
'We have to protect the reputation of the brand' (COO); 'Make the brand and product as attractive as possible' (FM); [The first challenge is to] 'put in place IT capability that develops and supports the brand growth.... [to] keep staying hugely relevant and exciting and novel or leading edge' (SCD).
'Try and get the customer experience, the customer journey, to be as flawless as possible' (FM); 'Ensure that we have the easiest and best customer ordering experience' (COO); 'Making sure that our customer engagement is what we need it to be going forward' (CIO).
'The brand was born on innovation pre IT .. [now it's about] taking that innovation into digital marketing and tech and IT [so that it can] can influence the customer' (CMO).

Operational
Excellence
Control of costs
'Lowest costs and best supply chain capability is really important' (CIO); 'IT is quite important cutting costs ... for example,

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NVivo Node - Level 1 \& 2 Supporting Evidence
automating a lot of the processes can save a lot of time' (FM); 'We are dealing with continued or rising cost to operate either driven by imported [materials] inflation in a post Brexit world or driven by increasingly bureaucratic government legislation that are driving more costs into the model' (COO).
Improved decision making
Meeting needs

Improved Staff
Productivity
'Turning that data into insight ... [using] that data to better analyse the effectiveness of the business' (COO).
'It's very important to know will the people .. know how to use [the system], what will they do with that system, [or] are they actually going to just have it available .... and never use it' (FL); 'You were asking earlier about where does IT go wrong, and, you know, nobody ever sits me down and says, right, tell me about your IT needs' (SCD);
'You're trying internally to create work practices, which are easier for people to operate within' (CEO); 'We can do a far better job of deploying IT to improve store level productivity and profitability' (COO); [We are good at brand\} ... 'but not brilliant to downright bad at the efficiency and productivity aspects of an individual working' (SCD).
Improved business 'Part of the strategy needs to be about ... making sure that all of operations these systems are cohesive and operating effectively to support their business models and how they need to operate' (CIO); 'Ease of processes ... ease of ordering, good functionality would be an example' (FM); [With our new system] 'information is so readily available to me that it makes life a lot easier' (FL).
People, Skills \& Environment

Attract and retain the right skills
Capability \& Skills to
exploit IT
Empathy and mindset
Strategic Planning
\& Governance
Balance of portfolio Back Office vs Front Office
[We are] 'seen outwardly as quite a digital business so we try and attract talent into our organization that have a digital mindset and are digital operator's in their own right' (CIO); 'I think right now retention is the issue more than recruitment' (FL). 'Biggest lack [of capability] is operational literacy. We're getting better, but we're not where we need to be' (CEO).
'Empathy is the overarching thing. [For example] It's very easy to be here [in head office] and forget what goes on at the coal face, in the trenches' (OD).
'Traditionally we've not provided great operational capability in the stores [nor] in the corporate side. So they're the things that we really have not balanced well with our investments' ( ClO );

| NVivo Node - Level $1 \& 2$ | Supporting Evidence | 'Customer versus back office has probably been skewed to <br> customer for the last five years' (CEO); 'So I would still say if I have <br> a choice of spending a million pounds on the customer facing app <br> to generate more sales versus the back office, I'd still keep pouring <br> the money [into the front end] app' (CFO). |
| :--- | :--- | :--- |
| Building foundations | 'IT is very important. It plays a very important role....it needs to be <br> set of foundations that don't really have any cracks in them. <br> Because IT is such a fundamental part of the business' (OD). |  |
| Business case | 'I personally would judge that linvestment] on a business case that <br> had either a strategic need or a payback element to it' (SCD); <br> 'You've got to have a financial top line benefit where you going <br> drive sales ... a bottom line benefit where you going to provide <br> efficiency and cost savings and reduced complexity ... and legal <br> compliance ...to really make sure you protect your business and <br> your reputation from any damage that might happen' (CIO). |  |
| 'The role of the corporate strategy is to provide a vision in terms of |  |  |
| where we are heading' (COO); 'We have multi-year projects ... So, |  |  |
| we're sort of slowly moving away from that reactive tactical |  |  |
| approach' (FL). |  |  |

Chapter 5

## 6 Stage 2 Data Collection and Analysis

In Stage 2 each stakeholder was asked to complete the Standard Grid developed in Stage 1. These grids can then be compared, exposing the cognitive diversity at the group level.

During the stage 2 interviews the management team composition changed in the manner previously described. These new members also completed the Standard Grid on the basis that this grid could be viewed as having been developed using a focus group that represented a large proportion of the management team (Armstrong and Eden, 1979). However, other than the HR director who was not available, the new stakeholders first completed the Stage 1 interview process and their personal constructs were captured. These personal constructs mapped to the Standard Constructs without difficulty with one notable exception, the CFO. This is discussed in later in section 6.2.2 alongside a broader discussion on the dynamic nature of social alignment.

### 6.1 Stage 2 Data Collection

Prior to the interview each participant was sent the Standard Grid together with an explanation and reminder as to how it had been developed. To help with this, each Standard Grid had that person's personal constructs mapped to the standard constructs; the intention being to help engage the participant as it reflects where their specific contribution is being reflected in that of the overall group.

As both the elements and constructs are supplied, an A3 print out of the Standard Grid was provided for the interview. This allows the participant to simply fill in the ratings, which is quick, and removes any barriers that may be introduced by working with a computer. Even so, the grid is reasonably large and on the limit suggested by Lemke et al. (2011). Initially most participants were rather daunted by a 290 cell grid, however everyone completed the grid in 45-60 minutes.

Following the meeting the grid ratings were entered into the Rep Plus software. Using the output from the software, an email was then sent to each participant showing them their completed Standard Grid together with a small
amount of analysis and a further explanation and example of how the grid was to be used (Appendix 5).

### 6.2 Stage 2 Data Analysis

### 6.2.1 Honey Analysis

This is a Rep Grid analysis technique originally developed by Peter Honey (Honey, 1979) to conduct an attitude survey as to what comprises a good manager. This analysis formed part of the Stage 1 and 2 feedback given to each individual (Appendix 4 and 5). Here it is used to generate a high-level view of the group's perception as to what comprises an effective investment. The output from this analysis is presented in section 7.1.

In its original form this technique was designed to aggregate the Rep Grid constructs across a participant sample and analyse the data against a supplied construct that elicits an overall summary position on the topic of interest. For this study the supplied construct was targeted at the overall view of the effectiveness of an investment, Overall More effective - Overall less effective. For each participant grid Honey divided the constructs into three roughly equal groups that represent the degree to which each construct was rated similarly to the supplied construct. The high, medium and low similarity groupings were then collated. The high similarity grouping is then compared with the low similarity grouping; a process Honey calls 'comparing the top and tail data'. Honey (1979) refers to this outline view as "pen pictures". This form of analysis allowed Honey to develop an outline view of the characteristics most associated with effective and ineffective managers. By taking this approach 'Honey is able to preserve the individual meanings being conveyed whilst aggregating the different constructs across the sample' (Jankowicz (2004), p176).

This exact procedure could be followed in this study. However, in this study the individual Rep Grid constructs have already been aggregated to create a Standard Grid. These Standard Grid constructs already convey the meaning from the individuals' grid and are used differently by each management team member to rate the supplied investments (elements). Therefore, the Honey analysis was applied to the Standard Grid responses. From the CIO's
perspective, this approach will be shown in Chapter 8 to be closely and understandably associated with that data.

When applied in this manner, this technique will group the constructs across all management team members whilst preserving how they each construed overall IT effectiveness. It is then possible to get a group view as to which constructs and projects the group rate as highly similar to their overall stance on IT effectiveness and the Ideal project as a whole.

The RepPlus software was used to generate the Honey rankings. Through a comparison of the High and Low ranked constructs Honey posits that a researcher is able to develop an outline view of the group attitude towards the question of interest, in this case IT effectiveness. For this study the Honey analysis was more simply used to offer a summary view to the CIO as to which investments appeared most preferred and which constructs most closely reflected the supplied construct. The implication of the latter summary is that it suggests which constructs the CIO might place a greater focus upon as they would presumably be important to team members when determining IT effectiveness and therefore their decision to invest. The output of this analysis is discussed in section 7.1.

### 6.2.2 Standard Grid Analysis

Conceptually, the approach was to develop a set of IT investments decision constructs that represent those used by the management team to indicate the degree to which the CIO and others in the management team see and interpret investments similarly. Where investments are construed similarly it is possible to conclude that there is a shared understanding (Preston and Karahanna, 2009), which is a critical pre-requisite for firms wishing to realise value from their IT and improve performance (Sammon and Nagle, 2017, Avison et al., 2004). The conceptual model that is inspired by a product profiling diagram used in manufacturing strategy (Hill (1995), p177) is shown in Figure 13.

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Figure 13: Conceptual model for the approach
Looking at the steps in Figure 13 from left to right:
(a)As described in the previous chapter, to understand how the management team makes sense of IT investments, each member was asked to take part in a Rep Grid exercise (Eden and Jones, 1984). This approach is widely used in business and management development scenarios (EasterbySmith, 1980b). The output from this exercise generated a number of [investment decision] personal constructs. Working with an independent expert, the individual grids where amalgamated to create a Standard Grid where the constructs are mapped to the Luftman alignment model categories. Such a grid can be used to explore the cognitive diversity (i.e. difference in mental model) across the group members when considering IT investment decisions (Phythian and King, 1992).
(b)The Stage 2 data collection asks each participant to complete the Standard Grid. The example shown in Figure 13 provides an example where three actors provide their construct ratings for an investment: Actors A1 and A2, and the CIO (Ac). In the study each participant provides ratings for all investments.
(c) As the action plan is designed to be driven by the CIO, the rating differences between actors A1 and A2 are shown in comparison to the CIO (Actor Ac). This is not suggesting that the CIO's perspective is "correct", it is simply a way to provide a fixed reference point. In this example, compared with the other actors, the CIO favours the left-hand pole of the
first four constructs for this investment, and the right-hand pole thereafter. The gaps between Ac and the other actors represents the cognitive diversity between them. Any action plan will seek to reduce this diversity.

It can be expected for teams to change over time, and having completed the interview process and developed the Standard Grid, there were three changes to the management team composition. Individual grids were developed for two of these individuals and were mapped onto the Standard Grid with little problem except for the CFO. Personal constructs elicited from the CFO contain ones related to skills. The context for these remarks was as much a lack of skills in the finance group as in the IT group. With the agreement of the CIO, these constructs were aligned to the Standard Grid construct S23, Confidence in the delivery of a highly reliable and trustworthy system configurable to needs. The rationale for this decision is that if the skills don't exist either in the business or IT, then presumably the confidence to the successful outcome is low, and vice versa. While these changes are captured in the categorisation mentioned, it is a reminder of the dynamic nature of alignment and that periodically the Standard Grid constructs would need to be revisited.

The stylised output from this exercise that reflects the conceptual model (Figure 13, part (c)) is shown in Figure 14.


Figure 14: The conceptual model in reality

In Figure 14, actor G is the CIO and is shown by the thick vertical line (this representation is difficult to portray in monochrome, and is clearer in colour). The difference to the other actors is shown by the (differently shaded) lines that accumulate on either side of this vertical. If the overall sum of the ratings across all elements for an actor is less than the CIO's, the difference is shown to the left of the vertical CIO line, and conversely on the right for differences that are greater. The length of each horizontal line indicates the size of the difference for each actor compared with the CIO.

However, this representation is capable of giving a misleading view as it is generated using net differences across multiple projects on a single construct. This means that in Figure 14, large equal and opposite ratings across projects on each construct could result in what looks like zero diversity to the CIO. That would be the wrong conclusion to draw.

A more helpful representation, and one that is adopted for much of the ongoing analysis, is to depict the variation in the form of a heat map, shown in Figure 15. This more clearly highlights the degree to which the management team as a group construe the IT investments differently compared with the CIO. The cell numbers represent the absolute difference to the CIO aggregated across all TMT members ( $\mathrm{n}=6$ as it excludes franchisees and the outgoing COO). This is the usual approach to represent differences between Standard Grids but is not as helpful as it could be. For example, in Figure 15, large and opposite ratings across members would result in a high absolute difference being indicated in the cell, which is correct, but it will not identify whether a member's perception is more positive or more negative compared with the CIO. Given that the CIO in any action plan is attempting to minimise overall difference, a more granular analysis showing the nature of the differences at the individual level is required. To gain this level of insight an approach, based on comparisons of a combination of pairs, is adopted. This is set out in the next section.

| RFO ABS (F) CIO GRID: Heat Map using Absolute Differences |  |  | Investment Orientation |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| clo perspective of the cognitive diversity across the (Final) RFO mangement team |  |  |  |  |  |  |  | ss Proces |  |  |  |  |  |
| Researche: Boot | otstrap Grouping. to-Model Alloction |  | Infrastucture |  |  |  |  | Market Faing |  |  |  |  |  |
| $\begin{array}{\|c\|} \text { Model } \\ \text { Categorisation } \end{array}$ | Case Study Descriptor | Standard Constructs |  |  |  | $\begin{aligned} & \text { on } \\ & \text { of } \\ & 0 \\ & 0 \end{aligned}$ | $\begin{aligned} & \hat{\partial} \\ & \frac{6}{6} \\ & \frac{3}{6} \\ & \frac{8}{x} \\ & \dot{x} \\ & i \end{aligned}$ |  | $\begin{aligned} & 6 \\ & 0 \\ & 0 \\ & 0 \\ & 0 \\ & 0 \\ & 0 \\ & 0 \\ & 0 \\ & 0 \\ & 0 \end{aligned}$ |  |  |  |  |
| Governance | Market, Sales \& Growth | S1 More market/strategic coal driven (eg rowth or sales) | 7 | 2 |  | 1 | 10 | 3 | 4 | 4 | 3 |  | Less strategic/ More internal operation and/or control driven |
| Governance | Customer/Product | S2 Creates broad consumer perception benefitis 8 reason to swith | 8 | 10 |  | 15 | 12 | 10 | 7 | 2 | 4 |  | Doess'tcreate perception benefits and/or reason to svitch |
| Govermance | Custome/Product | 53 Makes product more compelling and/or provides credible long term solution | 6 | 1 | 4 | 13 | 10 | 10 | 9 | 3 | 3 |  | Solution Iacks long term creedibiliy in the market place |
| Govermance | Operationa Excelence | S41mproves sisk management/ operational capability | 6 | 8 | 3 | 6 | 4 | 8 | 6 | 6 | 4 |  | Has ititl impact on risk management/ operational capability |
| Govermance | Constrained decision making | 55 Solutiondiven by what we want to do | 15 | 9 | 6 | 8 | 8 | 8 | 6 | , | 4 |  | Solution driven by what we need to do |
| Measures | Rationale/Scope clarity | S6 Benefitilikely to be maintained over the long term | 5 | 9 | 5 | 7 | 5 | 7 | 7 | , | 5 |  | Benefitilikely to be short term. Costly verel long term. |
| Measures | Rationale/Scope clarity | S7Technology solution seen as best option | 10 | 5 | 4 | 5 | 9 | 8 | 8 | 5 | 4 |  | Technology solution notvalued//unatrative |
| Measures | Clarit//Ese of ROI quantifiction | 58 Clear how benefitis/R01 are to be calualted | 11 | 9 | 2 | 4 | 10 | 5 | 5 | 4 | 8 |  | Not clear on measurement and/or benefitit less tangible |
| Measures | Clarit//Ese of RO1 quantifiction | S9Value derived directly from benefitito franchisee | 6 | 6 | 6 | 2 | 4 | 6 | 6 |  | 2 |  | Value derived indirectly and/or benefitit FFO fous only |
| Measures | Abiliyt torealise ROI | S10 Delivery metexpectation of consumer and/or customer | 9 | 6 | 1 | 4 | 3 | 7 | 6 | 1 | 2 |  | Delivery versold and/or failed to meet expectation |
| Measures | Abiliyt trealise ROI | S11 Quick and easy to deliver/deploy | 12 | 12 | 10 | 3 | 2 | 4 | 6 | , | 6 |  | Slow and hard to deliver/deploy |
| Measures | Abiliy torealise ROI | S12 Orives a key business/ strategic parameter, eg Revenue/Cost/margin | 10 | 3 | 5 | 6 | 12 | 6 | 6 | 3 | 4 |  | Indiret//ow impatt on key business goal |
| Partership | Collaboraion/Engagement | S13 Good collaboration with delivery team during development | 7 | 4 | 1 | 4 | 3 | 8 | 6 | 7 | 3 |  | Poor collaboration with delivery team during development |
| Partership | Collaboration/Engagement | 514 Confidence/trust thatdelivery (incongoing will meet priority needs | 7 | 5 | 3 | 2 | 8 | 8 | 9 | 3 | 3 |  | Lackof confidence that aurent or future neds will be meet |
| Partership | Collaboration/Engagement | S15 Stakhoholders well briefed, managed and engaged | 4 | 5 | 3 | 3 | 7 | 5 | 4 | 9 | 3 |  | Stakeholders expectations notset, poorly managed and/or unengaged |
| Partership | Change management/ /doption | S16 Willingness to adopt system / High take up - Relevance | 8 | 8 | 4 | 4 | 9 | 4 | 7 | 10 | 4 |  | Reluctant to take on new ssytem / Low usage |
| Partership | Change management/ /doption | S17 Low degree of change - Easier to adopt | 6 | 4 | 16 | 5 | 4 | 12 | 6 | 9 | 16 |  | High degree of change - resistance to adopt |
| Partership | Ownership | 518 Has b broad or clear stakeholder ownership | 4 | 6 | 1 | 3 | 7 | 7 | 8 | 4 | 5 |  | Has a narrow/Iocalised appeal and/or unclear stakholder ownership |
| Partership | Shared clarity | S19 Clear rationale and expectation for investment | 5 | 14 | 0 | 3 | 10 | 6 | 8 | 1 | 6 |  | More confused/contusion over investment im |
| Tech Scope | Enabling The Future | 5201 Innovative \& market leading solution that inspires people | 7 | 6 |  | 8 | 5 | 7 | 12 | 2 | 3 |  | A solution that lacks ambition and makes noleap forward |
| Tech Scope | Enabling The future | 521 Provides a platiorm and/or catalyst for future development | 4 | 9 |  | 5 | 16 | 6 | 11 | 4 | 4 |  | Standalone system and/or offers limited future flexibility/cath up |
| Tech Scope | Enabling The future | 522 Provides agility without creating technical debt | 5 | 9 | 2 | 3 | 11 | 7 | 9 | 8 | 4 |  | Responsive to demands but with disproportionate ongoing cost |
| Tech Scope | Operational Exellence | 523 Conidence in delivery of highly reliable, trustworth system and configurable to | 1 | 5 | 2 | 14 | 10 | 7 | 8 | 1 | 4 |  | Low conidence in operational needs being met |
| Tech Scope | Operational Exellence | 524 High/broad operational reliance placed on system | 20 | 8 |  | 7 | 6 | 5 | 7 | 3 | 5 |  | Low/narrow operational reliance on system |
| Tech Scope | Innovation | 525 Tansiorms [aspects of the business mode//management capability | 5 | 8 | 3 | 18 | 11 | 6 | 8 | 6 | 7 |  | Maintains station or does same things better |
| Tech Scope | Innovation | S26 Ambitious, inspirational and forward thinking | 8 | 11 | 1 | 4 | 3 | 5 | 9 | 4 | 6 |  | Solution does the bare minimum |
| Tech Scope | Well designed 8 Specified | S27 Fitfor purpose solution and easy to maintain/operate | 4 | 6 | 3 | 3 | 6 | 4 | 8 | 7 | 3 |  | Faces challenges and hard to maintain/operate |
| Tech Scope | Well designed $\&$ Specified | 528 Technical darity of the solution achieved early in development ycle | 5 | 7 | 5 | 4 | 5 | 5 | 9 | 8 | 3 |  | lackof carity resulting in overly complex and/or more costly solution |
|  |  | 529 Verall MORE Effective | 3 | 8 | 1 | 5 | 5 | 6 | 8 | 4 | 5 |  | Overall Less effective |


| Key | Cells | Value |
| :---: | :---: | :---: |
| Compared with the CIO, the TMT have on average a difference < 25\% | 191 | 710 |
| Compared with the CIO , the TMT have on average a difference of $25-50 \%$ | 89 | 766 |
| Compared with the CIO , the TMT have on average a difference $>50 \%$ | 10 | 157 |
|  | 290 |  |
| Participants: B,C,F,H,J,K |  |  |

Figure 15: Heat map of the management team's attitude from the CIO's perspective

### 6.2.3 Standard Grid pairwise comparisons

To develop an action plan aimed at improving the cognitive alignment it is necessary to understand how the group level cognitive differences are generated. This can be established through a series of pairwise comparisons between the CIO and each participant. These can be used as a way to negotiate an agreed understanding between the CIO and other key stakeholders (Shaw, 1979). Again, it is stressed that it is not being assumed that the CIO's position is correct, it is simply identifying where it is different. The CIO will need to determine where on the construct scale they wish to target to achieve the greatest alignment and the steps they will need to take. As regards achieving alignment, Luftman (2003) suggests that these steps are unlikely to provide a "silver bullet" solution but that the resulting dialogue will be very valuable.

Two types of comparisons were used by the CIO to shape the action plan: (1) A comparison of the CIO with each of the other team members across all

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investments, and (2) A comparison of each investment individually across all team members.

In an effort to ensure that the outputs from the exercise could be easily explained and understood, the nature of the comparisons was deliberate kept simple and presented in a form that was instantly recognisable to the CIO and his colleagues. Initially, the pairwise comparison was displayed in the form of a grid and simply expressed the cell value as the difference between that same cell on each Standard Grid. The RepPlus software developed by Rep Grid experts, Shaw and Gaines, (2018), is able to calculate and output such comparisons, and these were presented to the CIO. However, displaying absolute differences between grids was insufficient for the CIO. The CIO wished to understand whether cell values being displayed arose from cells in the comparison grids having values that were higher or lower than the corresponding cell value in his grid. This is easily calculated using an excel spreadsheet. Once in Excel, the output grid was manipulated in a similar manner to a standard Rep Grid cluster analysis, whereby the rows and columns were moved based on their overall red score which clusters the red cells in the bottom right of the grid. Unlike a normal Rep Grid cluster analysis, the constructs were not reversed to improve the degree of clustering. This is because it is easier for the CIO to interpret and compare grids where the preferred pole is consistently positioned on the left on all grids. Figure 16 provides a simple example of the output from following such a process.


Figure 16: Grid comparison example - CIO to CEO clustered heat map

When this number is displayed in colour on a computer screen, the dark shaded cells are red and the light shaded cells are green. In the heat map above and those that follow, the red will be shown more intensely than green so that the difference is clear in monochrome. Consequently, the resulting grid was described as being a heat map of the cognitive diversity. Literature searches have not revealed grids displayed in this manner but it proved helpful to the CIO. Where a cell is green/has light shading the cell being compared with the corresponding cell in the CIO's grid is a lower value; and where red it is higher. As the commonly preferred construct pole in the Standard Grid (and for argument's sake let us assume that this is the case in in Figure 16) is always shown on the left-hand side of the grid; a green/light shading implies a view that lies closer to the left-hand pole compared with the CIO. This was jointly interpreted as representing a view that is more positive than the CIO's. The opposite interpretation is associated with a red/darker shaded cell.

An example of (1) A comparison of the CIO with each of the other team members across all investments, and (2) A comparison of each investment individually across all team members from the study, is shown in Figures 17 and 18 respectively. The roles shown in the Figure 18 reflect the management team changes: the incoming and outgoing operations executives (Operations and COO(1) respectively), the newly appointed CFO and the HR director. In Chapter 7 a specific comparison between the two operational executives is discussed.

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Figure 17: CIO - CEO Standard Grid Comparison Heat Map - Clustered by Red Max


Figure 18: Investment Standard Grid Comparison Heat Map: Cyber Security

### 6.2.4 Interpreting Standard Grid Comparisons

This section sets out the steps taken when interpreting the heat maps for inclusion in an action plan. It is recognised that as this is an interpretive step and it is necessary to have a procedure that the CIO can follow if that CIO is to then commit to take action on the strength of that interpretation. For action to be taken, the interpretation has to be very convincing and in this sense the procedures facilitate an extreme form of ensuring validation through member checking.

The Standard grids were compared in two ways: By project and by team member. The process for comparing each project across all team members is shown in figure 19.


Figure 19: Cognitive Differences: Compiling a CIO project summary (across all members)
This shows that working from the heat map a table was created that simply captures where the heat map is suggesting team members are taking a more positive or a less positive view of the project than the CIO; and areas where there is a mixed view (Table 22). The alpha numeric code shown in this table, for example [S5], is the Standard Grid construct number from the heat map. This has the effect of reducing a large heat map into a small number of summary statements that can act as the basis for possible action plan inputs. To provide further support for the CIO, based on these derived inputs suggestions were made as to the nature of the supporting evidence that the CIO may find helpful.

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Table 23 shows an example of this procedure applied to the Cyber Security investment together with some suggested supporting evidence that may be helpful. For this investment the suggested supporting evidence was contextualised as it leveraged a known service to which the CIO subscribed. The outputs for all the projects are shown in the Chapter 7.

Table 23: Cyber Security action plan inputs and suggested supporting evidence

Possible Action plan Inputs
Supporting Evidence Required

To address the biggest negative drivers, thought could be given to how to demonstrate that:

- By improving security, we are tacitly addressing a key a business driver.
- Security improvements do have a measurable value even if indirect.
- As there are step changes in security fraud, step changes are required to security protection. These represent a step change in how the firm does business and not simply doing the same things better. It is doing a broader /more complex range of things.
- Improved security will reduce the overall risk profile of the firm.
- The IT group can bring resources to bear that have the capability to collaborate and deliver a reliable system that is configurable to the firm's needs.

The CSO appears to view this project far more favourably than the CIO or anyone else, so may be a good business sponsor for the project.

Use your Gartner Executive programs service to gain views on (a) How other companies have framed the debate as regards to business benefit such as reduction in risk to brand and operation reduction (b) The best implementation approach to secure value for money protection and easy path for future proofing, and (c) An understanding of the vendor market and flexibility of their systems to suit the firm's needs.

This can be done through a combination of (a) Peer to peer connections (b) Analyst calls (c) Similar conversations at the March CIO Forum. Example analyst briefs have been prepared.

The action plan is by definition a change plan. It seeks to address specific areas through reference to the heat map initially via dialogue and from that change. Lewin (1951) developed the concept of force field analysis to better understand change. Broadly speaking it suggests that there are driving forces for change and resisting forces, and that it is usually better to reduce the resisting forces than increase the driving forces (Lunenburg, 2010). Likening positive and negative perceptions of an investment to potential driving and resisting forces for change, the action plan targets the negative perceptions.

From the CIO's perspective, positive forces shouldn't be ignored as they may represent expectations for a project that cannot be met. However, the view taken in this study is that it is easier to dampen team member enthusiasm on aspects of a project than it is to overcome a team mindset that is negative towards aspects of a project.

While the comparison across the TMT at project level is extremely helpful, the CIO wished to have a collated view by each TMT member. To develop this, data are drawn from a number of sources and combined in the manner set out in Figure 20. The project comparisons are combined with a similarly generated output from the CIO-member heat maps to form an investment (Element) view. The latter is also used to develop a discriminating factor (Construct) view. This is supplemented with material drawn from the personal grid interviews in Stage 1 and also combined with the output of a Honey analysis.


Figure 20: Cognitive Differences: Compiling a CIO - Member summary (across all projects)

### 6.2.5 Governance Grid

Table 18 set out a series of questions used to form a semi structured interview at the start of the Stage 1 participant meetings. Participant responses to these questions were transcribed and then thematically analysed, as described earlier. The themes emerging from the analysis were reviewed and agreed by the CIO in the manner previously explained. Together with the CIO, the Standard Constructs were reviewed and aggregated, reducing the total number of constructs to 21 , and mapped to the themes, see Appendix 6 . This creates a highly contextualised grid that is essentially an amalgam of much of the Stage 1 and 2 outputs.

At the summary level, the resulting grid represents the criteria that the TMT collectively use to determine effective investments, organised in terms of the TMT's collective view on the drivers of their corporate strategy and the role that IT plays in this strategy. Given that the origins of this grid are known to the TMT, it seems a short step to suggest that such a grid could prove to be a useful tool in their collective assessment of future IT investments. In essence, it becomes a cognitively derived set of investment decision criteria that could be used in the firm's governance process.

In Chapter 8.4, the CIO is seen to alight on this grid, believing it to be of immediate value at the management team's strategy awaydays. It was seen as a good way to create a dialogue around potential IS investments. In short, it is fulfilling a governance role and hence was called the Governance Grid.

In Chapter 2, the criteria used in the structured search focused very generally on shared understanding and decision making at the management team level in the IS domain. These papers were reviewed to assess which papers focused on any form of governance tool or process where cognition was a central theme. Of the 98 papers returned none referred to a cognitive approach to developing an aspect of a team's governance or decision-making framework. This a is possibly a future area to explore further.

Appendix 8 shows the mapping of the Standard Grid constructs to those in the Governance Grid, together with references to aspects of the Governance Grid emphasised in the personal grids not captured in the Standard Grid due to the
management team composition changes. The poles of the resulting grid are shown in Table 24.

Table 24: The Governance Grid

| Theme | Left Hand Pole | Right Hand Pole |
| :---: | :---: | :---: |
| Responsible Value Creation | G1: Helps drive market/key business goals such as sales/growth. | G1': More internal operation and/or control driven |
| Brand \& Customer | G2: A credible long-term solution that makes the product/brand more attractive to existing and new customer base. | G2': Lacks long term credibility and/or doesn't improve customer perceptions or reason to switch. |
|  | G3: Helps facilitate the CX and expectation, and is operationally sound | G3': Focused on internal (store) controls and efficiencies |
|  | G4: An innovative \& market leading solution that inspires people (as it is an ambitious step on) | G4': A solution that lacks ambition and make no leap forward |
| Operational <br> Excellence | G5: Improves risk management / operational capability. | G5': Makes little difference to the operational capability or risk profile of the firm. |
|  | G6: Delivery met expectation of consumer and/or customer. | G6': Delivery oversold and/or failed to meet expectation. |
|  | G7: Fit for purpose solution and easy to maintain/operate | G7': Will face challenges. Faces challenges and hard to maintain/operate. |
|  | G8: High/broad operational reliance placed on system Needs to be right first time. | G8': Low/narrow operational reliance on system - able to take calculated risk/modify over time. |
|  <br> Environment | G9: Confidence in the delivery of reliable system that meets the stakeholders' needs. | G9': Lack of confidence that either current or future needs will be met |
|  | G10: The skills and collaborative capability for the firm to exploit and realise the benefits of the solution are present. ( $\mathrm{H} 4, \mathrm{H} 8$ ) | G10': A good project understanding and/or capabilities are not present. |
|  | G11: Clarity of the underpinning business process is clearly understood and agreed (H5). | G11': Confusion/lack of clarity over the underpinning business process |

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| Theme | Left Hand Pole | Right Hand Pole |
| :---: | :---: | :---: |
|  | G12: Stakeholders are highly engaged and the solution will be readily adopted. | G12': Stakeholders not sufficiently engaged thereby endangering solution adoption |
| Strategic Planning \& Governance | G13 Technology is the best option for building the foundations for the future. | G13': Alternative options should be more fully considered. |
|  | G14: The solution does not create technical debt (i.e. does not disproportionately increase running costs due to its complexity). | G14': The solution introduces disproportional ongoing operating costs due to overall complexity |
|  | G15: Clearly understand how the benefits over the short and long term will be realised. | G15': Not clear on how benefits will be measured over the short and long term. |
|  | G16: Solution is quick and easy to deploy. | G16': The solution will likely to be hard or slow to implement. |
|  | G17: The system \& approach has a broad appeal and/or clear stakeholder ownership. | G17': System or approach has localised or unclear stakeholder ownership. |
|  | G18: There is a clear rationale and expectation for the investment. | G18': There is some confusion/disagreement regarding the rationale or expectation. |
|  | G19: Solution driven by what we want to do. | G19': Solution drive by what we need to do - business or legal need. |
|  | G20: An ambitious investment that transforms (aspects of) the business model/management capability. | G20': Not transformational, does the bare minimum or simply does the same things better. |
| Partnership RFO/Franchisee | G21: The value from the investment is derived directly from benefit to franchisee | G21' The value of the investment primarily benefits only the RFO |

### 6.2.6 Budget Orientation

Over stages 1 and 2, with reference to Peters (1988), each participant was asked three questions on IT budgets: (a) What would be the realistic ideal distribution of IT budget for new investments across Operations, Business Process and Market Facing systems; (b) what do you believe the distribution actually is; and (c) what do you believe is the proportion of the IT budget spent on investments as opposed to running the exiting estate.

The purpose of these questions was to form some judgement as to:
(a)The group level of understanding of the new investment spend allocation and if there is a pattern across the TMT of the overall perception of actual versus ideal, and
(b)The level of diversity of views regarding the overall IT budget allocation

This analysis wasn't aggressively progressed as the actual splits of monies over the years could not be easily reported as the data was not readily available. The limited analysis that was undertaken surfaced three main characteristics:
(a)The substantially different perspective of the Large Franchisee as regards the realistic ideal distribution for Market Facing investments compared with anyone else (it is much lower),
(b) The range across group members of where they believe the investment monies are actually allocated - with the COO, CMO and Medium Franchisee believing the actual allocation is very low, and the CFO and Ops Director believing it to be very high.
(c) The range across group members of how they believe the IT budget is split between "run the business" and investments - with the CIO, CMO and SCD believing most of the budget is spent maintaining and running the existing estate and the CEO and COO holding the opposite view.

The suggestion made, incorporated into the action plan, was that further effort should be expended in establishing and discussing the actual spends, and that the characteristics that were observed be explored with the relevant team members. The perceived value to the CIO is that such information could be used to better set expectations as to where and why monies need to be spent.

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## 7 Findings

Given that one of the research objectives is centred on developing an action plan, the findings from the study were presented in the form of an action plan to the CIO. In line with the conclusions reached in Chapter 2, and bearing in mind the caveats expressed in Chapter 6 ( $\mathrm{p} 146, \mathrm{p} 149$ ), this comprised two documents:

1. A short action plan summary that aims to reduce the attitudinal differences between key stakeholders regarding the effectiveness of their firm's IT investments, thereby improving the perceived value from IT, and
2. A second document that serves as a guide to the data and analysis supporting the action plan summary.

The following sections present much of the data from the summary action plan that was presented and adopted by the CIO. In this Chapter there are references to standard constructs, for example S19 denoting Standard Grid construct 19, and references to constructs from the personal grids elicited in stage 1 . The research was initially set up with link anonymised labels for participants, a letter being assigned to each. Where references to personal constructs are provided, the construct number is preceded by a letter, for example F3 - where participant F was the CEO (for example in section 7.3.1). It will be clear from the context to whom each letter was assigned.

### 7.1 Group Level Findings: Honey Analysis

The CIO was interested in knowing which investments were generally preferred and what was driving this view. For this the Honey analysis was applied to the Standard Grid responses. As with the heat maps, this approach draws on data that is familiar and can be broadly understood by the participants.

When applied to Standard Grids, this technique will group the standard constructs across all management team members whilst preserving how they each construed overall IT effectiveness. It is then possible to get a group view as to which projects and constructs the group rate as highly similar to the
supplied element (the Ideal project) and the supplied construct (Overall more effective - Overall less effective) respectively. The respective summaries are shown in the Figures 21 and 22.

For each member of the management team the investments that are most in line with their view of an Ideal investment are the investments for the new web/mobile platform and new web/mobile app. Though arguably the platform is not a market facing investment it directly supports one of a similar name and the two can be conflated. Order Delivery Tracking is also considered to have an element of market facing orientation, Figure 11 portfolio mapping. This implies that the successful delivery of market facing investments are viewed as being most similar to an Ideal investment, presumably as they drive growth of markets and sales. It is arguably where they appear to focus their attention. This view is consistent with the responses to the initial stage 1 questions in the first interview.
'From a consumer point of view, I think we have done an 8/10 job .... From an [operational] productivity point of view, I put us in at 2 to 3', COO
'If you just step back from it for a second, you sit there and say they've [customer facing systems] got to be pretty good haven't they", CMO
"So, brand evolution [market facing systems focus] I'd probably say 8 or 9 [out of 10]. And I'd say internal business efficiency and capability, 2 or 3', Supply Chain Director
'I think we are a 3 [out of 5] on the top line. I think we're a 0.5 [out of 5] on the bottom line and I think we're probably a 4 [out of 5] on compliance. I think we take seriously the top line and the compliance piece. I think that we're not as effective in investing in ourselves to be more efficient and productive. We're behind the eight ball in that area', CIO

Separately, the CIO when viewing these charts for the first time commented that it:
'Confirms my view that [the RFO] places a much greater emphasis on market facing investments than any other firm I have worked in'.

The investments viewed as being furthest from Ideal are the ERP followed by the Customer Order Management system. Both of these are largely internally focused operational/control systems.


Figure 21: Summary across investments for the management team
Certainly, in the case of the ERP, that covers finance and supply chain, the system was arguably oversold and not fully exploited. This should be explored in the action plan discussions.
'So, we put in a new ERP system here and I think probably for what they did in phase one of the project they oversold what the benefits were going to be' ...... 'So, my boss, when I write, we've [deployed the ERP system] and you know, I'm told you've got five extra heads now in the warehouse, managing transactions, yes, well we're supposed to have less heads not more. The system could have that capability but we decided not to do that at this stage', Supply Chain Director
'[The Customer Order Management system] was over-specified versus the minimum viable product ....... [and that reduced its effectiveness to me] because it was too expensive..... Not value for money', COO

The constructs that most closely mirror the "overall effectiveness" construct are where the investments build a platform for the future (S21) and where there is clear and broad stakeholder ownership (S18). This is closely followed by investments where there is confidence that the delivery will meet priority

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needs (S14), are ambitious and forward thinking (S26) and where clarity around how to deliver the solution is gained early in the development lifecycle (S28). Surprisingly the constructs more intuitively associated with market facing investments, such as market and brand growth (S1, S2 \& S3) or those concerned with the clarity of how the benefits are calculated (S8) mirror the overall effectiveness construct least well.


Figure 22: Summary across constructs for the management team
The conclusion reached is that market facing investments are preferred or at least their value is best understood; but that the critical discriminating factors associated with an investment's effectiveness is whether it gains the support of a broad and engaged stakeholder base and whether it has the ability to provide a foundation for the future.

An observation at the group level (i.e. the management team and franchisees) is drawn from a mapping of the participants' personal grid constructs to the Standard Grid constructs. Broadly speaking it is management team members whose personal constructs register against S1 (More sales and growth driven) and franchisees who register against S23 (Confidence in delivery and operational needs being met). Possibly an area for the CIO to explore is whether the RFO places enough focus on store operational issues. This view is re-enforced by the large franchisee who has placed a keen focus on operations, and rates his core in-house operational system very highly. This may suggest the RFO can learn from franchisees when considering store
activities and also why this franchisee is asking if the RFO would like to offer their system to other franchisees.
'Our back of house [operational systems] would be a 10 [out of 10] ..... we're so confident with our back of house that we're actually even talking to the RFO and other franchisees about maybe doing some backoffice tasks for them', Large Franchisee
'I am frustrated [with the RFO] mainly because I have spent a lot time ... [showing] them our back office, to show them even our front of house and say, if this is working for our group [with a large number of stores], and we are seen as the best in terms of standards and anything else right now, why are you not coming to me to say, why can we not put this across the board', Large Franchisee

Given the lack of direct store operational experience the RFO enjoys, this is a point not lost on the CEO.
'If we're going to develop systems for franchisees we need to understand how a store operates', CEO

### 7.2 Project Level Comparisons across the Group

The conclusions to the project level comparison were drawn from the member comparison heat maps and included in the action plan summary agreed with the CIO following the auditable process outlined in Figure 19 in section 6.2.4. This section takes the outputs from that action plan summary.

A high-level interpretation of the responses to the project comparisons that follow is shown in Figure 23. This figure shows the main characteristics suggested from a comparison across the action plan summaries where greater emphasis is required if the more negative perception of some participants is to be overcome. For example, in section 7.2.1 the cyber security project actions suggest that there is value from (a) promoting the business value that the project provides, possibly as sales are grown by attracting customers who feel their payment data is managed securely, (b) demonstrating that it lowers corporate risk, possibly by protecting business reputation, and (c) the firm has the required capabilities in place to deliver this project.

The first four actions are reasonably specific and tangible and have been separated in Figure 23 from the more generic requirement of more information being required by stakeholders. One key area that appears to require a much greater emphasis is how the value of the investment is communicated: Promote business value/Reduce cost (line 1 of Figure 23). During the study this characteristic is often associated with the investment's impact on sales and growth or its ability to reduce cost. In a nutshell, it's the impact the investment has on the Profit \& Loss account. This finding accords with the output from the thematic analysis and the theme "responsible value creation". Understanding how each person construes value has also been noted by the CIO:
'What [the study] really teased out is the way that you are communicating the value of technology across the different stakeholder groups is important. Communicating in the right way to each person so that they can see where that value is'.

The new platform investments that have been, or are being, introduced are the customer facing web platform, the ERP platform (supporting the supply chain and finance operations) and the W10/O365 platform (primarily supporting office productivity). A key characteristic for these investments is that there appears to be a perception that they lack the ability to provide the foundation for future development and/or transformation. Platform investments are often large and complex, and can be relatively expensive. These findings suggest that for such investments a focus on their ability to change the status quo and their long-term development value to the firm is important

However, many questions are unresolved. There is a need to speak with key individuals if a group position on a project is to be better understood and effectiveness improved.

|  | Investment |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Key action: Requirement to demonstrate/promote the project's ability to ..... |  |  |  |  |  |  |  |  |  |
| Deliver business value and/or an ability to reduce cost | X | X | X | X | X |  | X |  | X |
| Reduced the firm's risk profile | X |  |  |  |  |  |  |  |  |
| Have the requisite team capability and collaboration skills to deliver | X |  |  |  |  |  |  |  |  |
| Provide a future proofed / transformational platform |  | X | X |  | X |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Input required from stakeholders to better understand project positioning |  |  | X |  |  | X | X | X | X |

Figure 23: Action characteristic from project comparison
The CIO now plans to hold a series of one to one meetings to socialised the outputs from the study and gain feedback. The aim of these meetings is to move towards developing a shared mental model, which will likely require some element of debate and negotiation to get the meeting of minds (Walsh (1995), Eisenhardt et al. (1997)), and will likely span a series of formal and informal meetings over time. In planning such meetings the evidence in the literature is that story telling is the preferred way for messages to be conveyed (Boje, 1991); that the frequency of communication is more important than the richness (i.e. a regular drip feed probably works better than a detailed quarterly interaction) (Johnson and Lederer, 2005) unless frequency is being associated with conflict management (Smith et al., 1994). There are mixed views as to whether formal (Preston, 2004) or informal (Smith et al., 1994) social interactions work best. This will likely be dependent on the degree of social capital the CIO feels that he has with each stakeholder. Social capital is built up over time, and teams with long tenure typically communicate more often and less formally (Smith et al., 1994).

For the CIO a parallel was drawn by the researcher with the Luftman (2003) study. In that study and this, the findings from both the project and member analysis will not provide a "silver bullet" solution for [social] alignment but the resulting conversations with group members will be of value.

The following sections show the summary findings from the project comparison grids following the process set out in section 6.2.4. For each

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project, the project description and status is provided together with the actions following the grid analysis (for example, Table 23) and suggestions to the CIO where further information could be helpful prior to meeting with his colleagues, the other stakeholders.

### 7.2.1 Cyber Security

Status - Future Demand: Potential future development to improve the protection across the systems estate against unauthorised/malicious attacks.

Table 25: Cyber security action plan inputs

## Action plan Inputs

Suggested Supporting Evidence Required
To address the biggest negative drivers, thought could be given to how to demonstrate that:

- By improving security, we are tacitly addressing a key a business driver.
- Security improvements do have a measurable value even if indirect.
- As there are step changes in security fraud, step changes are required to security protection. These represent a step change in how the firm does business and not simply doing the same things better. It is doing a broader /more complex range of things.
- Improved security will reduce the overall risk profile of the firm.
- The IT group can bring resources to bear that have the capability to collaborate and deliver a reliable system that is configurable to the firm's needs.

The CSO appears to view this project far more favourably than the CIO or anyone else, so may be a good business sponsor for the project.

Use your Gartner Executive programs service to gain views on (a) How other companies have framed the debate as regards to business benefit such as reduction in risk to brand and operation reduction (b) The best implementation approach to secure value for money protection and easy path for future proofing, and (c) An understanding of the vendor market and flexibility of their systems to suit the firm's needs.

This can be done through a combination of (a) Peer to peer connections (b) Analyst calls (c) Similar conversations at the March/October CIO Forum/Symposium.

I can draft the Analyst call briefs for you if required.

### 7.2.2 Windows 10 / Office 365 Upgrade

Status - Delivered: The move from previous version of Windows OS and desktop. Upgrade to tools used by staff, i.e. the Office suite. Used to drive efficiency / collaboration.

## Action plan Inputs

1. Consider building some evidence to show the CEO the value of the investment. Specific focus on operational needs being met, cost of the solution and ease of deployment.
2. Develop the perception of the investment creating a platform for the future and use this to offset the perception that it is not a project the team would choose to undertake. Also, use the evidence to help demonstrate the rationale and benefits of the investment.

## Suggested Supporting Evidence Required

1. What is the value, maybe in terms of security and/or collaboration, that other firms have experienced? [Gartner].
2. Are there any ancillary projects that could be injected to extract greater value - vis comments from the CSD:
'I need to do confidentially. That's really useful. Instead of having to send stuff out to printers and then it hasn't quite worked and wondering whether it's gone or if there's somebody else who's got your confidential document $\qquad$ nobody sat me down and said, well, how do you work? You know, how much do you think you're going to be working at home or how much are you going to be at [sites $A, B$ or $C$ ] or your other sites, and what are your IT needs to operate on the move and would one of these be more appropriate'?

### 7.2.3 New Web/Mobile Platform

Status - In Progress: Mobile site re-platforming (assume = customer journey redesign: changing the customer experience of the website. Making purchasing more engaging and efficient).

Table 27: New Web/Mobile Platform action plan inputs

## Action plan Inputs

1. Reinforce the argument that the investment simplifies and reduces long term cost. Ally this to the sense that it is viewed as easy to deliver.
2. Focus initially on understanding why the franchisees view this investment so negatively.
3. Also, understand why this is seen as an effective investment, that is easy to embrace and yet not clearly an outright investment of choice.

## Suggested Supporting Evidence Required

An articulation of the benefits from the 150 systems that it replaces and simplifies, the reduction in operating/maintenance costs and a vision that shows the future value to multiple aspects of the firm (to broaden stakeholder ownership prospects).

If linked to a "digital" story, then how have others developed this story in this area. Possible Gartner input.

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## Action plan Inputs

4. Then focus on the CFO showing how the platform is in some manner transformational and together with the CEO show that the investment has a long-term benefit.

### 7.2.4 Automatic Supply Ordering

Status - Future Demand: To facilitate automatic store supply ordering based on sales patterns with additional functionality to manage promotional events.

Table 28: Automatic Supply Ordering action plan inputs

## Action plan Inputs

1. Build the case that systems need to promote/support opportunities for consumer growth/brand awareness as well as strong controls. These controls turn the growth into profit ... so argue that shareholder value is created through improved margins.
2. The focus of this message would be the CEO and CMO [overall most negative].

## Suggested Supporting Evidence Required

Re-examine the business case to assess the increase in margins arising from (a) improved store staff productivity (b) a reduction in waste, and (c) increased margins during promotional events.

Gain support/input from large franchisees in particular to quantify this view.

### 7.2.5 ERP Platform

Status - Delivered: ERP platform covering Finance and Supply chain.

For the franchisees, the systems considered was their in-house equivalent. For the Franchisees this was their back-office management system that covers Staffing; Sales; Ordering; salaries. The franchisee systems were not the same but provided each with an appropriately similar capability.

Table 29: ERP Platform action plan inputs

## Possible Action plan Inputs

1. This project failed to meet expectations and/or was oversold [S10] - members only marginally construe this project more positively than the CIO . Though

## Supporting Evidence Required

A revised governance for stakeholder and project/change management on large business process systems are to be improved.

Possible Action plan Inputs
introduced to improve operational control, the value of this needs to be promoted [S4].
2. Arguably, this project was only part delivered / not fully funded. Taken as a whole this project therefore could provide a strong platform for the future and this theme needs to be developed.
3. An action plan would need to re-position and re-launch the next phase of the project. Emphasis is on articulating how the benefits can be shown, how it addresses a business need, and the value perception of improved operations*.
*As regards improved operations, assuming the RFO's main control system can be built as well as those of the large franchisee, can lessons be learned as to how/why such controls are valued so highly? With modification or assistance from the

## Supporting Evidence Required

Consider supporting with a longer-term vision for business process systems that links to overall corporate strategy.

How have other firms justified and successfully deployed large control systems - such that the firm recognises and values the controls. (This could be another Gartner brief)

### 7.2.6 MIS and Reporting

Status - Delivered: A high-level business reporting tool. Can be used by the firm and franchisees. Franchisees can build custom reports and receive a revised selection of reports from Head Office.

Table 30: MIS and Reporting action plan inputs

## Action plan Inputs

1. Explore why there is such a large difference in view between the large and medium franchisees.
2. Also, explore the negative attitude of $H R$ towards this investment.
3. Review the delivery of the project to assess what lessons can be learned to change the perception that the collaboration with the delivery was poor and the system is not reliable.
4. Why is this project not being readily adopted given that the stakeholders

## Suggested Supporting Evidence Required

How do other companies sell the value of improved BI [Gartner]. Can the value be supplemented by franchisee input - this is assuming that the large franchisee has a negative perception of the MIS reporting platform as they already have adequate BI systems in-house.

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Action plan Inputs Suggested Supporting Evidence Required
were well briefed and the project rationale is clear?

### 7.2.7 Customer Order Management

Status - In Progress: A way to improve franchisee operational response time.
Table 31: Customer Order Management action plan inputs

## Action plan Inputs

Suggested Supporting Evidence Required

1. RFO staff (particularly the CEO, CSO and then CMO) appear to view this investment more negatively than franchisees or those with a franchise background. Are store operations well understood by RFO staff
2. Are there ways to promote the value or importance of store operational capability (as opposed to RFO brand/consumer growth).
3. Develop the association with / importance of the business parameter that this project is seen to address.

Can any lessons emerging from the corporate stores projects be "sounded out" with the Large/Medium franchisee?

Are there any stories from other (retail) companies regarding a subtle switch in focus from pure growth to operational efficiency as their markets mature/saturate? [Gartner input]

### 7.2.8 Order/Delivery Tracking

Status - Delivered: Targets a reduction in franchisee operational cost.

Table 32: Order/Delivery Tracking action plan inputs

## Possible Action plan Inputs

1. As this is generally a highly regarded project, explore why is the take up of the system perceived as being low / faces challenges.
2. Question the standout negative perceptions with those involved - (a) CEO (not a project of choice); (b) Franchisee medium - placing low operational reliance on the system, (c) CFO perception of low adoption*.

## Supporting Evidence Required

A key element of the benefit for Order Delivery Tracking is that it reduces labour costs (through improved scheduling). What proportion of franchisees have adequate controls in this area? What might be in the future plans for this technology to tempt them to onboard?
*One avenue might be highlighted by the large franchisee believing that "It doesn't satisfy that business performance requirement".

### 7.2.9 New Web/Mobile Application

Status - In progress: Mobile App rebuild to improve the User experience / customer journey.

Table 33: New Web/Mobile Application action plan inputs

## Possible Action plan Inputs

1. Reinforce the argument that the investment simplifies and reduces long term cost. Ally this to the sense that it is viewed as easy to deliver.
2. Focus initially on understanding why the franchisees view this investment so negatively.
3. Also, understand why this is seen as an effective investment, that is easy to embrace and yet not clearly an outright investment of choice.
4. Then focus on the CFO showing how the platform is in some manner transformational and together with the CEO show that the investment has a long-term benefit.

## Supporting Evidence Required

An articulation of the benefits from the 150 systems that it replaces and simplifies, the reduction in operating/maintenance costs and a vision that shows the future value to multiple aspects of the firm (to broaden stakeholder ownership prospects).

If linked to a "digital" story, then how have others developed this story in this area. Possible Gartner input.

### 7.3 CIO- Member comparisons

The comparison tables below were developed following the process outlined in Figure 20. These tables also were included in the action plan summary agreed with the CIO. The outputs are a tailored summary by stakeholder designed to be used by the CIO to structure a conversation with the each of them. Consequently, they include elements of the project actions and/or Honey analysis where they have particular relevance to that stakeholder.

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The comparison tables also make reference to "Red/Green bias" and sometimes to "Red Max". The Red/Green bias is simply the net of the Red and Green column scores from the heat maps. For an example, see bottom line of Figures 17 and 18. This metric gives a view as to the overall perception of a member's view of a project compared with the CIO. Red Max (or Green Max) is the sum of all the Red scores (or Green scores) from the heat maps that are used to calculate the Red/Green bias (the difference between Red and Green Max). These scores can be used to broadly assess the overall attractiveness or otherwise of an investment.

Unlike the project comparisons, what is striking about the member comparisons is the lack of similarity between them. Though the themes arising from the project comparisons are being reflected in the comparisons below, they do not dominate, making the comparisons read very differently. Maybe this is to be expected. That different people can experience the same events in different ways is consistent with PCT. But it suggests one reason why social alignment is hard to achieve. Without a process to help identify these varied individual perspectives it is challenging to initiate a dialogue with an individual decision maker, and even harder to engage and align a group of decision makers.

### 7.3.1 CIO - CEO Comparison

Table 34: CIO - CEO Comparison

| Focus | Area to explore further |
| :--- | :--- |
| Constructs | S5: Why does the CEO believe more investment is driven by what needs to be <br> done rather than what he wants to be done. It suggests that the CEO feels IT <br> activity is more mandated than he would prefer. The exception is Cyber Security <br> where he has indicated a polar opposite view to the CIO - this needs to be <br> checked. Also, on this construct the standout negatives on Order/Delivery <br> Tracking and W10/O365 should be explored. |
|  | S1, S2, S3: The CEO appears to have a generally higher rating (more positive <br> stance) than the CIO when determining whether an IT investment is of market <br> value and brand impacting, which the CEO assesses in terms of sales growth. <br> 'Sales come from brand value'. [F3] <br> 'Extracting value (i.e. money) from the customer'. [F9] <br> 'The ideal investment always provides growth'. [F2] |


| Focus | Area to explore further <br>  <br>  <br>  <br>  <br> S29, S25, S7: Particularly regarding operational process investments, the CEO <br> takegative stance. <br> If one examines the construct distribution for the CEO, he is very geared towards <br> market value and less towards operations. Franchisees, and especially the large <br> franchisee, by comparison place an emphasis on operations. Given that the CEO <br> has stated that: |
| :--- | :--- |
|  | 'The ideal investment would have some benefit to the customer' [F8], |
| It implies that the CEO views an investment that is purely focused on operations |  |
| quite negatively. |  |
| Maybe some evidence can be sought to help alter this perspective - possibly |  |
| another Gartner call would help? Again, I can write the brief. |  |

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### 7.3.2 CIO - CMO Comparison

Table 35: CIO - CMO Comparison

| Focus | Area to explore further |
| :---: | :---: |
| Constructs | S2 \& S3: Maybe unsurprisingly the CMO is far less believing that any of the business process investments create any consumer benefits or make the product more compelling; i.e. he perceives them as being more associated with the least preferred pole than the CIO. Are there ways to demonstrate the less tangible but real impact of say, Customer Order Management project? For example, it improves service delivery which is a benefit to the customer. He similarly construes Automatic Supply Ordering particularly poorly, but this investment could arguably provide customer benefit by allowing stores to fulfil demand when promotional offers are running. Feedback on this will be key to better positioning this future demand project. |
|  | S27: For a highly rated project, Order/Delivery tracking would be expected to command a high perception across the team as regards being "fit for purpose", and yet this is not the case for the CMO. Why? Also, no other team member has, to the same extent, differentiated it as not being or not required to be operationally reliable (S24). Again, what is driving this view. As was seen in the project comparisons by person, the person to perceive this investment least favourably is the large franchisee - but this could be driven by the cost of deployment to a large number of stores. |
|  | S9: The CIO's views on how the investment benefit is derived vis a vis the RFO and franchisee are also different for many projects. This should be probed. |
| Projects | Within the management team the CMO views Win/O365 upgrade the most positively. What is it that influenced this and are there lesson to be learned should there be similar projects in the future? |
| Other | The CMO's personal grid has three RFO investment elements (the others were external to the firm). One of these was the new mobile app which most closely mirrors the Ideal investment, but the other two both triggered a response that the solution lacks ambition and belief (B1, B12), and rationale (B7). Generally, this might be an area to discuss further to gather views on what could be improved or what approaches would minimise this perception with future projects. <br> The concept of ambition and newness is raised by the CMO in many of the discussions when eliciting the personal constructs in the first Rep Grid interview: <br> 'So, in all these cases the ambition was really good' (B8, B9); 'They are similar because they are trying to push stuff to the bleeding edge' (B7, B12); 'They innovate and come across like we're ahead of our direct competitors'. 'There wasn't a belief that IT could be brilliant'; 'No belief that digital or technology could play any role with customers' (B1, B2). |

Not all of these comments were elicited when discussing RFO projects but it may provide some insight as to what might shape the CMO's perception.

7.3.3 CIO - Supply Chain Director (SCD) Comparison<br>Table 36: CIO - Supply Chain Director (SCD) Comparison

| Focus | Area to explore further |
| :--- | :--- |
| Constructs | S5: Given the high negative rating on the ERP platform and W10/O365 <br> investments suggests that the SCD viewed these very much as mandated projects, <br> similarly Auto Supply Ordering. There is merit in trying to understand what it was <br> about ERP and W10/O365 that led him to this view as this may help better <br> position and improve the desire/commitment to undertake the future demand <br> project of Auto Supply Ordering. <br> Also, check that the reason for the mid-point rating for the Ideal project simply <br> means that sometimes the SCD recognises that on occasion some projects just <br> need to be done (even if it is of lower interest to him), as opposed to ideally all <br> projects should have an equal element of both criteria. |
|  | S4/S5: The SCD looks like a good ally for cyber security, rating it very highly as a <br> project he would want to do (polar opposite rating to the CIO), and is the most net <br> positive stakeholder. However, it appears as though he does not believe it will <br> improve risk management or operational capability. This is a general action that <br> has been captured. |
| S7: On the surface at least, it would appear as though the SCD is generally very <br> favourably predisposed to construing technology as being the best option where it <br> has been used/proposed. Can his reasoning be captured and promoted more <br> widely? |  |
| Projects | Very negative views on the MIS reporting, ERP platform and Customer Order <br> Management projects. The first two of these projects was in the SCD's personal <br> grid and were rated as being oversold, not helpful in driving revenue, slow to <br> deliver and poorly adopted. The MIS project also received special criticism as not <br> having any clear rationale/purpose, transcript comments being: |

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| Focus | Area to explore further |
| :--- | :--- |
|  | The implication is that the value of these largely process driven projects needs to <br> be better explained. |
| Other | The Standard Grid Honey analysis for the SCD shows that the MIS reporting, ERP <br> platform and Customer Order Management project are the lowest rated projects <br> as regards IT effectiveness. This is consistent with the above and needs to be <br> investigated. |

### 7.3.4 CIO - CFO Comparison

Table 37: CIO - CFO Comparison

| Focus | Area to explore further |
| :---: | :---: |
| Constructs | From the first interview funnel questions, the CFO makes it clear that value creation (sales and growth) is key to his thinking: <br> 'I obviously come from an angle of the CFO, so fundamentally [the rationale and motivations for the strategy] is about value creation. That's it. As a public company our job is to create value for our owners. Everything else is secondary to that'. <br> S3 \& S2: The scale of the Red Max rating suggests that more emphasis needs to be placed on how to make the product/offer more compelling and to a lesser extent how technology can be used to improve consumer benefits and hence reason to switch. While other constructs can be linked directly to value creation (e.g. S1), these constructs are highlighted. |
|  | S28: In comparison to the CIO, the CFO doesn't believe that generally there is adequate technical clarity around solutions. This needs to be tested as it may be that the CFO views the firm's general skill levels in some areas as being incomplete: <br> 'It's not a terribly mature environment, you do come here, you do step back in time - So I don't think the expectation is as high as it should be from the employees here of what "good" looks like'. [H4]. (See later comments). |
|  | S22 \& S1: Broadly speaking, compared with the CIO, the CFO has a similar, if slightly more positive, perception around the firm's ability to deliver systems without disproportionately driving up costs and the degree to which the projects are driving sales (ERP project excepting). |
| Projects | A specific on Cyber Security is the CFO's positive and polar opposite view of the operational reliance placed on cyber security. Given the general comments on this project, this may be a useful starting point to push the argument as to the overall value of the investment |

## Focus Area to explore further

For the Ideal project on the Standard Grid, the CFO had two very different projects in mind:

> 'I think in terms of front office and back office and [for my ideal investment], I would think of one that's front office and one that's back office'. [H3]
> 'So, my problem with the ideal is I keep flipping between the two so I think I'll try to stabiliser on one to make it a bit easier. .... It's actually quite difficult to think about that ...because this one's actually around HR systems implementation in a previous place, which went terribly well'. [H7]

By not considering the Ideal project abstractly, the CFO has rated the (possibly conflicting) projects he was thinking about. Test if this is the cause of the negative difference compared with the CIO. If this is the case then OK, nothing further to investigate.

The new web/mobile app and platform rate highly in the CFO's Standard Grid Honey analysis. That is not surprising as it is sales focused (i.e. value creating). What is surprising is that this is followed by W10/O365. This aspect is worth probing as it could help with articulating the overall promotion of its business value.
Similar to other team members, the ERP project is viewed negatively. However, for the CFO specifically, this negative view is generated from a perception of there being a skills gap. The staff are not able to clearly describe their business processes.
'I have heard a great deal about the poor functionality, for instance, of the ERP system. I've heard a great deal about that but I think it's a misdiagnosis of the problem'. [H4 commentary] 'It [ERP] was never going to work ..... Because the problem here is people, leadership and processes, non-existent processes, not the automation and standardization of those processes' [H6]
'And I don't mean processing in terms of purchases and orders. I mean it in the sense of how you do things, at a most basic level'. [H6]

Other The CFO's personal grid raised directly a construct previously not mapped to the Luftman model - one relating to skills [H4]. Though captured too late for inclusion in the Standard Grid (the CFO was a late change to the team composition), it has been reflected in the Governance Grid. This theme should be explored more widely with each member (along with communications).

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### 7.3.5 CIO - Operations Director Comparison

Table 38: CIO - Operations Director Comparison

| Focus | Area to explore further |
| :--- | :--- |
| Constructs | The OD has a more positive perception than the CIO across all constructs and all <br> projects (Net green bias by investment \& construct: 193). Are there lessons to be <br> learned about how he expresses these positive perceptions that may help with <br> other team members? |
|  | S2, consumer benefits for operational systems, is the most negative differential <br> and is applied to the Automatic Supply Ordering, ERP, MIS reporting and <br> W10/O365 projects. Having an operations background may in part account for <br> this. Also, it may be the emphasis he places on consumer experience (Individual <br> construct distribution against S1). |
| Projects | As above the most negatively perceived systems are the back of house systems of <br> ERP and W10/O365. Actions for these are noted on the project comparisons <br> table. |
| Other | None |

### 7.3.6 CIO - COO Comparison

Table 39: CIO - COO Comparison

| Focus | Area to explore further |
| :--- | :--- |
| Constructs | S9: Given that there is ideally a partnership with franchisees, the view that most <br> system are perceived as being RFO focused is possibly a concern. Question too <br> why W10/O365 is seen as directly benefiting the franchisees. |
|  | S12, S25: Polar opposite views on security and Web platform respectively. Not <br> recognising the role of security in terms of achieving a strategic aim is not on the <br> project comparisons. Need to question why the web platform is not viewed as <br> having any effect on the firm's capability. |
| Projects | The COO is the only person in the group that views the new mobile app on <br> balance negatively (red/green bias by project). The COO seemingly believes this <br> investment does not help operationally [S23, S25], is not especially <br> strategic/market driven [S1, S25], is hard to deploy [S11] and where collaboration <br> with the development team is poor [S13]. Need to understand why is there such a <br> difference in view. |
| Other | As judged by the Red/Green bias on the member pairwise comparison the COO is <br> the person with the greatest diversity to the CIO. Addressing the points above <br> may help explain / overcome this diversity. |

### 7.3.7 CIO - HR Director Comparison

Table 40: CIO - HR Director Comparison

| Focus | Area to explore further |
| :--- | :--- |
| Constructs | S3, S12: These suggest that compared with the CIO the HR Director does not view <br> many of the investments as favourably as regards longevity of solution in the <br> market place or addressing key business drivers. |
| Projects | The standout project for HR is the MIS project (extreme difference) followed by <br> the ERP Platform project (large difference). These differences should be <br> discussed. |
| Other | None |

### 7.3.8 CIO - Franchisee Large Comparison

Note: The ERP investment for this franchisee is in fact their own ERP platform equivalent

Table 41: CIO - Franchisee Large Comparison

| Focus | Area to explore further |
| :--- | :--- |
| Constructs | S20 \& S21: The ratings imply that this franchisee's general perception of the <br> portfolio is slightly more positive when considering innovation and developing <br> foundations for the future. This should be contrasted with S3 below as regards <br> the longevity aspect of that construct. |
|  | S3: Back of house systems are viewed less favourably as regards their impact on <br> making the product more compelling and/or the solution having longevity. This <br> franchisee's individual construct distribution was weighted towards an operational <br> view. Given that this construct fares poorly on essentially operational systems, it <br> is worth exploring with the franchisee further. |
|  | S15, S28: Given that market facing systems are generally preferred (vis Honey <br> analysis), aim to understand how it is that the franchisee perceives there to be a <br> lack of stakeholder ownership and engagement. |
| Projects | MIS reporting: This investment is generally perceived poorly (Honey analysis) with <br> the large franchisee being a main detractor. Understand from the franchisee <br> perspective why this is so. |
| Order/Delivery Tracking: This project is less favoured by the large franchisee. It is <br> possible this is because they already have systems that adequately cater for the <br> functionality provided by the Order/Delivery Tracking project and they do not feel <br> in control of the direction of any future development, for example: |  |

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Focus Area to explore further
an insurance element to it as well [and] we don't need that because we have our own systems'. [D1]
'The actual function and how it's developed is controlled by the RFO'. [D1]

Given the trend towards fewer franchisees with larger store portfolios, this should be explored.
Automatic Supply Ordering: Though an advocate of this project (Red/green bias by project) there is value is discussing what would need to be in place to overcome the more negative perceptions given this is a future demand project that should directly benefit franchisees (staff efficiency/productivity).
Other As can be seen from the personal construct distribution, this franchisee places an emphasis on systems delivering reliable and helpful information (S23 is mapped to D7, D8, D10 and D11). This is driven in the personal grid triadic process by their in-house ERP investment. Given that [their ERP] investment also has the best Redgreen bias, look to understand what is driving this and how the RFO might exploit the learnings.

### 7.3.9 CIO - Medium Franchisee Comparison

Note: The ERP investment for this franchisee is in fact their own ERP platform equivalent.

Table 42: CIO - Medium Franchisee Comparison

| Focus | Area to explore further |
| :--- | :--- |
| Constructs | Alongside the Ops Director the Medium franchisee is the most positive member of <br> the group (Red/Green balance). |
| Projects | The new web platform, and to some extent the accompanying web app <br> investment, is not as well received as other projects. This is interesting for an <br> owner who recognises the importance of the high percentage of sales that are <br> through the web channel. Maybe it implies that systems that focus on <br> efficiencies and productivity are more highly rated. This could be explored as this <br> perspective is different to the RFO's. |
| Other | This owner is very hands on and takes a very up-beat perspective on the ease of <br> deploying systems. For example: |
| 'WhatsApp is a wonderful thing. And the timing in New Zealand, it's |  |
| midnight here it's 9am there. Perfect. They'd wake up and I'm just going |  |
| to bed. I work late so I didn't really mind. They just walked into their |  |
| offices and I could just give them a project - so when I wake up tomorrow |  |
| morning it would be done. So, when I got up at eight in the morning it was |  |
| already done. So, whilst I'm sleeping, they're working. Fantastic. We |  |

should get them all in NZ it works a lot better. At least we're getting somewhere now'. [E7]

A key element of his individual Rep Grid is around integration/automation of systems for operational ease/effectiveness. It was raised in some form in many places during the interview, for example:
'And the integration is of value because it will save you, depending on the system that you're comparing it to, integration might save you labour costs or material costs'. [E3]
[The ideal investment] 'would help me with my accounting. It would help me with my marketing or help me with my up selling. It would do everything with it. .... it would just make my life easier. It would make the whole franchise model that I have got much, much easier if I had this ideal'. [E3]
'These two [investments] are standalone, this thing [Ideal investment] includes everything....[researcher's response: Yes, I've got that] . Do you understand? That's my issue'. [E3]
'[The CEO] said it was fantastic, isn't this lovely. But you know what his reasoning [for not integrating my systems] was for me, is that, he said I don't think it's such a great idea as the franchisees won't go to the stores they can sit at their desk and everything's there. But that is what franchisees do these days'. [Commentary].
'The [future demand] Back office [sales capture] system [5] is all about extracting data, automating processes'. [E2]
'Timesaving. That's, automation ....... I want a report that gives me how many orders I had last night from every store, and drill into that by clicking a button, drill into that order to see what happened, how it happened, how it was made'. [Commentary]

The medium franchisee has big plans for the Order/Delivery Tracking system too: 'It's going to become even more integrated. But right now, it's piecemeal. Are you going to mention I'm planning to take my credit cards on this. I'm planning to do my marketing on this. I'm planning to do loads of stuff'. [E9]

### 7.4 Conclusion

The tables presented in this Chapter are how the CIO and researcher interpreted the heat maps generated from the Stage 2 Rep Grid exercise. These tables were collated to form an action plan summary to be used to support a discussion with each of the stakeholders. Due to the participants'

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close involvement in the process, they are familiar with the Standard Grid format and the nature of the cell values, and more broadly the concept of a heat map. Consequently, just as Kelly had always sought to use Rep Grids, the heat maps can be used directly by the CIO and participant to draw their own conclusions, with the tables serving as a prompt for the CIO. These dialogues can easily be generated, without confrontation as the heat maps are factual, and used to start to develop shared understanding. From the CIO's perspective it helps with positioning the IT activities, improve relationships and drive the business value from IT investments.

## 8 Implications for the CIO: The CIO's comments

## 8.1 introduction

This study explores whether a better understanding of the nature and extent of the cognitive diversity across key stakeholders when making IT investment decisions can lead to the creation of an action plan that can improve IT effectiveness. Any such action plan would need to be of practical adequacy (Kanellis et al., 1999). This means that the CIO would consider it a workable plan (Denzin and Lincoln, 2008), and presumably trustworthy, and would wish to adopt all/part of it.

### 8.2 Value of the study to the CIO

At a summary level, the CIO believes that the study provides a greater insight into what most influences the stakeholders' decision making and has delivered a workable action plan capable of improving the IT effectiveness in his firm.
'The main value [of the study] was to gain a deeper understanding of how people view investments .... beyond the politicalness of the environment and their influences in terms of external influences that would normally influence their thinking.....[and] got to a deeper level of thinking about what they intrinsically thought was of value to them. It was having that understanding of how they think about those things. It really took away a lot of the clutter and got to the underlying thoughts that really mattered to them. And that's more powerful, to be honest'.
'Yes, [the action plan will improve IT effectiveness]. I think part of the reason why [is because], when you look at successful IT departments in an organization that are seen as value creators for the business, it's about making sure everyone understands ... it's about making sure you're surfacing that through the right conversations. This [action plan] helps give that steer. It helps you to start those conversations, and it also helps you to follow them through so that you can share what the value of IT is in a way that's relevant to people'.

For the CIO, the study has brought to the fore the value of good communication and the need to tailor the communication to each stakeholder. The action plan provides the information to shape these dialogues.
> 'What [the study] really teased out is the way that you are communicating the value of technology across the different stakeholder groups is important. Communicating in the right way to each person so that they can see where that value is. Beyond that, it's about making sure that you take into account those views when you are assessing the value of something. If you can't communicate that value, then that's not really going to win the day'.

What has struck the CIO is the value of placing a greater focus on the more personal or emotional aspects of gaining agreement. In other words, the CIO recognises the importance of the social dimension of alignment. The CIO feels that the study has been able to get under the surface of an expected response driven purely by a person's role. This marks an important distinction from the normal planning process (associated with the intellectual dimension) and he sees how it can help drive the commitment to an activity.
'When people make decisions, they're not just influenced by information. There's always this emotional connection to everything we do'.
'Part of the research that I value as well is it really does show where that emotion was and is in terms of some of the ways that they rated some of the projects. It allows you to cut through it ... because it's more intrinsic, more internalised. So, I think it provides clarity'.
'You might have people reaching consensus in the room, when underlying they're actually going "I don't really agree with that". Now you can get to the bottom of that'.

Linked to the above, the study's approach and use of one-to-one interviews, though more time consuming than a focus group approach, is valued by the CIO.
'It's easy to elicit a response on: "Do you think there's value in that investment? Yes or no?" in a room of people. That might provide a very different answer, to if you had a one-on-one and you really got to the core of what they were thinking, and I think this study really teased out a lot of that information and cut through it'.

### 8.3 Data collection and analysis

When planning the study there was a researcher concern that the method may not be readily understood, or that it may appear too complex, for an organisation to adopt. Though the CIO commented that the approach was methodical he did say that initially there was a lot to take on board.
'There's a quite a volume of information that was collected. It was very difficult for me in the first instance to try and distil between the left and right columns [construct poles] and trying to really gain a better understanding. But some of the further work that you were able to provide around the Honey analyses around the difference ... that was really valuable. That really gave me a better sense of what the data was trying to say, without having to try and distil it down and put all of the statistical analysis around it'.

A more statistical approach was deliberately not adopted as the literature had suggested this would not be valued in a case study of this type.
Consequently, heat maps were used to depict the degree of cognitive diversity between the CIO and stakeholders. The initial format of the heat maps provided insufficient information for the CIO, who specifically requested that they the show direction of the differences, i.e. do other TMT members view a construct more positively or more negatively than the CIO. This made it easy for the CIO to interpret the data.
'It actually provided quite a pictorial view of, well that's more or less what they're thinking on that. That's how they lean. Whether it's positive, negative or other'.
'I think one of the benefits of measuring everyone against my thinking helps me contextualized what they're thinking is going to be. Because I have a starting point now.... [It] is how I think about things. .... I know where to focus my energies. I know where not spend my time'

### 8.4 Findings and CIO engagement

The mapping of standard constructs to the Luftman model were developed in conjunction with an independent expert. However, the Governance Grid, developed from the thematic review of the funnel questions, relied on the
researcher alone. Consequently, the process involved in creating the Governance Grid was explained to the CIO. The structure/nodes and outputs of the NVivo analysis were reviewed, with the CIO checking the analysis of his own transcript and all of the value creation node; together with sample checking the CEO's and CFO's transcripts and other nodes.

Given that this study is informed by collaborative practice action research, it is important that the CIO felt engaged in this process and owned the output. The CIO stated that he felt "completely" involved in the process and recalled some pivotal meetings when the Luftman mappings and later the Governance Grid were generated.
'I did actually move some things around [when mapping constructs to the Luftman model] because I felt they didn't sit right in the context of our business environment and our people. But absolutely, I mean I literally did read through all of that material to make sure that those groupings made sense to me. And I think if I hadn't have done that, actually, I wouldn't have trusted that [Governance] grid'.
'Based on the information that was there, and it was very clear actually, when you look at the Constructs and you marry them up, that [construct], well, it does relate to that [theme]. I think the hard part is getting to what those headings are because you could end up with a hundred and it's really narrowing the focus down'.

In mapping the standard constructs to the Luftman model, none of the constructs were mapped to the category of communications. One interpretation of this finding is that the model is heavily process orientated, meaning that communications is largely expressed in terms of meeting types and frequency, which is a narrow representation, and arguably an intellectual dimension representation. A social representation of communications is unlikely to be expressed in those terms. Additionally, the model attracted some criticism from the independent expert. He felt the model generally was 'a bit old school'. His view was that it reflects a 'master-servant relationship and not the co-creation of teams increasingly found in digitally savvy companies'. In this sense he too thought the model didn't easily cater for the social dimension in a 'new world reality'.

Certain language, particularly technical jargon, is cited as important aspect of poor communication (Jentsch et al., 2014), and yet none of the standard constructs elicited refers to this or other aspects of communications. The CIO is not surprised that there is no mapping. His view is that IT groups have been working on improving their style of communication (language) since y2k. Good communication and lack of excessive jargon in the context of this firm is expected, and valued. Even so, it is a good characteristic to be reflected and one that is maybe less common than the CIO might expect. More satisfying to the CIO was not so much that the communications category did not attract comments about language or jargon but that IT hadn't been accused of communicating poor investment decisions positively.
'Yes, but what we didn't get is, you communicated it really well, but was it really the right thing to do?'

While at the individual level the CIO thought the study provided him with 'very valuable information'for developing a series of dialogues with stakeholders, the Governance Grid was seen as an especially helpful tool in guiding future debates on investment. The CIO recognised the value of a series of metrics that have been developed by the stakeholders as a result of this study. In the future, the Governance Grid will be used as part of the strategic planning process.
'One thing in the research that came out that sort of spreads across the whole group that could be used quite uniformly is that Governance Grid .... one of the great outcomes actually, which you provided to me' '[The Governance Grid] really gives me a great starting point for when we look at projects... [and] provides a really good balanced approach. Fundamentally, when you distil it down, those are the areas that people are thinking about'.
'So, if we can just use that as a template in strategy to say inherently how we all think about things, these things come up as important. If we're moving towards a strategy, how do we measure those initiatives against this Governance Grid'

At the individual team member level, the study provided value to the CIO through the heat maps. These can be used to help shape conversations with each individual on the topics of most importance to that individual.
> 'It does get to the core of someone's being and how they think about things and how they behave ... if you take our CEO as an example, it's really around "Do we make money from that?" That's his core thing. If we're not making money from it, why the hell are we doing it? So that very black and white view of his that the analysis and the study really showed very clearly, that actually is one of his intrinsic values .... I know for a fact now that he's not just saying that to pretend being a CEO, saying "This is my value", it really is, and it genuinely comes through in all the material that was shown'.

For the CIO, the study's action plan summary reflects that the RFO views the market facing investments very positively but views the in-house and store operational investments less so. This has crystallised the CIO's view that the RFO places a much greater emphasis on market facing investments than any other firm he has worked in. The main take away for the CIO is the need to place a much greater focus on positioning and implementing the operational investments. He feels that this has already started, with the MIS reporting project gaining greater traction as the older systems and reports are phased out. Also, the value of the improvements to the in-store Customer Order Management process project has been deployed and better understood.

Related to this, the study has brought into focus the difference in emphasis between the RFO and franchisee regarding brand and operation. This is potentially a more deep-seated issue arising from the more sales driven short term goals of the RFO and the longer-term foundational goals for the franchisees. As the CIO explains,
'[The franchisees] are creating a sustainable future for them[selves]. And it isn't just short-term thinking. They're not making money just because they want to live on an island somewhere. They're building an empire. They're building their legacy. [This is] driven by [the] need to be here for thirty, forty years, and [the] need to give something to my kids that they can value and respect. Whereas the internal view from a
number of people inside the company - they might be transient in their roles - their views are very much driven by: I'm going to be here for this long, how do I just get that momentum [in the role I'm doing]'.

The CIO's perspective is confirmed by the large franchisee who believes they are a family business focused on growth and sustainability.
'We're in this business for the long term .... a family business .... to make sure that the future generations have something to build on .... Our sole goal here is to build this [franchise] empire as much as we possibly can', Large Franchisee

Franchisees, whilst appreciating the value of the on-line sales platforms are, maybe unsurprisingly, equally if not more focused on store operations. The CIO wants to probe this area further as he believes that the larger franchisees in particular may see good operations as being just as pivotal in driving sales as a strong order platform. The CIO explains this thus:
'It's because the value proposition to them is not just price point ... all things being equal, what's the difference between my price at twenty pounds versus a competitor down the road for twenty pounds - [the answer is] Slick operations and product'.
'To them, the customer values the service that you're providing .... So, they focus on a lot of the metrics around, "if I run my store this way, my sales should just go up anyway"'.

### 8.5 Value of the Action Plan

The practical adequacy of the plan is seen as an important measure for this study as it would clearly demonstrate that the study has provided a contribution to practice. The Governance Grid is clearly something that the CIO is excited about and is going to take forward. In addition, the CIO is keen to progress a series of dialogues with the stakeholders based on the tailored plans for each individual/project set out in action plan summary.
'We talked about an action plan and there's a number of actions that come out of looking at some of the project specific things. Cyber security, as an example, I think there are really great things in there
that this research helps me define an action plan to get that thinking across the business on an equal footing'.
'I can use this research, to know where those gaps are, build up an approach at the individual level it will help me get people to the same place. So, when I mention cybersecurity, everyone gets it. They get that we have to invest this money and it becomes an aligned conversation as opposed to that emotional underneath the breath they're saying: I don't really believe in this. The research helps me create that plan to fill in those gaps [and] that's on me to now take that away and fill those gaps'.
'When you have a dialogue with someone you can't just get them to immediately trust that what you're telling them is the truth. So, the research and the things in the background helps support the dialogue. They help you pull out the bits that are relevant and say, well, actually, this is the case. It's sort of bringing it back to the truth all of the time'.

Generally, the study has been helpful to the CIO as it has given him greater insight into the perceptions of his senior management colleagues - saying that there is a 'lot of good stuff here'. The study has presented the data in a manner that is easy to understand and follow, and that has allowed him to form his own conclusions. The CIO believes that the study and resulting action plan will allow him to improve IT effectiveness.

The Governance Grid in particular was immediately adopted and used to support the firm's strategy planning process. The tailored plans of individuals/projects will also be used to create a targeted dialogue to improve IT effectiveness. These tailored plans are seen as really capturing the essence of certain individuals, for example, the CEO's focus on brand and sales. The study has also prompted the CIO to reflect on the positioning and implementation of the operational investments and the potential conflict created differences in the planning horizons of the RFO and franchisees.

By highlighting the areas of greatest cognitive difference, the CIO will now have conversations with key stakeholders on specific points of maximum difference. The CIO's belief is that this targeted approach will be effective and appreciated by his colleagues.

## 9 Discussion

### 9.1 Contribution to Practice

The nature of a DBA doctorate is that an aim of the research is, in part, to make a contribution to practice. By shaping the research so that the output was in the form of an action plan for the CIO, the final research question is in place to assess the workability of that plan. The responses shown in Chapter 7 and Chapter 8 confirm that the plan was of practical adequacy and thus is making a contribution to practice. The nature of this contribution is from the outcome of targeted discussions with stakeholders supported by an improved investment governance process. Together, the CIO believes these activities will improve communications and increase the level of shared understanding. Extant research suggests this will result in improved social alignment and hence improved IT effectiveness and value.

The action plan was agreed with the CIO at a meeting in February 2019. In September 2019 an unsolicited comment on the plan was received by email saying:
'I have really appreciated your insights and outcomes the study has produced. It has given me a new perspective on how people perceive our technology investments and helped steer my engagement to varying degrees with some individuals'

Not only has the Governance Grid been used at strategy awaydays, the heat maps are being used, in the manner intended, as the basis for dialogue with TMT members. Such action is a prima facie indication of the research's perceived trustworthiness and quality, and an indication that it is truly contributing to practice.

More broadly the approach can be developed and used by firms to provide a helpful mechanism whereby organisations can explore their alignment issues. To help with such a process the activities described and followed in this thesis could easily be packaged into a simple to use data capture and reporting tool that would allow firms to repeat the whole exercise periodically with minimal effort; triggered by market changes, team changes or passage of time. To support this position, consultancies have expressed an interest in developing
the approach into a SaaS service. This is because they view the approach as a powerful value add service that also gains access to the TMT, and which can be extended into the broader senior management team and their activities. Other firms have also directly expressed an interest in conducting this study with their TMT.

### 9.2 Contribution to Research

IT investment choices often involves senior management in a decision making process (Rawstorne et al., 1998) that can be viewed as a social interaction (Langley et al., 1995) where the different senior managers can have different perspectives of IT (Chan et al., 1997). Where different actors hold different views on a topic of interest, for example the CEO and CIO, disagreement between actors can result. Benlian and Haffke (2016) concluded that future IT cognitive research should specifically explore areas where disagreements are likely to occur, such as IT investment decisions. A structured literature search has confirmed this is a research gap at both a dyadic (e.g. CEO to CIO) and management team level; with the management team aspect being of increasing interest (Tan and Gallupe, 2006).

As previously commented upon (p53), while this is not a study in cognition it does draw on this concept. Though there is no recognised theory of shared cognition, PCT is considered to have provided the most significant contribution (Tan and Gallupe, 2006). Through its operationalisation it provides a way to quantify person's perceptions (Easterby-Smith, 1980b); which is the mechanism a person uses to evaluate the external environment and which determines their response/behaviour (Huang et al., 2010). Tallon and Kraemer (2007) concluded that TMT member perceptions are a good indicator of actual, implying that they provide a reasonable basis upon which to act. In other words, this act of sensemaking, which occurs through an individual's personal constructs can be used to assess events, such as investment decisions (Simpson and Wilson, 1999). Through mapping out the TMT member's construct system it is possible to assess the level of cognitive diversity, the management of which is critical if the TMT is to perform well (Eisenhardt et al., 1997).

This study focused on IT investment decisions, an area of likely disagreement, and has addressed the identified research gap at a dyadic level through the development and interpretation of the CIO-CEO pairwise heatmap comparisons. It has undertaken this activity not only with the CEO but all investment decision makers (TMT) and influencers (franchisees) identified by the CIO through the Project level heat map comparisons and interpretation of the Honey analysis. By doing the latter, this study has contributed to the research at the group level. It has also provided evidence that, though sometimes accurate, the expectation of a person's cognitive structure based on role stereotype is not always accurate

Many firms will formally engage in the intellectual dimension of alignment as evidenced by firms that produce operating plans and strategies for their company and IT. However, the literature search did not highlight any studies that examine how a firm might seek to formalise a process designed to improve social alignment. The literature searches demonstrate that when studying social alignment, the focus is placed on surfacing antecedents. For example, the social dimension of alignment has shared understanding as a key antecedent (Preston and Karahanna, 2009), which in turn has trust and influence as antecedents (Nelson and Cooprider, 1996). As such they tend to focus on the process of alignment as opposed to content of alignment (Wu et al., 2015).

This study focuses on the content of alignment in that it identifies contextual cognitive factors that might realise social alignment and sets these out in an action plan. The plan promotes communication between IT and other senior stakeholders in the firm, which is an important if differences of opinion are to be reconciled (Martinho et al., 2016), and should improve Business-IT relationships. According to Martinho et al. (2016) this in turn will improve ITBusiness alignment and thence organisational performance. The plan achieves this by targeting specific areas where cognitive diversity might lie and creates a targeted plan to tackle a relatively complex problem in a manner that can be easily understood and actioned. In this sense it is a contribution as it provides a pragmatic insight into social alignment, where the idiographic antecedents are being expressed in terms developed directly from elicited constructs. In

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this study, these were grouped under themes and presented in the form of a Governance Grid.

### 9.3 Contribution to Method

For this study, the constructs elicited during the personal Rep Grid interviews were transcribed, reviewed/modified and checked with the participant so as to captured as accurately as possible the participant's meaning. In part this was to help overcome any inadequacies of the researcher who, though experienced at interviewing, was new to the Rep Grid Technique; and in part to ensure that accurately worded constructs were being considered when forming the Standard Grid. This is believed to have provided a minor but helpful improvement and together with the other procedures put in place has helped to overcome the main procedural criticisms that Yorke 1983 raises, see Appendix 12.

Heat maps appear to be a novel and yet helpful way to present data intended to highlight differences between participant's cognitive structures. The literature searches and review of the specialist software packages did not reveal data being presented in this manner. Consequently, it may be the first time that Rep Grid data has been presented in this format. The value of this style for depicting differences is that most CIO's have experience of heat maps and are familiar with them. It would also seem fair to say that they are very easy to interpret, helping remove any barriers to their use and hence being seen as easy to adopt and act upon.

### 9.4 Stereotyping

In line with the sociality corollary, one might expect over time for the CIO to be able to part construe the construction processes of a colleague and associate these processes in a stereotypical manner to a role title.

Stereotyping in this context means the CIO associates a particular set of constructs with a role (Fransella (1977), p41). This research is sensitised to this attribute as Benlian and Haffke (2016) suggest it's an interesting aspect of investment decision making. There is a suggestion that the CIO has identified constructs that he would expect to associate with a person's role, for example:
'I guess there was a broad array of thinking across the different roles of my peers. And some of them were quite obvious, [for example] in terms of Marketing Director, [he] thinks a certain way about customer facing, outwardly facing projects versus, say, the operations or someone else who thinks more inwardly about how those things look'.

As we have seen, it was also no surprise to the CIO that the information confirmed that the CEO was focused on sales, i.e. how an activity makes money. In this sense the CEO's comments were aligned to the CIO's stereotype of that role.
> 'If you take our CEO as an example, it's really around "Do we make money from that?'

However, there is a cautionary note. During the study there were changes to the management team composition, with one such change being the appointment of an Operations Director to replace the outgoing COO. There is a significant difference in perspectives between the COO and newly appointed Operations Director. The CIO cites their different backgrounds as being a major contributory reason. The COO has a marketing background whereas the Operations Director was a medium size franchisee. This may explain some aspects of the diversity between them though one suspects that arguably the Operations Director currently has a more positive mindset towards IT (judging by the comparative heat map, see Appendix 9). From the CIO's perspective these positive aspects need to be retained. Interestingly, the conclusion reached by the CIO on this operations role appears to warn against making judgements on individuals based on role title, i.e. guard against stereotyping.
'Well that goes to show that a role title does not mean that person necessarily thinks the way that you would expect that role to think. And I think that showed in that transition, to be honest. It is very clear. So, you can't make assumptions about [associating constructs with a] role'.

Arguably it is possible to discern some negative stereotyping from the way in which certain personal constructs were expressed. For example, the CMO reflecting on past IT investments (before joining the case study firm) said:
'There wasn't a belief that IT could be brilliant'; 'No belief that digital or technology could play any role with customers'.

This resulted in a construct "Ambitious and forward-thinking mindset - Doing the bare minimum. Poor mentality driving the solution creation". This would reflect a stereotype trait identified in the literature for IT professionals and CIOs, that they lack ambition. Comments from the CFO about a project at a previous company also reflects a lack of ambition and/or possibly leadership.
> 'I think people thought you just pay a load of money, move onto a Hybris platform, snap your fingers and like suddenly our sales [go up]. Almost like re-platforming was a fad. You know, Hybris must have done a selling job to say this will be incredible. And the IT team, I remember, were simply trying to mimic the old site from the previous legacy platform onto Hybris - you think they're literally trying to copy and paste, well no, not literally but you know what I mean, they were ... if customers did this on the old platform they can do this on the new ...but right, I'm not sure that's going to change anything'.

However, their view at their current firm appears to be very different. An old stereotype may be active but it is not being blindly applied. This firm appears to have a CIO that has a mindset and approach that will deliver a good outcome.
'This [new mobile app investment] is still in development so I can't swear that it's going to be effective, but I feel like it's a really good project that going to be really good'.
'I laughed when you said what you said earlier Boards who say "yes" to an IT strategy when really they mean "yes" move onto the next agenda item. I think IT [here] is quite good but then that's probably from wherever anybody goes, you always think IT is crap. So, actually coming to [the RFO] I'm pleasantly surprised. I'm two years in of course, I'm a bit battle weary to some of the frustrations you get .... But if I wind back to when I started - [the RFO is] a lot better than most businesses really', CMO.

The CFO also suggests that IT is providing a degree of leadership in an important area for the business.
> 'We are in the process of upgrading from a hopeless technology to some very good technology. [The CIO] is leading the way on that, and that is incredibly important'.

Generally, CIO stereotype traits are not easily identified from the transcripts and where they do, in this case study, they are somewhat disconfirming of the researched CIO stereotype. Maybe this is not surprising. Combining studies such as Gonzalez et al. (2019) and Willcoxson and Chatham (2006) suggest that role stereotypes reflect personal traits and abilities. By contrast, constructs are arguably identifying investment traits. While there may be some touch points, to say that an investment is ineffective because its delivery is heavily influenced by a CIO's stereotype personality trait, should not necessarily be expected.

Reflecting on Breu and Peppard, (2003), stereotype traits could be viewed as being an example propositional knowledge. For a CIO to be informed that stereotypically they may not be a good leader is only partly helpful. Because the perceived negative outcome of negative stereotype traits is not being articulated, it provides few directional clues to a CIO as to any potentially corrective action that might be taken. By contrast, constructs provide more procedural knowledge. For example, negative stereotype traits such as socially inept, poor communicator, introvert (Gonzalez and McKeen, 2013) could be perceived as contributing to poor leadership. But what is the perceived outcome of these traits, and what practical action that can be taken? A construct rating might indicate that IT collaborates poorly with business groups and as a consequence they feel unengaged. Expressed in the form of a construct it is easier to develop a response. In this sense constructs have the potential to provide more practical and "useful" knowledge. However, such procedural knowledge may not be easily surfaced. Stereotypes are 'images in our head' (Leidner, 2013). One might conclude that activated stereotypes are therefore easily recalled, and in the case of CIOs, the image consistently reported in studies is seemingly quite damaging. By contrast, generating Rep Grid constructs is referred to as being cognitively demanding

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for the participant (Curtis et al., 2008). The implication being that constructs are not quickly activated 'images in our heads'. Constructs would therefore appear to be more deep seated and arguably less superficial.

How might this idea be operationalised? In this case study there is huge focus on market facing investments.
> 'I think the most important part of technology for this business is what I would call the client facing/customer facing technology. [The new mobile app and web are] by far the most [important technology for this firm] ...I'm sure everybody would say the same thing. It's what we spent a lot of money on', CFO.

It probably follows that more operational (back office process) investments, whilst possibly accepted as being required or important, are not where the business wishes to spend its money. However, IT will likely play a pivotal role, have high involvement and an identifiable (and material) cost. Such a project, as it is not market facing, may be perceived as a grind (detailed process oriented and unexciting) and non-enterprising; traits reflected in the CIO/IT stereotype. By considering the potential investment traits of even a well delivered operational project, the CIO might be able to position the project so as to provide disconfirming evidence to offer against the negative IT stereotype traits.

The evidence is that IT is of value to firms and yet popular and academic literature, which presumably shapes peoples constructs and stereotyping, often portray IT functions and CIOs as failing (Hirschheim et al., 2003). They suggest the real question to ask is how these senior executive perceptions are formed. In this study, the ERP project was perceived as failing and it would be easy for senior executives to simply say IT failed. But is that true? From the transcripts it emerges that the project failed because (a) the wrong business skills were applied by business functions (b) the business functions were not clear on their operational processes and (c) the project was only part delivered, due to funding revisions, thereby omitting project elements that delivered promised benefits. Hence the project was considered as oversold. In fact, it was not oversold, it was under delivered, but not solely due to a failure of IT.
'I think, before I joined and equally after I joined, I have heard a great deal about the poor functionality, for instance, of the ERP system. I've heard a great deal about that but I think it's a misdiagnosis of the problem', CFO.
'So, there's an assumption here that something went wrong in the implementation of the ERP system, and we need some group of people to come in and fix the system. All we'll have then is a beautiful system run by people who don't know how to use it. Because the problem here is people, leadership and processes, non-existent processes, not the automation and standardization of those processes. It was never going to work', CFO
'The ERP feels like a bit of a disaster here but actually compared to what I'd say is phase one of other ERP implementations I've seen, it hasn't gone badly - but it hasn't delivered the benefits that it was sold on. But that's because we've only done half of what would be needed to be done to get those benefits but in terms of, you know, making a big transition from one platform to another platform that hopefully you can build on in the future, I think, relative to other ERP implementations, it was relatively unscathed', CSD

Not observed in this case study, but contentiously, one might argue that in many firms it suits business executives to perpetuate IT/CIO stereotypes, as it can deflect attention away from the true cause of the problem, which might lie outside of IT. This implies one doesn't start to make changes to perceptions by first considering CIO stereotypes. This study challenges conventional conclusions that, for example, stereotypes are a useful starting point from which to understanding of the relationship between IT and the business (Gonzales, 2012), to be used as the basis for enhancing their status (Gonzales, 2013). An area for future research could be to examine the area of IT perceived failure more holistically from a cognitive perspective based on outcomes of the investments. It could even be problematised and framed as a strategic paradox, for example, IT is required to balance flexibility with standardisation, or IT is required to balance rapid growth with strong operational control.

### 9.5 Paradox

A secondary objective of the research was to assess the study revealed any form of paradox. Lewis (2000) describes the source of a paradox as a perceptual tension arising from persistent contradictory yet inter-related demands (Smith and Lewis, 2011). Drawing on the work of Kelly, (1955), suggests that these contradictions are accentuated as a consequence of the nature of a person's construct system. At a strategic level, a paradox would arise from different stakeholders having competing organisational demands (Smith, 2014). In this case study, the CIO has perceived two such paradoxes, these being the firm's need to: (a) Balance the growth demands of the RFO with the equally important demand of operational control sought by franchisees, and; (b) Balancing the shorter term drivers of a plc with the longer term ambitions of a family business.

Though not commented upon, the standard constructs highlight the potential for a paradox to exist at the investment level. For example, it may be construed that standard constructs S17 and S25 potentially cause a paradox. Taken together, these constructs require an investment to offer a balance of attributes that preferably reflect a low degree of change at the same time as being transformational, i.e making substantial change. In practice such a combination of attributes is potentially unlikely to be exhibited by a single investment. Consequently, the construct system contains constructs that are contradictory, or paradoxical, in nature. PCT caters for this 'inferential incompatibility' through the Fragmentation Corollary, p48.

Though the study is not specifically designed to identify and explore paradoxes, it has provided sufficient information to conclude they exist at the firm. On reflection this is unsurprising. The RFO and franchisee are essentially two separate, but tightly coupled, businesses. The RFO would appear to have put in place sensible measures to help manage this conflict by embracing franchisee representation on key committees/boards.

### 9.6 Structure

Reporting structures were raised in section 2.13 .1 as being important as they define power and control. Such phenomena are associated with performance,
which for this study would be reflected in the CIO's ability to enact the action plan. Consequently, it was highlighted as an area of interest. With reference to the characteristics highlighted in the earlier Chapter, Table 43 below comments on the observed positioning in this case study.

Table 43: Assessment of the characteristics facing the CIO

| Characteristic | Observed Position |
| :--- | :--- |
| Firms with focused goals for IT realise more | The linkage diagram (Figure 10) developed |
| value than those that do not, and are more | with the CIO's team using secondary data |
| likely to be better strategically align (Tallon et |  |
| al., 2000). | sources show a clear focus at the intellectual <br> dimension for the firm's IT. |
| Where the firm's IT focus is on the firm's <br> growth and shareholder value then inclusion <br> of the CIO on the senior management team <br> can be beneficial (Taylor et al., 2015). | It is clear that the management team at least <br> have a focus on growth. The franchisees do <br> also, but temper this demand with <br> operational control. The CIO is an integral <br> part of the senior management team and is <br> fully engaged in the strategic planning process |
| -which now incorporates the Governance |  |

For this case study the conclusion reached is that the CIO is appropriately and well positioned to develop a strong working relationship with the CEO and other TMT members; and hence well positioned to deliver value from IT.

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## 10 Conclusions, Limitations and Future research

This research is motivated by the researcher's professional encounters with senior management, and finding that the value of IT is often not always fully recognised and hence not perceived by senior executives as being totally effective. That IT is viewed in this way is supported in the literature (Shpilberg et al., 2007, Johnson and Lederer, 2010). This view prevails despite the fact that, more generally, IT is shown to be of value (Manfreda and Indihar Štemberger, 2013), that IT is often mandated, typically by the senior executives (Rawstorne et al., 1998, Carugati et al., 2018); and that it is senior executives who keep on investing in IT (Burton-Jones and Grange, 2012). That it is the same executives that make the investment decisions that declare IT to be ineffective is the strange dynamic that helps shape the real-world problem that this research seeks to explore.

The research aim was to explore whether a better understanding of the cognitive differences across IT investment decision makers and key influencers regarding the effectiveness of such investments can be used to develop an action plan in which the CIO has confidence and on which this technology leader is willing to act. In so doing the research potentially offered practical guidance in an area that is rarely, if ever, covered by a formal process in a firm.

To address this aim, a qualitative and exploratory view of social alignment was taken. Social alignment is a critical dimension of business/IT alignment, which in turn is a phenomenon positively associated with IT effectiveness and value through improved firm performance. The action oriented and inductive nature of the study is consistent with the pragmatic philosophy and case study approach adopted, with the intended output being a workable plan for the CIO to improve IT effectiveness.

The conclusion reached is that it is possible to assess the cognitive diversity across a senior stakeholder group within a firm and that a plan can be developed that the CIO is willing to act upon. The study contributes to knowledge by examining cognitive diversity with respect to the CIO in an area of disagreement; contributes to practice by virtue of developing a high content action plan that the CIO is enacting; contributes to theory as it offers a
different perspective on social alignment antecedents; and offers a minor contribution to method.

### 10.1 Reviewing the research questions

Table 11 in section 3.3 sets out the research objectives together with four research questions. The responses to these questions will allow a conclusion to be drawn on the exploratory aim of the research.

### 10.1.1 Investment decision stakeholders

Research Question: Can a CIO identify the key stakeholders involved in IT investment decision making?

In this study it is clear that the CIO was able to identify the stakeholders involved in the investment decision making. Purposeful sampling was used to ensure that the CIO targeted those who were key to the decision-making process of the RFO. This resulted in a sample that included the top management team and two key franchisees. The management are directly involved in the decision making but the franchisees selected sit on key operational/advisory RFO boards and are highly influential. The sample selected appears typical of what might be expected at many firms (Rawstorne et al., 1998, Xue et al., 2008).

During the study, the composition of the management team changed and the CIO asked that the new team members be included in the study. This demand clearly shows the intent and the importance attached to management team members by the CIO in the decision-making process.

### 10.1.2 Stakeholders' mental models of IT effectiveness

Research Question: Assuming the stakeholders can be identified, can their mental models regarding IT effectiveness be captured?

A Thematic Analysis of responses to a semi structured interview and Rep Grid analyses at both the individual and group level were used to capture stakeholders' mental models. The CIO was the first participant to be interviewed for each stage thereby allowing the CIO to experience the interviews and techniques being deployed ahead of the rest of the
management team and franchisees. Any feedback or questions on procedure was discussed and reflected in the interviews that followed.

The real time capturing of the constructs and the ability to present a small number of analyses at the end of the interview helped engage the participant. At all times they were able to see what was being captured, and the immediacy of the analysis outputs helped provide context and meaning in what could otherwise have felt like an abstract exercise. Though Rep Grids are recognised as being cognitively demanding, neither the CIO nor members of the management team had issues in completing the exercise. However, one franchisee interview did last nearly 3.5 hours. On reflection, this was possibly because the Rep Grid exercise was more tightly scoped than had been anticipated by the participant; a specific challenge of the technique that is noted by Curtis et al. (2008).

The CIO has commented that he was fully engaged in the process of capturing and mapping of individual constructs to the Luftman model, with the creation of the Standard Grid, and development of the Governance Grid. The manner of the creation of the Standard Grid and the CIO's understanding and willingness to accept and use it for Stage 2, demonstrates (a) The CIO understood how mental models were to be compared, and (b) Had sufficient confidence to sanction its use with senior executive colleagues. The CIO's engagement and understanding were also strongly evidenced by his input that shaped the nature of the comparisons, resulting in the heat map format.

The CIO also engaged in the thematic analysis. The CIO reviewed the NVivo analysis of his own responses and those of two other participants, together with sample checks of the coding of other stakeholder responses. It was this overall amount of review and checking by the CIO that developed the declared trust he had in the Standard and Governance Grids.

In summary,

- The use of Rep Grids, both personal and Standard, proved to be a practical and viable way to capture stakeholders' mental models of IT investment effectiveness. This was despite the obvious time pressures that senior executives are under and changes to the management team.

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- The CIO understood, helped develop the format and was deeply engaged with and trusted the Grids used to compare the stakeholders' mental models.

Taken together, the first two research questions have shown that the objective to capture each decision makers perception of IT investment effectiveness and views on business/IT alignment was achieved.

### 10.1.3 Contextual understanding of the causes of cognitive

 diversityResearch Question: How might the stakeholders' mental models be analysed and communicated to the CIO in a simple and easy to understand way?

Having created the Standard Grids to compare the stakeholders' mental models and completed the Stage 2 stakeholder interview, can the comparison data be presented in a way that the CIO can easily understand?

At a summary level, the CIO believed the Honey analysis was valuable because he said it 'gave a better sense of what the data was trying to say without having to try and distil it down and put all of the statistical analysis around $i t^{\prime}$. While this type of analysis provides a good starting point, a more detailed account is needed to drive an action plan.

To understand how the group level cognitive differences were generated, a series of comparisons were calculated using the CIO position as a reference point. The CIO was chosen as the reference point, as being the firm's technology leader and a powerful voice in technology decisions, has a vested interest in understanding the differences. It was not assumed that the CIO's position was correct, simply the most committed to determine where on the Grid's construct scale the firm was likely to achieve the greatest alignment and the action required. The format finally chosen to present the data was a heat map that clustered similar rating differences across projects or individuals. These heat maps allowed the CIO to easily identify the gaps and from that understand the conversations that would be most helpful to 'get people to the same place', i.e. drive a shared understanding.

Feedback from the CIO provided in section 8.4 is clear. Cognitive differences between the stakeholders in the context of this firm can be presented back in
an easy to understand and engaging manner. From the CIO's perspective the second research objective has also been achieved: The degree of cognitive diversity across the TMT and franchisees regarding IT effectiveness has been assessed.

### 10.1.4 Practical Adequacy

Research Question: From the analysis, is it possible to create an action plan of 'practical adequacy' (Kanellis et al., 1999) designed to reduce stakeholder cognitive diversity?

This study is intended to be informed by collaborative practice action research (Iversen et al., 2004), for which a key output is a jointly created action plan for the CIO output that is of practical adequacy (Kanellis et al., 1999). For a plan to meet this criteria it must be acceptable to the CIO and the knowledge gained acted upon. Denzin and Lincoln (2008), p73 refer to this as the workability of the action plan and whether the technology leader is willing to act on the findings of the study of any related action plan. By being willing to act on the plan the technology leader is placing sufficient confidence in the finding's validity to expect that there will be a net improvement to IT effectiveness.

Kanellis et al., (1999) suggest that to develop such a plan the CIO and researcher need to be actively communicating and engaged in the interpretation of the study's outputs. Chapter 7 confirms that not only has the CIO been engaged in developing the plan, he has been engaged in the processes that developed the Luftman mappings and created of the Standard and Governance Grids. As for the plan itself, evidence was presented in Chapters 7 and 8 that shows the CIO is willing to immediately take the Governance Grid to the Board strategy sessions and, more generally, is considering how to use it as a strategy tool moving forward. The CIO has also spoken about the dialogues he will have with the stakeholders around the cognitive gaps and how the study helps him focus where to place his time and effort when so doing.

The responses from the CIO to that specific question confirms that it can produce such a plan at an individual, group and project level.
'I can use this research to know where those [cognitive] gaps are, build up an approach at the individual level it will help me get people to the same place'
'The Honey analyses around the difference, was really valuable....it actually provided quite a pictorial view of what the [group are] thinking on that .....[and the Governance Grid] spreads across the whole group'.
'There's a number of actions that come out of looking at some of the project specific things this research helps me define an action plan to get that thinking across the business on an equal footing".... "[Also, the Governance Grid] really gives me a great starting point for when we look at projects'.

The CIO has been engaged throughout the process, has been involved with interpreting the study's outputs, has declared his trust in the grids, has endorsed and is now enacting the plan. The conclusion reached is that the plan provided is of practical adequacy. In saying this, the third research objective is also achieved: An action plan designed to increase the degree of shared cognition across the group has been developed.

### 10.1.5 Research Aim

From the responses to the above questions it is concluded that:

1) It is possible to gain an insight into the nature and extent of the shared cognition across these stakeholders regarding IT effectiveness, and
2) It is possible, from an understanding of any cognitive differences, to develop a plan designed to improve the social alignment across these stakeholders and hence value gained from IT.

Consequently, the aim to explore the possibility of being able to develop an action plan designed to improve social alignment and IT effectiveness based on an improved understanding of the TMT's cognitive differences has resulted in such a plan being produced; to the satisfaction of the participating CIO.

### 10.2 Limitations

The most obvious limitation is the time limited nature of the research outputs. An individual's construct system can change over time (Choice/Experience

Corollary) meaning that the nature of an existing group's diversity may change over time. Changes in the team's composition will also have a similar impact especially if the new team member is also new to the firm, for example the CFO in this study. Changes in market circumstances my also drive a change in a firm's mission and in turn how individual's view their world. It would have been particularly interesting to track the CFO and new Operations Director over time to ascertain whether their perception of IT effectiveness changed as they became more embedded in the role and management team. None of this is a surprise and simply reflects the already noted dynamic nature of social alignment. The CIO recognises this and the requirement to periodically repeat the research activity:
'People do grow up and mature, even new people come into the business. This is very much a moment in time exercise'.

This is a single, idiographic, qualitative case study. Such studies aim to explore a 'phenomenon within its context' (Baxter and Jack, 2008) and do not lend themselves to generalisation. This is consistent with PCT which holds that a person makes sense of the world through a construct systems that in part is actively shaped by choice and experience (Marsden and Littler, 2000). Consequently, context could be highly influential in shaping that person's view of reality. Furthermore, the evidence in this study is that attempting even to generalise at the level of a specific role will have its issues.

It has already been commented upon that a qualitative alternative for the quantitative criterion of generalisability is transferability. While the research outputs may not be generalisable, the method for generating the outputs is certainly transferable. The use of personal grids to form a Standard Grid to assess the degree of the group's diversity, to triangulate these findings by mapping the constructs to themes derived from a semi-structured interview, is transferable to other firms.

This study could benefit from being extended into a full action research or longitudinal study. Data could then be captured that could be used to assess the aspects of the change management required by the action plan. This would enrich the research and provide a greater research contribution. It could potentially provide an understanding of the change management activity
required to convert the action plan into improve shared understanding and an assessment of the change activity effectiveness. Such a course of action would materially increase the research time and resources required, and prolonged access to senior executives would also likely prove challenging. An extension of this study, designed to capture and analyse the change management aspects of a cognitive diversity reduction action plan, could be a candidate for future research.

The personal Rep Grid interviews in this study were transcribed. This was to help ensure that the constructs captured were a good representation of the meaning being expressed by each participant. It could be argued that this action in itself identifies a weakness in the process. There may be little challenging of the statements, though probing questions are used through the technique of laddering to clarify construct meaning. Objectively determined original meaning might not be satisfactorily uncovered. The debate becomes one of hermeneutics with the above comments being advanced from a critical perspective (Butler, 1998). However, in the same text, adapted from Coyne (1995), a pragmatic/constructivist hermeneutical perspective is provided that is reflected in Rep Grid praxis. This perspective suggests that interpretation is contextual and draws on the background of the researcher and participants. In this study the researcher has a rich background in IT management and interaction with senior executives, and is familiar with many aspects of the case study firm's industry. The additional steps taken are uncommon in Rep Grid studies and are believed to only help refine the accuracy of the participant's meaning.

Finally, though generalisability may be viewed as a limitation of the study, the study's focus was always to study cognitive diversity within the context of a firm and explore the value that might accrue from that understanding. The study has successfully demonstrated that an understanding of the cognitive diversity across a group of stakeholders in an area of disagreement, such as IT investments, can be used to create an actionable plan of merit. Also, it is believed that the study has established a process that is repeatable within and across firms.

### 10.3 Implications for Future Research

As previously mentioned, extending the study over time could be a valuable avenue to explore, as could extending the study to other regions within this firm. More generally, this would suggest designing research that explores the nature of management team cognitive diversity across firms that are regionally discrete, possibly legally separate businesses (as would be in this case when extending this study), but united by a common overall purpose and ethos. This was discussed with the CIO who commented that:
'I think the nature of our business [between regions] is not different. It's the same .... the contrasting nature of that would be interesting to see. Actually, do people view more broadly the technology challenges the same or different [across regions]. And is one area [region] doing it better than another. And what we learn from that. I think we naturally try to get to that answer by just visiting these markets and talking it through with people. But having some way of actually measuring it, I think is quite powerful for sure'.

The study could also be extended to explore the nature of constructs in firms of different strategic topologies as outlined by Miles et al. (1978). One might expect "Defender" firms to perceive IT as being effective if it helps the firm be more efficient; whereas in a "Prospector" firm value perception from IT may be associated with product exploitation.

It would be interesting to explore possible derivations of the Luftman model that expresses alignment in terms that are less process oriented given the experience of this study. This study arguably provides a hint that an alternative a model that is more socially sensitive might express alignment in terms of a distinction between a good and poor outcome of a process, rather than whether a process exists and is followed. This would provide management with a different perspective that might have value.

Finally, a re-shaped study could explore circumstances where cognitive diversity is occurring due to role conflict. Role conflict can arise where one or more stakeholders has an expectation of the role being providing by the CIO that is not met (Floyd and Lane, 2000). For example, Kock (2004) examined a role conflict arising from a management team view that the role of IT was to

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protect information whilst the end user's view was that IT should deliver exciting new services. There is potential in this study for such conflict but it was not explicitly explored, and could not be explore directly with the triad question posed. In a business environment where staff are becoming more IT-savvy and where different development methodologies such as "agile development" demand changes to working practices that blur past role boundaries; role conflict may become a challenge. Possibly a better understanding of role perceptions would improve team performance and value.

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## Appendix 1: Participation Information Sheet

## Participant Information Sheet

Study Title: A cognitive approach to IT effectiveness and firm performance

Researcher Name: Alastair Tipple

ERGO Number: 30704
Please read this information carefully. If you are happy to participate you will be asked to sign a consent form.

## What is the research about?

This research is centred on gaining an understanding of the different ways in which senior decision makers and key influencers of technology expenditure think about technology effectiveness. The goal is to reach a common understanding of how technology can be best positioned to deliver greatest commercial value for your firm. This will be underpinned by an action plan jointly developed with [Name]. The work is being undertaken as part of a doctoral project at the University of Southampton and is motivated from observations and experiences from my time as a CIO and advisor at FTSE 100 and other companies.

## Why have I been asked to participate?

[Your CIO ] has identified you as being a key person in shaping the use and operation of technology within the firm and someone whose input is very valuable. It would therefore be helpful and important to the research to capture your thoughts.

## Are there any benefits in my taking part?

Yes. A better understanding and managing the differences in the way that key people think about IT can lead to improved decision making and increased contribution to firm performance. The outcome of the research and action plan should make the IT within your firm more effective. In addition, you should feel that you are able to:

Gain better overall value from any technology expenditure.
Better understand how to further exploit changes in technology and market services.
Shape demands so that they contribute to a reduction in the long-term cost base.

## What would I be asked to do?

You will be asked to take part in an interview that will last 60-75 minutes. During the interview you will be asked some open-ended questions (that I will send you in advance of the meeting); and together we will complete a special form of questionnaire that I will explain when we meet.

Ideally, and not unusual for research projects, I would like to audio-record our interviews. This is because it will be challenging for me to run the session and take accurate notes simultaneously. The audio recordings will not be shared with anyone. Where a transcript is produced it will be sent to you if requested/desired. Transcripts will not be shared. The sole purpose of the recording is to allow me to go back through the interview to make sure l've captured everything of importance.

## Will my conversations be confidential?

All information captured from the interviews will be encrypted and held in a link-anonymised way. This means that your data will be coded so that interview inputs/analysis outputs can only be linked to your name via a 'key'. This 'key' will be stored securely.

Having said this, the value of the research is from building an understanding of how different people in the firm think differently about IT. In particular it is important that this understanding is shared with your CIO . Once you have been through and understood the process, I would wish to share with the ClO the themes emerging from your responses to the open-ended questions and an analysis of your response to the questionnaire. This allows a comparison to be made between the CIO's view and those of the other decision makers and key influencers. It is this comparison that will inform any action plan. Any such plan that results from the research will be executed and managed by the ClO and does not form part of this research.

## What will happen to the results of the research?

The results from this research are intended to form part of a thesis that will submitted for an academic award from Southampton University. The thesis will be written such that your name and that of the firm will not be disclosed. It is not intended that any source data (for example from interviews) be stored or used for future research, nor is it my intention to publish the thesis. However, it is the policy of Southampton University to store the thesis and its supporting data for 10 years in their institutional repository. There should be no risk involved. As this proposal has been endorsed by Southampton University, the University has insurance in place to cover its legal liabilities in respect of this study.

## What next?

We have an interview scheduled for 7 December. It would damage the value of the research should you now decide to drop out of the process, but if this happens please let [Name] and myself know.

If you need more information, please contact myself or one of my supervisors:

- Associate Professor Jonathan Klein - Tel: +44 (0)23 8059 2554; Email J.H.Klein@soton.ac.uk
- Dr Hameed Chughtai - Tel +44 (0)23 8059 8994; Email H.Chughtai@soton.ac.uk
- Or via post at Southampton University, Building 2, Highfield Campus Southampton SO17 1BJ UK.

If you have any concerns that cannot be dealt with by either the ClO , myself or my supervisors, the University's Research and Governance Manager who is independent of the study can help determine with you the best course of action. Their contact details are as follows:

Research and Governance Manager - Tel +44 (0) 238059 5058; Email: rgoinfo@soton.ac.uk

Thank you for taking the time to read the information sheet and I look forward to meeting and working you soon.

## Appendices

## Appendix 2: Research Consent Form

## CONSENT FORM

Study title: A cognitive approach to IT effectiveness and firm performance

## Researcher name: Alastair Tipple

ERGO number: 30704

Please initial the boxes if you agree with the statements:

I have read and understood the Participant Information Sheet (Participant Information Sheet v1c BW) and have had the opportunity to ask questions about the study.

As set out in the Participant Information Sheet:
I agree to take part in this research project and agree for my data to be used for the purpose of this study (only). I have understood the process and I am willing to share with the CIO my responses to specific set questions and an analysis of my response to the special questionnaire.

As set out in the Participation Information Sheet, I understand that:

My participation is voluntary and I may withdraw (at any time) for any reason without my rights being affected.

Information collected during my participation in this study will be stored securely My interview will be audio recorded for the purposes of helping the researcher. A copy of any transcript will be available to me on request but otherwise will remain confidential.

The study is being undertaken as part of a doctoral project at the University of Southampton. My responses will be anonymised in reports of the research. I understand that I may be quoted directly in the submitted thesis but that my name will not be used. Likewise, the name of my firm will not be disclosed.

If you have any specific request as part of your participation, please comment below:

## Name of Participant (Please print)

Signature:

Date:
/ / 2018

## ALASTAIR TIPPLE

Name of Researcher

Signature:

Date:
/ / 2018

Appendix 3: Part 1 search returns: SQ category mappings
This appendix maps the papers presented in the SQ category of the search return to the Jentsch et al. (2014) shared understanding model.



| Author | Tise |
| :---: | :---: |
| Oppenheim C Studies on information as an asset II: Repertory grid |  |
| Uu 5., Zhang 1 . Comparing senior executive and project manager percepstons of it project rime |  |
| Mhlungu, NSN The underiying factors of a successful organkational digital transformation |  |
| Ow, TT ; Morri An Experimental Study of Executive Decision-Making With implications for Decision Support |  |
| Vermerris, $\mathrm{A} ; 1$ No time to waste: the role of timing and complementarity of alignment practices in creating bus iness val |  |
| Apan, SO; Hariconsidering social subsystem costs and benefits in information technology investment deisions: A view it |  |
| Orikowski W. Technological Frames: Making Sense of Information Technology in Organizations |  |
| Lehong S.M., I An investigation into the perceptions of business stakeholders on the benefits of enterprise archinecture: |  |
| Pan, GSC | Information systems project abandonment a stakehoider analysis |
| Young BW, M inconsistent and incongruent Frames During IT-enabled Change: An Action Research stway into Sales Pro |  |
| -6u, Cw | Frame misal grment interpreting the implementation of information systems security certification in an |
| Cho, v; Wright Exploring the evaluation framework of strategic information systems using repertory grid technique: a co |  |
| Tegarden D.P. Cognitive factions in a top management team: Surfacing and anajping cognitive diversity using causal me |  |
| Amoroso D.L. The Senior Executive as Organizational Staheholder of Microcomputer Technology |  |
| Hedelin, L; Allh [T and strategic decision making |  |
| Tan, F BFF B T Aligning business and inform ation systems thinking a cognitive approach |  |
| Elaize Horner Factors that influence the social dimension of alignment between business and information technology 0 |  |
| Krotov V. | Bridging the CIO-CEO gap: It takes two to tango |
| Reich, BH; Ber Measuring the Inkase between business and information technology objectives | Measuring the linkage between business and information tochnology objectives |
| Gupta Y.P. | The chief executive officer and the chief information officer: The stratogic partoersh |
| Johnson, AM; IS Strategy and IS Contribution: CEO and CIO Perspectives |  |
| Johnson, Alia CEO/C10 mutual understanding, strategic alignment, and the contribution of is to the organization |  |
| LA Tai, R Phelr CEO and C1O perceptions of information systems strategy: evidence from Hong Kong |  |
| Kearns, GF; Le The effect of strategic al gnment on the use of is-based resources for competitre advantage |  |
| Martinho, תl: The role of people and sodal context in promosing the IT organizasional performance Evidence from Port |  |
| Schobel K., De The Chief information Officer and Chief Finandal Officer dyad in the public sector: How an effective relat |  |
| Benlian, A; Ha Does mutudity mateer? Examining the bilateral nature and effects of CEO-CIO mutual understanding |  |
| Teo, TSH3 king An assessment of perceptuad differences between informants in information systems research |  |
| Enns, HG; Huf How CIOs obtain peer commitment to strategic is proposals: barriers and faclitators |  |
| Karahanna, E The effect of social capital of the relationship between the CIO and top man agement team on firm perfoil |  |
| Roinhard, Nac The influence of shared mental models between the Cio and the top management team on |  |
| Jarvenpaa 5.L Executwe involvement and partiopation in the management of information technology |  |
| Johnson, AM; The effect of communication frequency and channel richness on the convergence between chief executh |  |
| Grill G.P., Spill Chief executive officer perceptivity of planning information systems |  |
| Tallon, Paul P1 Fact or Fiction? A Sensem aking Perspective on the Reality Behind Executives' Perceptions of IT Bussiness V |  |
| Ragu-Nathan, A path analytic study of the effect of top management support for informason systems performance |  |
| Khandetwal, VAn empirical study of misalignment between Australian CEOs and IT managers |  |
| Tallon, Pp | Do you see what I see? The search for consen sus among executives' perceptions of IT business value |
| OS Preston, E Development of Shared Understanding Between the Chief information Officer and Top Management Tea Jablokow, K W IT leadership from a problem solving perspective |  |
|  |  |
| Preston, Davi Antecedents of is Strategic Alignment: A Nomological Network |  |
|  |  |
|  |  |
|  |  |

## Appendix 4: Example of participant feedback sheet - Interview 1

The information below was contained in an attachment to email that reiterated the purpose of the study, the next steps and thanking the participant for their time and co-operation.

## Output summary

These are the grid outputs from based on the transcript from our meeting.
They will be combined with the outputs elicited from the other participants and developed into a Standard Grid that will be used in our second meeting. The grids below show the "mental model" that you use to determine whether an IT investment is likely to be effective. It's how you make sense of IT effectiveness. Mental models vary between people as different people see the world in different ways and can be modified over time based on a person's experiences. Mental Models are made up of a number of personal "constructs" and the grids below show the constructs that you use.

## Display Output

This shows the grid that you developed. The constructs that you use to determine whether an IT investment is likely to be effective are shown down the sides; and the activities that were used to generate the constructs are along the bottom.

Postid the value abpecta by rie oustomer (or the cropect) Pooitive choce made to invest to enabie business chnage Ho immediase / intangitle gain but the right thing to do for our business Offers spith, without creating lechincal dest Deuplsps our business mpdet Do silserert things /frort and businass. 1 Helps our coce bruainess operale. Dires efficiencies and marpina linternal) Strategic goal focusad Protgcta the samd (eg into scurit s food satath) Indred beneff fo the RFO| tom improved franchise operation Overall MOfe ptoctive Netrics for measunng Rol were sircle - monetary

222115 Direct /nmenedato taogble Snancial pain provided
$1 \begin{array}{lllll} & 5 & 4 & 2 & \text { Harder to change andjor creates lechnical dett }\end{array}$
2 $25: 31$ Deesnt change our busin4ss model Do same thinge ssther/ process drwan
$\begin{array}{llll}5 & 1 & 1 & 3\end{array}$ Heips our customer (eriernai)
23112215 Not drectly straleg c gual 10 cused
Otrect benett to RFO. Orectly infuences franchase profitatily

13121
7 Neasese
Euziness inteligence. Toois 4 capabitits
5 GDPR Campsance
4. Wteroriff Officn 385
a orderif Oewery Traciong
2 ERP Platorm

1. Hew W6D Platorm

## Cluster Analysis output

This analysis uses the Display Output and moves the columns and rows around so that columns and rows with similar scores are placed next to each other. It will also reverse the constructs (and scores respectively) to help
create the cluster effect. The "branch" scales show the degree of similarity between parings of constructs and activities.


## Principle Component Analysis (PCA)

This is a statistical analysis that needs to be handled with care for the reasons we discussed. In summary, if a person has high cognitive complexity, or low cognitive structure, then the resulting PCA display has lines that are evenly distributed like the spokes on a bicycle wheel. This means that the person looks at problems from a variety of angles. If a person has low cognitive complexity, or tight cognitive structure, then the resulting PCA displays sets of lines that are more closely grouped. This means the person tends to think about problems in a more directed manner. There's an upside and downside to both types of structure.


## Appendices

## Honey Analysis

This analysis shows which of your constructs are most similar to the construct of "Overall MORE effect - Overall LESS effective". This analysis will also be performed on the Standard Grid outputs to assess if certain constructs are important at the group level.

## Match: BEBW01vTrans v1

Matches between constructs, at least $50 \%$
H1.5 89.3\% Metrics for measuring ROI were simple - monetary-Metrics for measuring ROI were not simple - multiplelpossibly conficting Overall MORE effective-OverallLESS effective
H1.5 89.3\% Delivered the value expected by the customer (of the project;-Did not deliver against the customer's eapectations. Poorly implemerted, elements mis-sold. Overall MORE effective-Overall LESS effective
H3 $82.1 \%$ Positive choioe made to invest to enable business chnage-A reluctant necessity: Not seen as a key enabler of business improvement. Overall MORE effectiv-Overall LESS effective
$1478.6 \%$ Helps our core bvusiness operate. Drives eficiencies and margins (intemal)-Helps our customer (external) Overall MORE effective-Overall LESS effective
I $5.575 .0 \%$ Develops our business model. Do differentthings / front end business-Doesnt change our business model. Do same things better $/$ process driven. Overall MORE effective-OverallLESS effective
$15.5 \quad 75.0 \%$ Offers agity without creating technical debh-Harder to change andlor creates technical debt Overall WORE effective-Overall LESS effective
L $767.9 \%$ Indirect beneft (to the RFOI from improved franchise operation-Direct beneft to RFO. Direclly influences franchise profitabiity Overall MORE effectiv-Overall LESS effective
L8.5 57.1\% Strategic goal focused. Protects the bamd (eg info scurity \& food safety)-Not directly strategic goal focused. Overall MORE effective-Overall LESS effective
L8.5 57.1\% No immediate / intangible gain but the right thing to do for our business-Direct/immediate tangible financial gain pronided. Overall MORE effective-Overall LESS effective

## Appendix 5: Example of participant feedback sheet - Interview 2

The information below was contained in an attachment to email that reiterated the purpose of the study, the next steps and thanking them for their time and co-operation.

## Your Standard Grid

Displayed below is the Standard Grid that you created. This is the grid for which the constructs have been developed from the first round of interviews. It represents the Group's mental model for an effective IT investment.


Your grid will be combined with the others' grids to create a "heat map" that will highlight areas of cognitive diversity from the perspective of the CIO, for example. A more granular view of the diversity is generated through the pairwise comparisons of Standard Grids (see below). Together these grids will help to shape an action plan aimed at reducing the degree of cognitive diversity. This is important as the evidence shows that shared cognition drives understanding and commitment which are important drivers of strategic alignment and firm performance.

## Example of a pairwise comparison grid

An example taken from a pilot study of a comparison grid is shown below.
This example compares a CIO grid with that of the CFO. The differences between the grids are calculated and displayed. Where the matches between the grids falls below 75\%, for example, they are highlighted by the graphs.


## Honey Analysis

This analysis can show the similarity of a selected Investment, for example the Ideal investment against the other investments; or the overall construct "More effective - Less effective" against the other constructs. At first glance it would appear that the investments that you have favoured most highly are the market facing investments of the new web platform/app and a security investment. ERP platform and Customer Order Management are not investments that appear to be viewed particularly favourably.

## Match: Participant C Standard Grid

```
Matches between elements, at least 20%
H1 82.8% 3. New Web/Mobile platform (In progress)
    10. Ideal
H2 81.9% 9. New Web/Mobile App (In progress)
    10. Ideal
H3 77.6% 1. Cyber Security (Future demand)
    10. Ideal
14 76.7% 8. Order/Delivery Tracking (Delivered)
    10. Ideal
I5 61.2% 4.Automated Supply Ordering (Future demand)
    10. Ideal
16 56.0% 2.W10/O365 (Delivered)
    10. Ideal
L 7 43.1% 6. MIS Reporting (Delivered)
    10. Ideal
L8 33.6% 5. ERP Platform (Delivered)
    10. Ideal
L 9 30.2% 7. Customer Order Management (In progress)
    10. Ideal
```

Once again, many thanks for agreeing to take part in this research.

Kind regards

Alastair Tipple

## Appendix 6: Standard \& Governance Grid - Constructs to themes

 mappingThis table shows the themes emanating from the thematic analysis of the funnel questions (called nodes) and how the Standard constructs might map to them. To reduce the size of the table, only the preferred pole of the construct is shown. A suggested reduced set of constructs aimed at providing a practical and helpful framework for a governance tool is then suggested. New personal constructs that have arisen due to management team changes during the course of the study are obviously not included in the Standard Grid constructs, but are reflected in the Governance constructs. Where this is done, it is highlighted in the table.

## NVivo Node - Level 1 \& 2 Standard Construct Reduced Construct set for Governance Grid

## Responsible Value

## Creation

- Build a sustainable family practice
- Share holder and customer value \& citizenship
- Web site, conversion and spend metrics


## Brand \& Customer

- Brand management
- Innovation
- Good customer experience (This theme is emphasised in the Op Director's personal grid $(J 2, J 3)$ - which is not reflected in the Standard Grid constructs).

S1: More market/strategic goal driven (G) S12 Drives a key business / strategic parameter, eg Revenue/cost/margin (M)

S2 Creates broad consumer perception benefits \& reason to switch (G)
S3 Makes product more compelling and/or provides credible long-term solution (G)
S20 Innovative \& market
leading solution that inspires

G1: Helps drive market/key business goals such as sales/growth.

G2: A credible long-term solution that makes the product/brand more attractive to existing and new customer base.

G3: Helps facilitate the CX and expectation, and is operationally sound (J2,J3) G4: An innovative \& market leading solution that inspires people (as it is an ambitious step on)

G5: Improves risk management / operational capability

| NVivo Node - Level 1 \& 2 | Standard Construct | Reduced Construct set for Governance Grid |
| :---: | :---: | :---: |
| - Improved decision making <br> - Meeting needs <br> - Improved business operations (This theme is emphasised in the Operation Director's personal grid (J5, J7) which is not reflected in the Standard Grid constructs) | S10 Delivery met expectation of consumer and/or customer (M) S27 Fit for purpose solution and easy to maintain/operate ( $T$ ) | G6: Delivery met expectation of consumer and/or customer <br> G7: Fit for purpose solution and easy to maintain/operate |
|  | S24 High/broad operational reliance placed on system ( $T$ ) | G8: High/broad operational reliance placed on system Needs to be right first time (J5,J7) |
| People, Skills \& Environment |  |  |
| - Attract and retain the right skills <br> - Empathy and mindset <br> - Capability \& Skills to exploit IT (This theme is emphasised in the CFOs personal grid ( $\mathrm{H} 4, \mathrm{H} 5, \mathrm{H} 8$ ) which is not reflected in the Standard Grid constructs). | S13 Good collaboration with delivery team during development ( P ) S14 Confidence/trust that delivery (inc ongoing) will meet priority needs ( P ) S23 Confidence in delivery of a highly reliable, trustworthy system and configurable to needs ( $T$ ) | G9: Confidence in the delivery of reliable system that meets the stakeholders' needs. <br> G10: The skills and collaborative capability for the firm to exploit and realise the benefits of the solution are present ( $\mathrm{H} 8, \mathrm{H} 4$ ) <br> G11: Clarity of the underpinning business process is clearly understood and agreed (H5) |
|  | S15 Stakeholders well briefed, managed and engaged (P) S16 Willingness to adopt system / High take up - Relevance (P) S17 Low degree of change Easier to adopt (P) | G12: Stakeholders are highly engaged and the solution will be readily adopted |

## Strategic Planning \&

## Governance

- Balance of portfolio Back Office vs Front Office
- Building foundations
- Business case

S7 Technology solution seen as best option (M)

S21 Provides a platform and/or catalyst for future development (T)

G13 Technology is the best option for building the foundations for the future G14: The solution does not create technical debt (i.e. does not disproportionately increase

## Appendices

| NVivo Node - Level 1 \& 2 | Standard Construct | Reduced Construct set for <br> Governance Grid |
| :--- | :--- | :--- |
| Vision and tactics | S22 Provides agility without <br> creating technical debt (T) <br> S28 Technical clarity of the <br> solution achieved early in <br> development cycle (T) | running costs due to its <br> complexity). |
|  | S8 Clear how benefits/ROI are <br> to be calculated (M) <br> S6 Benefit likely to be <br> maintained over the long term | G15: Clearly understand how <br> the benefits over the short and <br> long term will be realised |
|  | (M) <br> S11 Quick and easy to deliver / <br> deploy (M) <br> S18 Has a broad appeal and/or <br> clear stakeholder ownership (P) | G16: Solution is quick and easy <br> to deploy <br> G17: The system \& approach a broad appeal and/or clear <br> has <br> stakeholder ownership |
| R19 Clear rationale and |  |  |
| expectation for investment (P) |  |  |$\quad$| G18: There is a clear rationale |
| :--- |
| and expectation for the |
| investment |

Key to Luftman categories (provided as part of the Standard grid ref):
M = Measures; T = Technology; P = Partnership; G = Governance

Appendix 7: Luftman Model and Standard Construct mapping

The complete spreadsheet, showing all the stages of the construct mapping process is too large to be shown on A4. Consequently, this Appendix comprises 3 extracts from the Excel worksheet that captured the process used to create the Standard Grid. These extracts are intended to clarify the steps outlined in section 5.4.1

- Extract 1: Initial Luftman Model categorisation of all elicited personal constructs by the researcher and independent expert
- Extract 2: Initial bootstrap categorisation of all elicited personal constructs by the researcher and independent expert
- Extract 3: Mapping personal constructs to Standard Grid constructs

Extract 1: Initial Luftman Model categorisation of all elicited personal constructs by the researcher and independent expert

| 1 | A | B | c | D | F |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  | First Meeting |  |  |  |
|  |  | Personal Construct | AT Allocation | Expert Allocation |  |  |
| 5 |  |  | Luftman Model Category |  | Expert's Category Description |  |
| 61 | 56 | F2 | Tech Scope | TechScope | Enabling the future - build strategicframework |  |
| 62 | 57 | G5 | Tech Scope | TechSoope | Well designedfor effective devlops - doitwell, runit well |  |
| 63 | 58 |  |  |  |  |  |
| 64 | 59 | E6 | Tech Scope | TechScope | Improvinguser operator performance /employee efficiency | Columns C \& D: This shows how the researcher and independent expert separately categorised construct E6 against the Luftman model. In this particular extract the categorisationswere identical. Across all the elicited constructs there were only three differences of opinion. |
| 65 | 60 | D10 | Tech Scope | Tech Scope | Improvinguser operator performance / employee efficiency |  |
| 66 | 61 | 011 | Tech Scope | Tech Scope | Improvinguser operator performance/employee efficiency |  |
| 67 | 62 | 07 | Tech Scope | Tech Scope | Fittor purpose I high confidence |  |
| ${ }_{68}^{68}$ | 63 | 08 | Tech Scope | TechScope | Improvinguser operator performance / employee efficiency |  |
|  | 64 | C1 | TechScope | Techsoope | Improvinguser operator performance /employee efficiency |  |
| 70 | 65 | 09 | Tech Scope | Tech Scope | Improvinguser operator performance / employee efficiency | Column E: This shows how the independent expert started to instinctively categorised the constructs. <br> Note that there is a gap in row 63. This is where a category change was later made by the ClO to construct A9. This will become clearer in extract 2 . |
| 71 | 66 | B12 | Tech Scope | TechScope | Enabling the future - build strategioffamework |  |
| 72 | 67 | G6 | Goverance | Governance | Operational excellence (Internal) |  |
| 73 | 68 | C3 | Patnership | Patnership | Alignment of solution/producttoorg and managementreed |  |
|  | 69 | A9 | Tech Scope | TechScope | Enabling the fuure-build strategic framework |  |
| 75 | 70 | B5 | TechScope | TechScope | Enabling the fuure - build strategio framework |  |
|  | 71 | A1 | TechScope | TechScope | Fittor purpose lhigh confidence |  |
|  |  |  | Personal con <br> Rep Grid eli | tructs from the ed during the | participants' <br> first interview |  |

Extract 2: Initial bootstrap categorisation of all elicited personal constructs by the researcher and independent expert


Extract 3: Mapping personal constructs to Standard Grid constructs


## Appendix 8: Standard Grid to Governance Grid mapping

NVivo Node - Level 1 \& 2 Standard Construct $\quad$ Reduced Construct set for
Governance Grid

## Responsible Value

 Creation- Build a sustainable family practice
- Share holder and customer value \& citizenship
- Web site, conversion and spend metrics


## Brand \& Customer

- Brand management
- Innovation
- Good customer experience
(This theme is emphasised in the Op Director's personal grid (J2, J3) - which is not reflected in the Standard Grid constructs).

S1: More market/strategic goal driven (G)
S12 Drives a key business / strategic parameter, e.g. Revenue/cost/margin (M)

G1: Helps drive market/key business goals such as sales/growth

S2 Creates broad consumer perception benefits \& reason to switch (G)
S3 Makes product more compelling and/or provides credible long-term solution (G)

|  | G3: Helps facilitate the CX and <br> expectation, and is <br> operationally sound (J2,J3) |
| :--- | :--- |
| S20 Innovative \& market <br> leading solution that inspires <br> people (T) | G4: An innovative \& market <br> leading solution that inspires <br> people (as it is an ambitious <br> step on) |

G2: A credible long-term solution that makes the product/brand more attractive to existing and new customer base.

G3: Helps facilitate the CX and expectation, and is operationally sound (J2,J3) G4: An innovative \& market leading solution that inspires people (as it is an ambitious step on)

## Operational

## Excellence

- Control of costs
- Improved decision making
- Meeting needs
- Improved business operations
(This theme is emphasised in the Operation Director's personal grid (J5, J7) which is not reflected in

S4 Improves risk management
/ operational capability (G)

S10 Delivery met expectation of consumer and/or customer (M)

S27 Fit for purpose solution and easy to maintain/operate ( T )
S24 High/broad operational reliance placed on system ( $T$ )

| NVivo Node - Level 1 \& 2 | Standard Construct | Reduced Construct set for Governance_Grid |
| :---: | :---: | :---: |
| the Standard Grid constructs) |  | Needs to be right first time $(\mathrm{J} 5, \mathrm{~J} 7)$ |
| People, Skills \& Environment |  |  |
| - Attract and retain the right skills <br> - Empathy and mindset <br> - Capability \& Skills to exploit IT (This theme is emphasised in the CFOs personal grid ( $\mathrm{H} 4, \mathrm{H} 5, \mathrm{H} 8$ ) which is not reflected in the Standard Grid constructs). | S13 Good collaboration with delivery team during development (P) S14 Confidence/trust that delivery (inc ongoing) will meet priority needs (P) S23 Confidence in delivery of a highly reliable, trustworthy system and configurable to needs ( T ) | G9: Confidence in the delivery of reliable system that meets the stakeholders' needs. G10: The skills and collaborative capability for the firm to exploit and realise the benefits of the solution are present ( $\mathrm{H} 8, \mathrm{H} 4$ ) <br> G11: Clarity of the underpinning business process is clearly understood and agreed (H5) |
|  | S15 Stakeholders well briefed, managed and engaged ( P ) S16 Willingness to adopt system / High take up Relevance ( P ) <br> S17 Low degree of change Easier to adopt (P) | G12: Stakeholders are highly engaged and the solution will be readily adopted |

## Strategic Planning \&

 Governance- Balance of portfolio Back Office vs Front Office
- Building foundations
- Business case
- Vision and tactics
\(\left.$$
\begin{array}{l|l}\text { S7 Technology solution seen as } \\
\text { best option (M) }\end{array}
$$ \begin{array}{l}G13 Technology is the best <br>
option for building the <br>

foundations for the future\end{array}\right\}\)| S21 Provides a platform and/or |
| :--- |
| catalyst for future |
| development (T) | | G14: The solution does not |
| :--- |
| create technical debt (i.e. does |
| not disproportionately |
| S22 Provides agility without |
| increase running costs due to |
| its complexity). |


| NVivo Node - Level 1 \& 2 | Standard Construct | Reduced Construct set for Governance Grid |
| :---: | :---: | :---: |
|  | S6 Benefit likely to be maintained over the long term (M) <br> S11 Quick and easy to deliver / deploy (M) <br> S18 Has a broad appeal and/or clear stakeholder ownership (P) <br> S19 Clear rationale and expectation for investment (P) | G16: Solution is quick and easy to deploy <br> G17: The system \& approach has a broad appeal and/or clear stakeholder ownership G18: There is a clear rationale and expectation for the investment |
|  | S5 Solution driven by what we want to do (G) <br> S25 Transforms (aspects of) <br> the business <br> model/management capability <br> ( T ) <br> S26 Ambitious, inspirational and forward thinking ( $T$ ) | G19: Solution driven by what we want to do G20: An ambitious investment that transforms (aspects of) the business model/management capability. |
| Partnership RFO/Franchisees |  |  |
| - Be attractive to franchisees <br> - RFO Vs Franchisee balance | S9 Value derived directly from benefit to franchisee ( M ) | G21: The value from the investment is derived directly from benefit to franchisee |

Key to Luftman categories (provided as part of the Standard Grid ref):
$\mathrm{M}=$ Measures; $\mathrm{T}=$ Technology; $\mathrm{P}=$ Partnership; G = Governance

## Appendix 9：Ops Director（OD）／COO comparison heat map

|  |  | $\begin{aligned} & \overline{0} \\ & \dot{0} \\ & \dot{0} \\ & \dot{\sim} \end{aligned}$ |  |  |  |  |  |  |  | $\stackrel{\circ}{0}$ － ${ }_{5}^{\varepsilon} \sum_{0} \bar{y}$ コ人之 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| S1 More market／strategic goal driven（eg growth or sales） | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | －3 |  | Less strategic／More internal operation and／or control driven |
| S2 Creates broad consumer perception benefits \＆reason to switch | －1 | 0 | 0 | 0 | 0 | 0 | －1 | 0 | －1 |  | Doesn＇t create perception benefits and／or reason to switch |
| S4 Improves risk management／operational capability | －1 | －1 | 1 | 1 | －1 | 2 | 2 | 0 | －1 |  | Has little impact on risk management／operational capability |
| S15 Stakeholders well briefed，managed and engaged | 1 | 0 | －2 | 0 | 0 | －1 | 0 | 0 | 0 |  | Stakeholders expectations not set，poorly managed and／or unengaged |
| S28 Technical clarity of the solution achieved early in development cycle | 1 | 0 | －1 | 1 | 1 | 0 | －1 | －2 | 1 |  | Lack of clarity resulting in overly complex and／or more costly solution |
| S17 Low degree of change－Easier to adopt | 0 | 0 | －1 | 2 | 0 | －2 | －2 | －2 | 0 |  | High degree of change－resistance to adopt |
| S26 Ambitious，inspirational and forward thinking | －1 | 0 | 1 | 0 | －1 | －2 | 1 | －1 | －2 | －1 | Solution does the bare minimum |
| S27 Fit for purpose solution and easy to maintain／operate | 0 | 0 | －1 | －1 | 1 | 1 | －2 | －1 | 1 |  | Faces challenges and hard to maintain／operate |
| S29 Overall MORE effective | 0 | 0 | －2 | 1 | 0 | 0 | －2 | －2 | 0 |  | Overall LESS effective |
| S5 Solution driven by what we want to do | 0 | －1 | 0 | 1 | －1 | 1 | －3 | －2 | －3 |  | Solution driven by what we need to do |
| S12 Drives a key business／strategic parameter，eg Revenue／cost／margin | 1 | 0 | 0 | －2 | －1 | 0 | －4 | －1 | －1 |  | Indirect／low impact on key business goal |
| S14 Confidence／trust that delivery（inc ongoing）will meet priority needs | 1 | 0 | －2 | －1 | 0 | －1 | －2 | －2 | 0 | －2 | Lack of confidence that curent or future needs will be meet |
| S6 Benefit likely to be maintained over the long term | －1 | 0 | －2 | －1 | －1 | 0 | －1 | －3 | 0 |  | Benefit likely to be short term．Costly over long term． |
| S13 Good collaboration with delivery team during development | 2 | 0 | 0 | 0 | －3 | －1 | －2 | 0 | －3 |  | Poor collaboration with delivery team during development |
| S18 Has a broad or clear stakeholder ownership | 2 | －2 | －1 | －1 | －1 | －1 | －1 | －1 | －1 |  | Has a narrow／localised appeal and／or unclear stakholder ownership |
| S21 Provides a platform and／or catalyst for future development | 0 | 0 | －2 | －2 | －1 | 0 | －2 | －1 | 0 |  | Standalone system and／or offers limited future flexibility／catch up |
| S23 Confidence in delivery of a highly reliable，trustworthy system and configurable to needs | 0 | 0 | 0 | －1 | －1 | 0 | －1 | －3 | －3 |  | Low confidence in operational needs being met |
| S3 Makes product more compelling and／or provides credible long term solution | 2 | 0 | 0 | －3 | －1 | －2 | 1 | 0 | －3 |  | Solution lacks long term credibility in the market place |
| S10 Delivery met expectation of consumer and／or customer | 0 | －1 | 2 | －1 | －2 | －1 | －2 | 0 | －2 |  | Delivery oversold and／or failed to meet expectation |
| S11 Quick and easy to deliver／deploy | －1 | 0 | 3 | －2 | －2 | 1 | －1 | －1 | －3 |  | Slow and hard to deliver／deploy |
| S16 Willingness to adopt system／High take up－Relevance | 1 | 0 | －1 | －2 | －1 | －1 | －1 | －1 | －3 |  | Reluctant to take on new system／Low usage |
| S22 Provides agility without creating technical debt | －1 | 0 | －1 | －2 | －1 | －2 | 0 | －3 | －1 |  | Responsive to demands but with disproportionate ongoing cost |
| S8 Clear how benefits／ROI are to be calculated | 2 | 0 | －1 | －1 | －2 | －2 | －4 | －2 | －1 |  | Not clear on measurement and／or benefits less tangible |
| S19 Clear rationale and expectation for investment | 0 | 0 | －1 | －2 | －2 | －3 | －1 | －1 | －2 |  | More confused／confusion over investment aim |
| S20 Innovative \＆market leading solution that inspires people | 0 | －1 | －1 | －1 | 1 | －2 | －2 | －4 | －1 |  | A solution that lacks ambition and makes no leap forward |
| S24 High／broad operational reliance placed on system | －1 | －2 | 1 | －2 | 0 | －3 | 0 | －2 | 0 |  | Low／narrow operational reliance on system |
| S25 Transforms（aspects of）the business model／management capability | －1 | 0 | 1 | 1 | －4 | －3 | 1 | －1 | －4 |  | Maintains station or does same things better |
| S7 Technology solution seen as best option | －1 | －2 | －1 | －2 | －1 | －2 | －2 | －3 | 0 |  | Technology solution not valued／unattractive |
| \＄9 Value derived directly from benefit to franchisee | －3 | －3 | 4 | －2 | －2 | －2 | －1 | 1 | －2 |  | Value derived indirectly and／or benefit RFO focus only |

[^9]
## Appendix 10: Generalisation of Approach - Alternative Perspective

## Introduction

To fill a perceived gap and to motivate its use in IS studies, Peffers et al., (2007) present a methodology for conducting Design Science Research (DSR). Through four case studies, they demonstrate the application of the DSR methodology. The last of these case studies is a previous study co-authored by Peffers that uses PCT to support the development of a design artefact targeted at producing a method for generating ideas for new IS projects. Initially this case study had been framed using information theory as the justification for the new method but is now re-framed and presented as design theory. This re-framing demonstrates how the same research and findings can acceptably be presented in multiple ways. This appendix takes a similar re-framing approach to this PCT based study, and via this alternative perspective, theorises that the approach taken in this study is transferable to other firm-based case studies.

## DSR re-framing

Contribution to knowledge is viewed as being of prime importance, but in addition to the research being true and new, it must, first and foremost be interesting (Gregor and Hevner, 2013).

Given the research aim, the intended contribution is to address a real-world problem in a manner that addresses a recognised research gap. This would be achieved if an action plan, based on an understanding decision makers' construal of IT investment effectiveness, was viewed as providing a solution path of sufficient credibility and interest that the CIO is willing to enact said plan. In so doing the research would make both a contribution to practice and to knowledge. The manner in which the research gap is addressed provides a secondary contribution to knowledge, as atypically the research focus is on the content of social alignment that generates procedural knowledge, which provides the helpful foundation for the action plan.

The qualitative, exploratory and predominantly interpretive nature of the research could be considered as resulting in research that is explanatory (Peffers et al., 2007) and not focused on theory building. However, by
considering this study as an example of Design Research, it is possible to claim that the study is solution oriented and builds theory.

Design Research, also referred to as Design Science Research (DSR), is seen as a strong candidate approach for IS studies (Gregor and Hevner, 2013, Peffers et al., 2007), and Peffers et al. (2007) set out a DSR methodology for IS studies. They summarised their DSR methodology in diagrammatic form, which when applied to this study is represented by the shaded area in Figure 24, for which Table 44 acts as a guide. Though unintentional, the practiceoriented focus of this study allows strong comparisons to be made with the solution and practice inspired DSR methodology.

The six activity steps set out by Peffers et al. (2007) in Table 44 are shown in a nominal order, although the authors do not necessary expect all researchers to follow this sequence.

Table 44: Design Science activities applied to this study

| Activity | Applied to this study |
| :---: | :---: |
| Activity 1: Problem identification and motivation. This defines the research question and why its resolution is important. | Explore if an understanding of cognitive differences can be used to improve social alignment and value for IT investments. |
| Activity 2: Define the objectives for a solution. Infer the solutions objectives and set the solution boundaries. | As will be explained later, conceptually the solution will be to show the cognitive diversity between the CIO (as a reference point) and other members of the TMT as regards what they perceive to be effective IT investments. By understanding and then working to reduce the cognitive diversity, social alignment is improved. This in turn is positively associated with improved IT effectiveness and firm performance. |
| Activity 3: Design and development. Create the design artefact such as decision support system, modelling tools, governance strategies or methods for IS evaluation (Gregor and Hevner, 2013). | For this study the design artefact will be shown to be a cognitive comparison map between the TMT; that has been generated in a highly rigorous manner based on a series of Rep Grid exercises. |
| Activity 4: Demonstration. Use the artefact to solve an instance of the problem identified. This could be through use of a case study. | Justification will be provided to support a case study approach in a corporate setting where IT is central to the firm's operation. The research will lead to the development of an action plan. |


| Activity | Applied to this study |
| :--- | :--- |
| Activity 5: Evaluation. Assess how well the <br> artefact solves the (instance) of the identified <br> problem. | The acid test for this research is whether the <br> CIO views the plan as being of practical <br> adequacy. For this to occur the CIO must have <br> a high degree of confidence that the plan <br> provides a valuable approach for improving IT <br> investment effectiveness and value from IT. |
|  | This activity step also introduces a feedback <br> loop for improving the design artefact. As will <br> be explained later, the initial improvement <br> was to depict the cognitive differences using <br> heat maps. This is a novel concept that is not <br> believed to be in the extant published <br> literature. A development of the design |
| artefact also leads to the creation of special |  |
| form of grid that later will be referred to as a |  |
| Governance Grid. |  |

Theory of equal standing to more traditional social science theory building and testing can be developed through DSR and used to apply IS research to better address practice oriented problems (Gregor and Hevner, 2013, Peffers et al., 2007). Applied to this study, a very highly summarised account of the logic supporting the development of theory using DSR that is provided by Sein et al. (2011), is presented through the following sequence:

- They define theory, using Gregor's (2006) criterion, as being "the power to generalise". They also rely on Gregor's (2006) theory taxonomy, and in particular "Type V: Design and action theory" that says how to do something by providing explicit prescriptions for constructing an artefact, for example a specific form of cognitive map focused on TMT perceptions of IT investment effectiveness.


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- The cognitive map artefact and any iteration of that artefact is used to solve an aspect of a practitioner's problem. This problem is conceptualised as representing an instance of a class of problem. For example, the chronically persistent problem of senior executive perception of ineffective IT resulting from poor social alignment.
- If, after the demonstration and evaluation activity steps, the artefact is assessed as contributing to the problem's solution, then the artefact is conceptualised as being an instance of a solution to a class of problem.
- Finally, these situated learnings are re-conceptualised from a specific solution instance into design principles for a solution class. By so doing, the requirements of a Type V theory are satisfied.

In practice, and expressed even more simply, it means that even though the findings from this study might be specific to the case study, the approach taken is transferable to other corporate context cases. Consequently, this study therefore contributes to a Design theory.

Although every effort is made to minimise researcher bias, it is recognised that there are parts of the research that require an interpretation to be made by the researcher. Consequently, it can be argued that there is some researcher intervention. It is also the case that the status quo in the case study is intended to changed. The study aims to provide an approach to improve (i.e. change) an aspect of TMT social alignment. Therefore, this research may be considered to be informed by Action Research. In the context of DSR, scholars are not agreed as to whether Action Research is considered as part of, distinct or similar to DSR, though there do appear to be some obvious touch points in the manner depicted (Sein et al., 2011). Regardless of how this debate is argued, proponents of DSR (or Action DSR) defend its theory building capability.


Figure 24: Derived from Peffers et al., (2007), the DSR methodology applied to this study

## Appendix 11: Kappa score calculation example

1. Introduction

In this study the constructs elicited from the personal grids are categorised by the researcher, an independent expert and the CIO. When two people, for example a researcher and independent expert, separately categorise these constructs, it is important to know how similarly they each categorise the constructs. This is referred to as the inter-rater agreement.

Kappa scores are used to measure this inter-rater agreement. It measures the degree of agreement over and above any agreement that that could happen purely by chance. Consequently, Kappa scores are calculated and ultimately expressed in terms of a probability. A Kappa score of one ( $\operatorname{Pr}=1$ ) indicates perfect inter-rater agreement, even accounting for the fact that some agreement could have resulted purely by chance.

Below is a contextualised example, though a good explanation more generally can be found on https://www.youtube.com/watch?v=hoJPB60XXww.
2. Kappa Calculation

Let us assume that two Raters (R1 and R2) categorise a series of Constructs (C1 to C10) against four Categories (Cat A to Cat D) in the manner shown in Table 45.

Table 45: Rater allocation of construct by category

|  | R1 | R2 |
| :--- | :--- | :--- |
| Cat A | C1 C3 | C1 C4 |
| Cat B | C2 C5 C6 | C2 C5 C3 |
| Cat C | C7 C10 | C6 C7 C10 |
| Cat D | C9 C8 C4 | C9 C8 |

If the outcome from Table 45 is set out slightly differently, it is easier to see the extent to which the two raters have categorised the constructs similarly. For example, in Table 46, the raters have both categorised Construct 1 in Category A.

Table 46: Similarity of construct allocation

|  |  |  |  |  | R2 |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  |  | Cat A | Cat B | Cat C | Cat D |
|  | Cat A | C1 | C3 |  |  |
| R1 | Cat B |  | C2 C5 | C6 |  |
|  | Cat C |  |  | C7 C10 |  |
|  | Cat D | C4 |  |  | C9 C8 |

In place of the actual constructs, the cells in the above table can be expressed in terms of the number of constructs in each category. This is shown in Table 47. For example, Raters 1 and 2 both categorised the same construct to Category A, whereas for another construct Rater 1 categorised it in Category D when Rater 2 placed it in Category A.

Table 47: Similarity of construct allocation expressed in numbers
$\left.\begin{array}{|l|l|l|l|l|l|l|}\hline & & & \text { R2 } & & \\ \hline & & \text { Cat A } & \text { Cat B } & \text { Cat C } & \text { Cat D } \\ \hline & \text { Cat A } & & 1 & 1 & & \\ \hline \text { R1 } & \text { Cat B } & & & & 2 & 1 \\ \hline & \text { Cat C } & & & & & 2\end{array}\right]$

The final part of this analysis is to calculate the Kappa score. Table 48 shows how this is done. This table is showing the observed count (expressed as a number) and the expected count (expressed as a probability) based on the data. This table shows that one construct was allocated to category A by both Rater 1 and Rater 2. However, just based on the null hypothesis, by chance one would expect only $4 \%$ (i.e. $0.2 \times 0.2$ ) of the count to be allocated to category A by both raters based on the parameters of the data. Obviously, because the numbers are small in the example ( $n=10$ ) this makes little practical sense, but in a scaled example where $n=100$, this would translate to an observed count would be 10 and the expected count would be 4, ceteris paribus. This is saying that there is a discrepancy, or systematic variance, between the observed and expected count. The raters are actually agreeing on something beyond chance.

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Table 48: Observed versus Expected counts

|  |  |  | R2 |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  |  | Cat A | Cat B | Cat C | Cat D | $\#$ |  | Pr\% |
|  | Cat A | 1 | 1 |  |  |  | 2 | 0.2 |
|  |  | $4 \%$ | $6 \%$ | $6 \%$ | $4 \%$ |  |  |  |
| R1 | Cat B | 0 | 2 | 1 | 0 | 0 | 3 | 0.3 |
|  |  | $6 \%$ | $9 \%$ | $9 \%$ | $6 \%$ |  |  |  |
|  | Cat C | 0 | 0 | 2 | 0 | 2 | 0.2 |  |
|  |  | $4 \%$ | $6 \%$ | $6 \%$ | $4 \%$ |  |  |  |
|  | Cat D | 1 | 0 | 0 | 2 | 3 | 0.3 |  |
|  |  | $6 \%$ | $9 \%$ | $9 \%$ | $6 \%$ |  |  |  |
|  | \# | 2 | 3 | 3 | 2 | 10 |  |  |
|  | Pr\% | 0.2 | 0.3 | 0.3 | 0.2 |  |  |  |

The Kappa score (k) is estimating this agreement level beyond chance using the formula shown below (Cohen, 1968).

Table 49: Kappa score calculation
Po is $7 / 10$ (add along the diagonals where the raters agree)
Pchance is $4 \%+9 \%+6 \%+6 \%$ (ie the $\%$ by chance that raters would agree) $=25 \%$
$\mathrm{k}=(\mathrm{Po}-\mathrm{Pc}) /(1-\mathrm{Pc})>(0.7-0.25) /(1-0.25)=0.6$
This means that one might consider that the overall agreement level between the Raters is $70 \%$ ( $7 / 10$ ) but when agreement that may be brought about purely by chance is taken into account, the overall agreement value drops to 60\% ( $k=0.6$ ).

## Appendix 12: Comment on Procedural Validity

In his PhD thesis, Yorke, 1983 sets out a detailed critique of PCT and the Rep Grid Technique. Beail (1985), in the foreword to Chapter 23, p381 summarises the position thus: 'The literature provides very few criticisms of Rep Grids, and even these are weak. Yorke appears to provide the only critique of the methodology'. This last chapter of Beail's book, which up to this point has been a collection of Rep Grid essays, designed to show the versatility of Rep Grids, is magnanimously given to Yorke who has the final word (Yorke, 1985). Chapter 23 outlines the main aspects of Yorke's critique, which together with some specific additions from his thesis (Yorke, 1983b) are summarised in Table 50. Alongside each aspect that Yorke outlines, the position of this thesis is commented upon.

Table 50: Commenting on Yorke's criticisms in the context of this study

| Yo | Comment |
| :---: | :---: |
| (Yorke, 1985) |  |
| Grid context 1: The way in which the elements are elicited can negatively impact the view of the universe that you're trying to capture. Example given of elements associated with "teaching" and impact of not setting good context for element elicitation. | Great care taken to promote the wide consideration of investments using the Peters (1998) matrix. Also set this in the context of <br> (a) an initial interview, and (b) a linkage diagram to ensure strategic understanding. |
| Grid context 2: Generalisability is difficult as a narrow grid that focuses the construing of something specific reduces the ability to generalise. However, broadening the grid to generalise "averages out" the responses. | Generalisation in this study would mean that the constructs captured would be nomothetic in nature. PCT/RGT is viewed as an interpretive methodology hence the constructs are viewed as idiographic. Only the approach is considered as being transferable. |
| Homogeneity of elements may be more difficult than expected and the 'range of convenience' for an individual(s) cannot be easily assumed. Elements may be irrelevant to the individual or the grid's main purpose | All respondents were members of the TMT. All were familiar with all the elements used in their Personal and the Standard Grid. Given the focus on social alignment regarding investment decisions, the elements would appear to be relevant and purposeful. |
| Construct that are supplied make assumptions about how each individual construes them. Different individuals can attach different meanings to the same words. | Only one construct was supplied - an overarching one that essentially forms the basis of the elicitation question. Its construal is captured in the personal constructs. It is agreed that individuals can attach different meanings to words. "Fast" can mean |

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## Comment

different things to different people. The action plan dialogue can test the potential for different member interpretations.

Not all constructs are dichotomous (logical opposites). The "difference" captures more meaningful characteristics but can produce 'peculiar' constructs.

Ratings of logical opposite constructs provides a limited scope for rating. Ratings become 'lopsided'.

A rating scale is not necessarily a simple linear continuum and scales can be responded to differently by different people. Difficulties can arise when the desire is to apply a statistical procedure to the grid - The Ingrid software program and PCA being specifically cited.

FOCUS [cluster analysis] is less mystifying as it retains original grid data but still falls foul of subjectively interpreted rating scales. Large clusters do not necessarily imply dominance of a construct system.

In a further article Yorke addresses this by referring to straight or bent constructs, (Yorke, 1983a). By eliciting contrasting (or difference) constructs the likelihood of bent constructs is reduced (Neimeyer et al., 2005). In this study contrasting constructs or psychological opposites were used. This is argued as providing greater scope for a range of ratings.

That a rating is scale is not linear is discussed at length by Shaw (1980), p156. This accords with Yorke who, according to Eden and Jones (1984), points out that there is a difference between a mathematical scale and a psychological scale. This study uses psychological opposites. In essence, Yorke in part is saying that scales cannot be assumed to be parametric, and consequently that some statistics are developed on 'quicksand'. Statistical analysis is not used in this study, partly in recognition of the non-parametric nature of scales - though some scholars attempt to take this dynamic into account, for example, (Ashleigh and Nandhakumar, 2007). Other scholars (see p96) also warn of using complex statistics with senior management. In this study judgements on how scales may be applied differently across individuals is not captured and enshrined in statistics from which generalisations as made - rather it is simply used as a prompt for an informed dialogue.

The FOCUS cluster analysis is only used at the end of the first interview as (a) a sense check (b) a way to secure engagement. Unlike Oppenheim et al. (2003), implied linkages between similarly rated constructs are not made.
$\left.\begin{array}{l|l}\hline \text { Yorke critique / observation } & \text { Comment } \\ \hline \begin{array}{l}\text { 'Consensus Grids' [when two superficially } \\ \text { identical grids are combined] assume meaning } \\ \text { equivalence of the construct labels between } \\ \text { respondents. This can result in misleading } \\ \text { PCA analysis. }\end{array} & \begin{array}{l}\text { Agreed - though the Standard Grid did } \\ \text { comprise words/labels directly captured from } \\ \text { personal grids and were reviewed with a TMT } \\ \text { peer (CIO) and independent expert prior to } \\ \text { the grids being completed by the other TMT } \\ \text { members. Again, through action plan }\end{array} \\ \text { dialogue it is highly likely that any major } \\ \text { differences in Standard Grid construct } \\ \text { interpretation would be identified. }\end{array}\right\}$

The high-level conclusion reached from compiling Table 50 is that Yorke:

1. Suggests that if care is not taken when establishing a Rep Grid exercise, then the researcher raises the spectre of the comments from Table 50 regarding aspects of the exercise's validity. This seems reasonable as it is saying that if there is no procedural validity then aspects of the Rep Grid exercise become questionable.
2. Places a large focus on critiquing any statistical analyses of Rep Grids. The case study presented has some sympathy with this view and consequently makes no use of complex statistical analyses. The study does make use of simple differences in ratings between TMT members. Such differences, as Yorke points out, could be influenced by different TMT members interpreting the constructs differently or bringing different 'evaluative loadings' to the rating scales. This is accepted but is argued that in the context of the action plan any CIO-member differences are to be discussed with the members, and should these interpretive or evaluative loading differences exist, they could be identified and explored.

PCT is a theory, and like other theories is open to criticism or alternatives. One example of how these differences can emerge is by adopting a different philosophy. Blowers and O'Connor (1995) refer to there being 'at least 20 distinguishable cognitive therapies', that like PCT can be associated with constructivism; and which presumably could in whole or in part present an alternative perspective to PCT. Also, there are other therapies that are based on philosophies other than constructivism (citing contextual behaviourism and system theorists). Presumably these will challenge the perspective taken by PCT and the other therapies based on constructivism, and vice versa. They conclude that Kelly can be a controversial figure with cognitive psychologists, but that the Rep Grid is useful for exploratory purposes, that PCT will continue to have a clinical role and that it will challenge other cognitively based therapies.

## Appendix 13: IT News stories from the press

The table below shows a selection of news stories taken at random during the 6 month period May-October 2018 that reported on various IT failures

Table 51: A selection of IT related news stories

| Source | Story |
| :---: | :---: |
| [28 May 2017] <br> The Mail Ekin Karasin and Jay Akbar | All BA flights from Heathrow and Gatwick are cancelled for the rest of the day due to 'major IT system failure' [Power failure]. |
| 23 April 2018 <br> The Guardian | One of the biggest transfers of banking data ever attempted in the UK, involving the switch of 1.3bn TSB customer records, fell into turmoil as millions of customers were locked out of their accounts. Some customers alleged that the IT "upgrade" had left them with rogue credits and debits on their accounts, while others complained they had been given access to random accounts. |
| 2 May 2018 <br> The Sun | SCREENING SCANDAL: 270 women died after NHS IT glitch meant 450,000 missed breast cancer screening - as Jeremy Hunt 'apologises wholeheartedly' to families involved. Health Secretary Jeremy Hunt today apologised for the "serious failure" affecting 450,000 women from 2009 to 2018. |
| 01 June 2018 <br> Mirror <br> Emma Munbodh | Card payments network Visa is currently experiencing a widespread outage with millions of customers unable to use their cards across the UK and Europe. <br> This is the network that processes transactions for a number of banks as well thousands of small and large businesses. <br> The scale of the issue is currently unclear with Visa currently "investigating" the problem which was sparked at around 4pm on Friday. <br> A statement from Visa told The Mirror: "Visa is currently experiencing a service disruption." <br> "This incident is preventing some Visa transactions in Europe from being processed. |
| 13 June 2018 <br> Evening Standard <br> Laura Onita \& Russell Lynch | Dixons escapes $£ 17 \mathrm{~m}$ penalty as it admits massive data breach. Escaped the full weight of GDPR as the hack of customer data occurred before the new legislation came into force. |

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| Source | Story |
| :---: | :---: |
|  | In the recent past the following companies have also been subject to cyber-attacks: <br> TalkTalk received a $£ 400 \mathrm{k}$ fine in October 2017 for 160000 customers' data being affected. <br> Tesco has had $£ 2.5 \mathrm{~m}$ stolen from 9000 customers. Reckitt Benckiser had 15000 laptops, 2000 servers and 500 computer systems hit [by cyber-attacks]. |
| 31 July 2018 <br> MSN feed <br> https://a.msn.com/r/2/BBLike9?m=en- <br> gb\&referrerID=InAppShare | Dixons Carphone says a data breach in 2017 was worse than originally thought and it affected 10 million customers. The huge breach first came to light in June when Dixons Carphone revealed hackers had accessed 5.9 million payment cards used at Currys PC World and Dixons Travel, and 1.2 million personal data records |
| 17 Aug 2018 <br> The Times Deborah Haynes - Defence Editor Chris Smith - Health Editor | Front page headline: <br> IT chaos in healthcare puts troops lives at risk alarm at computer debacle in military surgeries. Britain's armed forces are at serious risk because of chronic computer failures at military surgeries. Service personnel are in danger of being given the wrong drugs. One GP described the IT systems as "the biggest threat to patient safety I have encountered" |
| 7 Sept 2018 <br> The Guardian | British Airways frequent flyer- accounts hacked. <br> A BA spokesman said: "British Airways has become aware of some unauthorised activity in relation to a small number of frequent-flyer executive club accounts. This appears to have been the result of a third-party using information obtained elsewhere on the internet, via an automated process, to try to gain access to some accounts. <br> Hackers stole the payment card details of 380,000 customers https://money.cnn.com/2018/09/07/investing/ba-hack-british-airways |
| 4 Oct 2018 <br> The Verge (on MSN) James Vincent | Chinese spy chips reportedly found in Apple hardware: Chinese spies have infiltrated the supply chain for servers used by nearly $\mathbf{3 0}$ US companies, including government contractors, Apple, and Amazon, according to an explosive report from Bloomberg Businessweek. The operation is perhaps the most audacious example of hardware hacking by |


| Source | Story |
| :--- | :--- |
|  | $\begin{array}{l}\text { a nation state ever publicly reported, with a branch } \\ \text { of China's armed forces reportedly forcing Chinese } \\ \text { manufacturers to insert microchips into US-designed }\end{array}$ |
| servers. The chips were "not much bigger than a |  |
| grain of rice," reports Bloomberg, but able to |  |
| subvert the hardware they're installed on, siphoning |  |
| off data and letting in new code like a Trojan Horse. |  |$]$

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References


[^0]:    ${ }^{1}$ The term "grounded theory" would not have existed in 1955 when Kelly wrote about PCT, but can now be correctly referred to using this term following its introduction in GLASER, B. G., STRAUSS, A. L. \& STRUTZEL, E. 1968. The discovery of grounded theory; strategies for qualitative research. Nursing research, 17, 364.

[^1]:    ${ }^{2}$ The terms Constellatory and pre-emptive are defined in FRANSELLA, F. \& BANNISTER, D. 1977. A manual for repertory grid technique, Academic Press inc, London. p8.

[^2]:    ${ }^{3}$ The Guardian, 23 April 18: One of the biggest transfers of banking data ever attempted in the UK, involving the switch of 1.3bn TSB customer records, fell into turmoil; The Evening Standard, 13 June 18: Dixons escapes $£ 17 \mathrm{~m}$ penalty as it admits massive data breach...TalkTalk, Tesco and Reckitt Benckiser all subjects of cyber attacks; The Times, 17 August 18: IT chaos in healthcare puts troops lives at risk; The Verge (MSN), 4 October 18: Chinese spy chips reportedly found in Apple hardware. Examples taken from Appendix 13.

[^3]:    ${ }^{4}$ As cloud technology has matured, firms have increasingly sought to provide a range of (typically) subscription-based services. Such a service might be to provide a platform, an infrastructure or software,

[^4]:    "as a Service". These can respectively be referred to as PaaS, laaS, SaaS. A general way of referring to these types of service is "XaaS" where $X$ denotes the service offered.
    ${ }^{5}$ It is possible for XaaS solutions to be purchased directly by end users without alerting the IT group.

[^5]:    ${ }^{6}$ A closed system might be thought of as being similar to a scientific experiment where all the variables other than the ones being studied are fixed. The experimental conditions are controlled and the

[^6]:    environment is sealed. Variables in social systems cannot usually be controlled in this manner, and as such are referred to as open systems (Wynn Jr and Williams, 2008).

[^7]:    ${ }^{7}$ To provide further depth to this statement from an alternative perspective, Appendix 10 outlines a qualitative Rep Grid based IS case study that has later been re-imagined as an example of Design Science research that allows this statement to be made.
    ${ }^{8}$ Yorke addresses procedural validity from the perspective of accurately providing an appropriate and understandable context for the Grid exercise, care in forming and capturing and the elements and constructs, and caution over the use of complex statistics being applied to the cell ratings.

[^8]:    ${ }^{9}$ A less complex triad question is posed. The participant is simply asked "in what way are any two of these elements the same". Once a response is captured a new triad is offered. At the end of the interview the participant is asked to provide the contrasting poles by taking each elicited pole by asking "to you, an investment being [elicited pole] would contrast with an investment that is [specify the contrast]".
    10 "Bent" constructs in the differences method arise where the pole that identifies the similarity of two of the elements is in a different dimension to the pole that highlights the difference to the third element. For example, consider an investment construct, "Developed in house - Accessed via a smart phone" or "HappyConfused" (as opposed to say, "Happy-Sad"). To most observers these poles would appear to be unrelated, and do not provide a good example of a contrast or psychological opposite.

[^9]:    This chart shows the Standard Grid heat map comparison between the outgoing COO and his replacement．This chart shows that the
    incoming director has a very different perception of IT than the outgoing director；suggesting that role stereotyping is not always accurate．The Red（or dark shaded cells）show where the outgoing COO has a more negative perception of IT effectiveness compared with the incoming

    Operations Director．

