

**Are you thinking what I'm
thinking? Explaining the
relation between management
control systems and managers'
causal mental models**

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Certificate of original authorship

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

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List of abbreviations

ACFI	Aged Care Funding Instrument
AM	Accommodation Manager
BAC	Board Advisory Committee
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CM	Clinical Manager
CTA	Cognitive Task Analysis
GAM	General Manager – Accommodation
GCM	General Manager – Clinical Services
GOM	General Manager – Operations
GP	General Practitioner
KPIs	Key Performance Indicators
LLLB	Living Longer Living Better
LLO	Leisure and Lifestyle Officer
MCS	Management Control Systems
OM	Operations Manager
RN	Registered Nurse
TAPS	Think Aloud Problem Solving

Abstract

Research into the cognitive effects of management accounting and control systems is largely oriented toward understanding how decision makers use accounting information to inform their judgement and decision making activity. However, the effect of these systems on decision making is not limited to the provision of information; instead, management accounting and control systems may influence decision makers' underlying mental representations, which in turn form a critical input to judgement and decision making in an organisational context. As such, the objective of this thesis is to explore and then explain how the use of management control systems relates to the development of a type of mental representation: managers' causal mental models. In order to answer this question, I undertake a qualitative embedded case study of a medium-sized residential aged care service provider in Australia, incorporating specific Cognitive Task Analysis (CTA) techniques to elicit the causal mental models of individual study participants.

First, I draw on theory and concepts from cognitive psychology to develop the construct of causal mental models for application in an accounting context. I then develop a general theoretical model which identifies the conditions under which the use of management control systems is likely to lead to changes in the causal mental models of either senior and/or operational managers, and provides an explanation of the mediating relationship between management control systems and managerial judgement and decision making activity. This conceptual and methodological development allows for the direct observation of the content and composition of causal mental models, and the development and testing of more nuanced hypotheses relating the use of management accounting and control systems to judgement and decision making outcomes, and ultimately, to managerial and organisational performance.

Second, I apply and extend the general theoretical model in order to develop an explanation of the underlying socio-cognitive dynamics of Simons' (1987) concept of *interactive control*. Specifically, I explain *why* the interactive use of control systems would facilitate learning and contribute to improved managerial cognition and performance, and use the theoretical explanations that I generate to evaluate the conflicting conceptualisations of the interactive control construct present in the literature. I find that all five dimensions of interactive control identified by Bisbe, Batista-Foguet and Chenhall (2007) are required for interactive control to have the hypothesised effects on managerial learning and organisational performance, and provide support for their position that interactive control should be treated as a multidimensional, emergent construct.

Third, I apply my general theoretical model to the phenomenon of *budget participation*, in order to develop a *cognitive explanation* of the effects of participation on managerial cognition and capacity for judgement and decision making. Application of the theoretical model to the phenomenon of budget participation generated a set of three specific explanations: first, it suggests an expanded definition of participation is necessary to completely capture the potential of budgeting for information sharing and coordination; second, it explains the theoretical value of conceptualising job-relevant information in terms of the components of managers' causal mental models; and third, it explains both how and why budget participation can facilitate the transfer of causal knowledge and beliefs between levels of management.

Chapter 1: Introduction

1.1. Research Objective

The broad objective of this thesis is to explore and then explain the relationship between management control systems and the *cognitive inputs* to managerial judgement and decision making. More specifically, I focus on how management control systems influence the development of managers' *causal mental models*¹, which support essential cognitive functions such as decision making and problem solving. I also consider how managers' *causal mental models* themselves influence the development of management control systems.

While the provision of information to support organisational decision making is one of the most commonly cited and often studied purposes of management accounting and control systems (Burchell et al. 1980; Hopwood 1972, 1978), empirical evidence consistently demonstrates that the direct provision of information is not the only way that management accounting and control systems influence judgement and decision making in practice (e.g. Bruns & McKinnon 1993; Mintzberg 2009; Tengblad & Edvin Vie 2012). Rather, managers have been described as “[spending] little time dealing with systematic approaches to planning and decision making: instead, most of their time is spent discussing issues and exchanging information in personal meetings, often in response to unanticipated problems” (Tengblad & Edvin Vie 2012, p. 39). When managers make direct use of accounting information, it is usually interpreted alongside other “soft” forms of information cultivated by the manager over time and through experience (Bruns & McKinnon 1993; Mintzberg 2009). Organisational decision making, therefore, is determined not only by the provision and use of accounting information, but also by the potentially diverse range of *cognitive inputs* such as knowledge, beliefs, intentions and capabilities of individual managers.

To understand the relation between management accounting and control systems and the cognitive inputs to managerial decision making, I draw on concepts, theory and research methods from

¹ Mental models are defined in this thesis as mental representations of “something in the world” that are: accessible to consciousness; the product of perception, comprehension and organised knowledge; relatively enduring but dynamic; and shaped by the regularities, laws and principles that are believed to govern the external system (Klein & Hoffman 2008). *Causal* mental models, then, refer specifically to mental models which represent a network of cause-and-effect relations. These constructs are discussed in greater detail in Chapter 2.

management control system design and use, and theory and research methods from the applied psychology disciplines of macrocognition and naturalistic decision making. Research in macrocognition has identified numerous primary cognitive functions and supporting cognitive processes which operate in a parallel and highly interactive manner (Klein & Hoffman 2008). The particular mix of functions and processes that are activated will vary for different kinds of cognitive work. The development of mental models is one such macrocognitive process which has been implicated in supporting primary cognitive functions including decision making, planning and coordination. By adopting a macrocognition approach, I develop a deeper understanding of the relation between management accounting and decision making, and thereby contribute to a more nuanced explanation of the roles of management accounting and control systems in organisations.

1.2. Motivation

1.2.1. Accounting judgement and decision making

The role of management accounting systems and information in supporting judgement and decision making within organisations has a long tradition in management accounting research, resulting in the development of a robust literature based on cognitive and behavioural psychology models (Birnberg, Luft & Shields 2006; Bonner 2008; Hall 2016; Luft & Shields 2009). Two distinct streams of research exist within this literature: the first stream considers the *motivational* effects of management accounting, while the second explores its *informational* effects (Birnberg, Luft & Shields 2006). This literature provides evidence that the effect of management accounting practices on an individual's behaviour depends not only on how objectively informative the practice is about factors that affect the individual's welfare (such as rewards and measured outcomes), but also on how understandable the practice is and how it stimulates the individual's attention, cognition, and/or motivation (Birnberg, Luft & Shields 2006). This stream of research has also used concepts and theory from psychology to identify and explain the causes and effects of various management accounting practices or information on specific types of individual judgement and decision making tasks (Hall 2016; Luft & Shields 2009).²

² Close to completion of this thesis I became aware of a recently published paper by Hall (2016), which provides an analysis and discussion of the use of psychology theory in contingency-based management accounting research and

A core assumption of the psychology theories used in the accounting judgement and decision making literature is that individual behaviour and decision making depends on the individual's *mental representation* of their environment. Luft and Shields (2009) observe that mental representations “act as the effective environment which arouses motives and emotions, and guides overt behaviour toward its target or goal” (p. 203). As such, it can be expected that management accounting influences judgment and decision-making not only through the direct provision of information, but also by influencing how boundedly rational individuals search for and process information and form mental representations of their organisation and operating environment (Birnberg, Luft & Shields 2006).

While the importance of mental representations is beginning to be acknowledged in the accounting judgement and decision making literature, this concept has largely replaced behaviour as a “black box” which assumes away the cognitive processes which transform information or data into decision outcomes. By investigating the nature and characteristics of these mental representations, and the manner in which their formation and use varies between individuals, it becomes possible to ‘widen the lens’ and investigate new pathways through which management accounting and control systems influence managerial cognition and decision making in practice.

Extant research demonstrates very little knowledge and explanation about the specific relations between management accounting and control systems, managers’ mental representations, and how these influence managers’ decision making. However, despite our current lack of understanding of mental representations more broadly, one type of mental representation – *mental models* – has

reflects on opportunities for development of this literature. Several of the opportunities identified by Hall are reflected in the conceptual and methodological approach undertaken in this thesis. First, Hall observes a general lack of explicit theorisation relating to the role of psychological *processes* in generating organisational level outcomes. Second, Hall notes that there is a need for greater integration of individual- and organisation-level studies, especially with respect to consideration of how individual-level results translate into organisational-level effects. Third, Hall suggests that there is a need for greater acknowledgement of the dynamic nature of management accounting practices and the development of bi-directional rather than exclusively uni-directional theoretical models. Fourth, Hall recommends greater use of field studies within management accounting research in order to address the concerns previously raised. Finally, Hall notes that attention to the wider information environment in which management accounting practices take place would be advantageous to developing explanations of their effects. Together, these five arguments provide compelling additional support for the research question addressed in this thesis and the novel approach adopted to examine the dynamic relations between management control systems (at the organisational level) and (individual-level) managers’ causal mental models in their naturalistic context.

had some implicit consideration in the management accounting research literature focusing on strategic performance measurement systems.

1.2.2. Cognitive effects of strategic performance measurement systems

Mental models are a type of mental representation of an external system, are consciously accessible, and are a product of perception, comprehension and organised knowledge (Doyle & Ford 1998; Klein & Hoffman 2008; Rouse & Morris 1986). As mental representations, mental models are relatively enduring but change in response to new information, and are shaped by knowledge of underlying regularities, laws and principles (Doyle & Ford 1998; Forrester 1971). Mental models can represent spatial relationships, conceptual relationships, causal relationships, organisational relationships, and potentially other forms of relations between concepts (Klein & Hoffman 2008).

Within the management accounting literature, the concept of mental models has been used to explain the cognitive effects of comprehensive performance measurement systems (Hall 2011) as well as subjective performance-measure weighting decisions (Krishnan, Luft & Shields 2005). Hall (2011) operationalises the mental models construct in a cross-sectional survey of business unit managers; he finds that comprehensive performance measurement systems can facilitate both the confirmation and building of managers' mental models of business operations, and that the relationship between comprehensive performance measurement systems and managerial performance is indeed mediated by these two types of mental model development. In contrast, Krishnan, Luft and Shields (2005) find that the properties of mental models that cause them to diverge from formal scientific models (i.e. they are qualitative, frequently incomplete, and substitute familiar for unknown attributes) contribute to systematic decision errors in subjective performance measure weighting.

When mental models are used to represent systems of cause-and-effect relationships these can be referred to as *causal mental models*. Causal mental models form the basis of any attempts to describe, explain and predict a system and its behaviour (Rouse & Morris 1986, Markman & Gentner 2001), and provide crucial input into goal-directed cognitive work such as decision making and problem solving (Klein & Hoffman 2008). This is because causal mental models represent not just passive information about the environment, but knowledge of how to manipulate

causal systems to achieve a desired state or goal (Sloman 2005). Without accurate causal mental models, it would be impossible to make sense of events and generate appropriate courses of action which inform decisions and behaviour (Klein & Hoffman 2008).

Given the significance of causal mental models for decision making, it is surprising that no accounting research has adopted the construct explicitly. Notwithstanding this, a stream of experimental research has consistently demonstrated that a decision maker's beliefs about cause-and-effect relations do affect the way that they process and use accounting information in a range of judgement and decision making tasks (Banker, Chang & Pizzini 2011; Banker, Chang & Pizzini 2004; Cheng & Humphreys 2012; Farrell, Luft & Shields 2007; Farrell, Kadous & Towry 2012; Humphreys & Trotman 2011; Kelly 2010; Vera-Muñoz, Shackell & Buehner 2007; Webb 2004). Specifically, the provision of causal information alongside strategy information has been shown to improve performance evaluation (Banker, Chang & Pizzini 2011; Banker, Chang & Pizzini 2004; Humphreys & Trotman 2011) and strategy judgements (Cheng & Humphreys 2012; Tayler 2010; Vera-Muñoz, Shackell & Buehner 2007), as well as enable more efficient allocation of effort by employees (Farrell, Kadous & Towry 2008, 2012).

However, in the above research the existence and operation of causal mental models can only be inferred based on the findings of the experimental studies, which typically hypothesise that the provision of additional causal information will lead to systematic variation in judgement and decision outcomes (e.g. Banker, Chang & Pizzini 2011; Banker, Chang & Pizzini 2004; Cheng & Humphreys 2012; Farrell, Luft & Shields 2007; Farrell, Kadous & Towry 2012; Humphreys & Trotman 2011; Kelly 2010; Krishnan, Luft & Shields 2005; Vera-Muñoz, Shackell & Buehner 2007; Webb 2004). Related to this and similarly, survey studies, such as Hall (2011), have not been able to capture any specific characteristics of managers' mental models. Use of a survey instrument necessitated the assumption that managers have pre-existing mental models and that learning is reflected in how often these existing models are either confirmed or updated.

Despite the accumulated implicit evidence of the operation of causal mental models in accounting judgement and decision making tasks, we currently do not have any direct insight into the *content and composition* of managers' causal mental models. There are at least two interrelated reasons for this.

The first reason is the *theoretical* under-specification of the causal mental models construct, which in turn makes this concept highly problematic to operationalise within a predominantly quantitative paradigm (Klein & Hoffman 2008). Mental models are difficult to define, with existing definitions characterised as “overly brief, general, and vague” (Doyle & Ford 1998, p. 3). For example, within the accounting literature, mental models have been defined simply as “subjective, internal representations of systems of relations that can be used to support managers’ judgements, decisions and explanations” (Markman & Gentner 2001). Without additional conceptual specification, this definition does not provide any boundaries on the potentially infinite set of knowledge and beliefs that could be incorporated in such a representation (Klein & Hoffman 2008).

The second reason relates to the *methodological* challenges presented by studying causal mental models within a traditional experimental paradigm. Mental models reside in individuals’ minds, and are dynamic and change over time in response to new information or even attempts to elicit them (Klein & Hoffman 2008). Furthermore, mental models are often considered incorrect or incomplete relative to the external system that they represent; rendering them prone to measurement error that may only be minimised using time-consuming and expensive experimental techniques.

The result of these two interrelated challenges is that no adequate method for eliciting and analysing mental models has been developed within the experimental paradigm of cognitive psychology (Klein & Hoffman 2008), which has been a key informant of behavioural management accounting research. As a consequence, there has been no capacity to study mental models directly in a management accounting context.

Despite the challenges associated with studying causal mental models directly, existing management accounting literature suggests that strategic performance measurement systems can be used to inform the development of managers’ causal mental models. This includes the use of these systems to provide information about an organisation’s strategy, or the use of strategy maps to directly communicate cause-and-effect relationships (e.g. Banker, Chang & Pizzini 2011; Brewster 2011; Cheng & Humphreys 2012; Choy & King 2005; Hall 2011; Humphreys & Trotman 2011; Knechel, Salterio & Kochetovea-Kozloski 2010; Vera-Muñoz, Shackell & Buehner 2007).

While cause-and-effect relationships lie at the heart of many strategic performance measurement systems, the nature of these relations is highly contested in the literature with some studies showing a weakly positive relationship that varies significantly between industries (Banker, Potter & Srinivasan 2000; Ittner & Larcker 1998), while others show no evidence of statistically significant causal relations (Malina, Nørreklit & Selto 2007). An alternative view is that the causal relations embedded in strategic performance measurement systems reflect finality relations, which relate means to ends by way of human volition and action (Norreklit 2000). Consequently, it is an individual's *beliefs about causality* and will to achieve a particular end that drives the means. The implications of this difference in conceptualisation are significant, as it may help explain why strategic performance measurement systems can function as effective management control devices in spite of a lack of validated causal links (Malina, Nørreklit & Selto 2007).

To the extent that a strategic performance measurement system can influence managers' causal mental models of their operating environment, these systems can have a significant impact on managerial judgement and decision making and effort-allocation behaviour. The use of strategic performance measurement systems has been found to lead to positive strategic outcomes when they contain high levels of integrative information; that is, information that contributes to an understanding of causal linkages both between operations and strategy and between different parts of the value chain, and incorporates measures across a range of categories (Chenhall 2005). A subsequent study finds that the incorporation of explicit "link structures" into strategic performance measurement systems generates greater strategic consensus among middle managers than alternative systems that do not link measures explicitly (Aranda & Arellano 2010).

Taken together, these studies provide some evidence that management accounting and control systems *can* influence managers' causal mental models; however, it remains unclear precisely *how* this happens. Furthermore, questions remain as to how managers' causal mental models influence the development of management accounting and control systems.

A further and related issue is that the development of theory relating management accounting and control systems to managers' causal mental models has historically been frustrated by enduring theoretical and methodological preferences within the accounting judgement and decision making literature. The accounting judgement and decision making literature has to a large extent been modelled on the microcognition paradigm of cognitive psychology, and shares its interest in the

“building of theories for specific phenomena and with correlating the details of the theories with available empirical and experimental evidence” (Hoc, Cacciabue & Hollnagel 1995, in Schraagen, Klein & Hoffman 2008). Studies within the microcognition paradigm are typically oriented toward the interrelated methodological approaches of experimentalism, formalism and reductionism (Schraagen, Klein & Hoffman 2008), which is reflected in the tremendous volume of primarily experimental and overwhelmingly quantitative research produced within the accounting judgement and behaviour literature. The great advantage of these approaches is the ability to select and manipulate the key variables thought to be relevant to the phenomena of interest, to enable validation and extension of results through replication in controlled, laboratory-based environments (Schraagen, Klein & Hoffman 2008).

In the case of complex and context-rich cognitive processes – such as the development and use of causal mental models – the advantages of an experimental paradigm can become inherently constraining. While the use of naïve participants and relatively simple experimental materials is critical to achieving appropriate experimental control and internal validity, this control limits the possibility of studying diversity and complexity in causal mental models. Naïve experimental participants can be expected to form causal mental models of a hypothetical scenario based solely on the experimental materials provided; however, managers are likely to have significantly more complex causal mental models of their operating environment that are formed only partly on the basis of information communicated directly through management accounting and control systems. In order to examine the relationship between management accounting and control systems and managers’ causal mental models in an experimental setting, researchers need to be able to “trigger” this phenomenon on command – a feat which would not appear to be possible without the complex socio-cognitive inputs to the development of causal mental models in an organisational context.

To summarise, while the accounting judgement and decision making literature rests on the assumption that individual behaviour and decision making depends on the individual’s mental representation of their environment (Luft & Shields 2009), very little is currently known about the specific relations between management accounting and control systems, mental representations, and individual decision making. Of particular relevance to understanding the goal-directed behaviour and cognition that takes place within organisations is a type of mental representation known as a *causal mental model* (Klein & Hoffman 2008). However, theoretical and

methodological constraints have limited the development of insight into the nature of causal mental models, and as a result it remains unclear precisely how management accounting and control systems influence the development of managers' causal mental models. Further, it is not obvious how managers' causal mental models influence the development of management accounting and control systems, despite evidence of the lack of scientifically validated cause-and-effect relations embedded in these systems.

The need to understand the nature of causal mental models and their relation to management control systems also has implications for two additional management accounting literatures. The causal mental models construct and theory can be used to address theoretical issues both in the literature that investigates the interactive use of management control systems, as well as the literature on the cognitive effects of budget participation. In the following sections I discuss the specific motivation for this thesis with respect to each of these literatures in detail.

1.2.3. Interactive control and learning

The identification of interactive control as an important mechanism for influencing otherwise autonomous behaviour at the operational level represents a significant contribution of Simons' levers of control framework. In his original conceptualisation, Simons positions interactive control as necessary when decisions and actions originate from all levels of the organisation, and where they cannot be identified or programmed in advance. He states that: "... managers know that decisions and actions affecting current strategies will emerge from all corners of the organisation; their primary job is to provide guidance, resources and incentives to motivate the organisation to gather and interpret information so that the organisation can respond and adapt." (1990, p. 141). From this perspective, the levers of control framework – specifically, the interactive use of control systems – is argued to influence the pattern of decisions and actions of lower-level managers by providing an overarching *cognitive framework* within which these otherwise autonomous individuals can interpret information, make decisions, and solve organisational problems.

Within Simons' model, interactive control guides autonomous strategic behaviour – such as the decisions, actions and experimentation undertaken by employees – through the mechanisms of *signalling* and *learning*. Signalling refers to the use of information to reveal values and preferences (Simons 1990). In the case of interactive control, managers use information within the interactive

control system to communicate the set of activities that they consider to be the most critical: the strategic uncertainties which must be attended to in order to ensure that the goals of the organisation will be achieved. Signalling plays a particularly important role when the size and complexity of the organisation and its operating environment renders it impossible for top management to monitor these strategic uncertainties personally, given their inherently limited attention.

Crucially, it is debate and dialogue which translates the preferences signalled by the interactive control system into the learning which drives emergent strategy formation. In smaller organisations, this debate and dialogue is likely to happen organically as key personnel are able to interact and share information informally. Large organisations, however, require formal mechanisms to ensure that this interaction occurs and that information, opinion and insight is shared through system-facilitated debate (Simons 1995a). Interactive control systems can help to “build information bridges among hierarchical levels, functional departments and profit centres.” (Simons 1991, p. 61). Simons proposes that interactive control systems provide a platform for debate and dialogue by forcing participants at all levels of the organisation to engage with the information in the system and be prepared to contribute their own views in the interrogation of the causes and implications of the data discussed.

That top managers can use interactive control to send a signal about organisational priorities, and that the resulting dialogue and debate can lead to learning, is a core proposition within the levers of control framework. However, it remains unclear precisely *why* the interactive use of control systems facilitates learning.

The lack of a theoretical explanation for the effects of interactive control on learning represents a socio-cognitive “missing link” in Simons’ theorisation, which makes it difficult to formulate coherent arguments for why and under what conditions the interactive use of control would influence managers’ cognition in such a way that would facilitate congruent autonomous behaviour at the operating level. This missing link is reflected in the varied and often surprising empirical findings in the literature relating interactive control to learning (e.g. Henri 2006; Tuomela 2005; Widener 2007).

Bisbe, Batista-Foguet and Chenhall (2007) argue that inconsistencies in the empirical literature are the result of incomplete conceptual specification of the interactive control construct; they identify all of the properties of interactive control systems through a content analysis of Simons' entire body of work on the topic. They identify five distinct criteria: (1) an intensive use of the system by top management; (2) an intensive use of the system by operating managers; (3) a pervasiveness of face-to-face challenges and debates; (4) a focus on strategic uncertainties; and (5) a non-invasive, facilitating and inspirational involvement. Further, they argue that interactive control systems should be treated as a multidimensional, emergent construct, as opposed to a latent or unidimensional construct. Modelling the interactive control system construct in this way implies that each of its constitutive components have distinct natures, but are each required for the abstracted construct to have meaning. However, this conceptual approach is largely inconsistent with the manner in which the interactive control construct has been operationalised in recent empirical studies, where interactive control is more commonly (if implicitly) modelled as a latent, unidimensional construct with varying numbers of indicators (e.g. Bisbe & Malagueño 2009; Henri 2006; Widener 2007).

The absence of a coherent theoretical explanation of the learning facilitated by interactive controls makes it impossible to evaluate the competing approaches to conceptualising and operationalising the interactive control construct that are currently present in the literature. The question of how to define and model interactive control is a theoretical one, and one that may only be answered with reference to the purpose of the theory or framework (Whetten 1989). However, at present no underlying theory is available to suggest which conception of interactive control is more suited to this endeavour. Whetten (1989) argues that it is the underlying rationale – the psychological, economic, or social dynamics – that constitutes the “why” of the theory, and that this logic provides the basis for evaluation of a model. Whetten explains the importance of understanding “why” the empirical phenomenon occurs:

The central question addressed here is: Why should colleagues give credence to this particular representation of the phenomena? The answer lies in the logic underlying the model. The soundness of fundamental views of human nature, organisational requisites, or societal processes provide the basis for judging the reasonableness of the proposed conceptualisation. (Whetten 1989, p. 491).

As a type of mental representation which is critical for goal-directed cognitive work (such as decision making and problem solving) (Klein & Hoffman 2008), the concept and theory of causal mental models may have explanatory value for understanding *why* interactive control facilitates learning and improved managerial performance. The current lack of coherent theory regarding *why* interactive control facilitates learning has led to the development of a body of empirical research characterised by results that are difficult to reconcile and frequently contrary to expectations. In order to extend the levers of control framework beyond the irreconcilable ambiguities and empirically dominated discussion that exist in the literature, research must consider not only the *whats* and *hows* of the framework, but also search for a *why* which is capable of providing “a plausible and cogent explanation for why we should expect to see certain relationships in our data” (Whetten 1989, p. 491). Using the concept and theory of causal mental models to understand the underlying psychological and/or social dynamics of interactive control would provide a logical basis for comparing and evaluating the different conceptualisations of the levers of control framework, and the interactive control construct specifically.

1.2.4. Cognitive effects of budget participation

A second literature within management accounting that may benefit from the application of the causal mental models construct is the stream of research that investigates the *cognitive effects* of budget participation. This literature finds that participatory budgeting practices facilitate the transfer of information between managers of different hierarchical levels and relates this transfer to outcomes such as managerial and organisational performance. Collectively, this literature has generated three key insights into the relationship between budget participation and information transfer. First, participation may act as a platform for superior managers to transfer job-relevant information directly to the subordinate, thus increasing the subordinate’s ability to perform in the role (Campbell & Gingrich 1986; Chong & Chong 2002; Kren 1992; Latham & Saari 1979; Magner, Welker & Campbell 1996; Parker & Kyj 2006). Second, participation may reduce a subordinate’s role ambiguity by clarifying the superior’s expectations, thus increasing the subordinate’s motivation to perform (Chenhall & Brownell 1988; Chong & Chong 2002; Chong, Eggleton & Leong 2006; Parker & Kyj 2006). Finally, in line with agency theory principles, participation may allow the superior manager to reduce information asymmetry by eliciting the

subordinate's information about local conditions (Brown, Evans III & Moser 2009; Covaleski et al. 2003; Shields & Young 1993).

Research on the effects of participation on individual cognition and behaviour has also considered a number of variables that potentially moderate the strength and direction of the relationship. Some moderating variables relate to the nature of the subordinate's task set; researchers have discussed job difficulty (Mia 1989), variety of tasks (Hopwood 1976), task uncertainty (Marginson & Ogden 2005; Shields & Shields 1998), and task complexity (Campbell & Gingrich 1986; Murray 1990). Other moderating variables relate to the nature of the organisation and its environment; this set of variables includes rate of organisational change (Hopwood 1976), environmental volatility (Kren 1992), and perceived environmental uncertainty (Shields & Shields 1998). A variety of behaviour- and motivation-based explanations have been used in the literature to explain the considerable variation in the outcomes of budget participation, including role ambiguity and organisational commitment. However, the ability of the literature to produce *cognitive explanations* of the effects of budget participation has been limited by the narrow definition of participation as it has been conceptualised in this literature. As a result, it has not been possible to examine the implications of different types or levels of participation for managerial cognition and capacity for judgement and decision making.

It is possible that the concept of budget participation could have a wider application. In his seminal study on budgets and human behaviour, Argyris (1952 p.1) suggests that for budgeting to be more effective, "the subordinates should be given an opportunity to participate in the various decisions that are made in their organization which affect them directly or indirectly". Subsequent studies within the budgeting literature have tended to interpret this recommendation exclusively in terms of a subordinate's involvement in budget goal setting; that is, the extent to which the subordinate is involved in and has influence on the final budget targets.³ Shields and Shields (1998) note the relatively small effects of participation in goal-setting observed empirically and suggest that one way to extend this literature is to expand the definition of participation. This may involve the

³ Most empirical survey-based studies that include budget participation as a variable use a variation on the measurement instrument developed by Milani (1975) (e.g. Brownell 1982; Brownell & McInnes 1986; Chenhall & Brownell 1988; Mia 1988, 1989; Nouri & Parker 1996; Nouri & Parker 1998; Parker & Kyj 2006). An adapted version of the Milani (1975) instrument was developed by Kren (1992) and used by a number of other more recent studies (e.g. Chong & Chong 2002; Chong, Eggleton & Leong 2006; Magner, Welker & Campbell 1996). Both of these instruments appear to deal exclusively with decisions regarding the generation of a single iteration of an annual budget.

incorporation of a wider scope and broader range of dimensions, as have been adopted in the organisational behaviour literature (e.g. voluntary or forced; formal or informal; direct or indirect; degree such as none, consultation, joint, self-selection; content such as type of decision or budget; vertical vs horizontal; and individual vs group) (Shields & Shields 1998).

A consequence of the narrow framing of participation in the extant literature is that little is currently known about the information that is potentially transferred during participative budgeting. Extant research has provided a convincing body of evidence that suggests participation in budgeting can facilitate the ex-ante transfer of information between superior and subordinate managers; however, no studies to date have studied information transfer directly. For example, studies in this stream of research consider the availability of “job-relevant information” to subordinate managers (Chong & Chong 2002; Kren 1992; Parker & Kyj 2006), which is defined and operationalised simply as “information that facilitates job-related decision making” (Kren 1992 p.511). However, while the empirical results of a series of cross-sectional survey-based studies find that the availability of “job-relevant information” is related to budget participation, it is unclear precisely what this information is. Increasing the scope of the participation construct would also allow for the development of a more nuanced understanding of the information transferred as a result of participatory processes.

The narrow interpretation of participation has also restricted the ability of the literature to examine the implications of different types or levels of participation on information transfer and managerial cognition. While the budget participation literature has produced considerable evidence that participatory budgeting practices lead to information transfer between superior and subordinate managers, and studies frequently hypothesise that information transfer can lead to outcomes such as reduced role ambiguity, increased organisational commitment, and higher quality budgets, little is currently known about the information that is potentially transferred during participative budgeting. As a result, prior literature has been constrained in its ability to produce *cognitive explanations* of the effects of budget participation on managerial cognition and capacity for judgement and decision making.

1.3. Research Question

While it is generally acknowledged that individual behaviour and decision making depends largely on an individual's mental representation of their environment (Luft & Shields 2009), research in management accounting has not previously attempted to identify and explain the specific relations between management accounting and control systems, mental representations, and individual decision making. Theoretical and methodological preferences within the accounting judgement and decision making literature have rendered the study of mental representations such as causal mental models particularly challenging, and have frustrated the development of insight into the nature of causal mental models and their relation with management accounting and control systems. Experimental research within the strategic performance measurement systems literature suggests that management accounting and control systems *can* influence managers' causal mental models; however, it remains unclear precisely *how* management accounting and control systems influence the development of managers' causal mental models, or how managers' causal mental models might influence the development of management accounting and control systems in the first instance.

The concept and theory of causal mental models may also have explanatory value for two additional management accounting literatures. The interactive use of control is widely theorised to influence organisational outcomes by facilitating signalling and learning, but conceptual ambiguities and lack of coherent theory regarding *why* interactive control would facilitate learning has led to the development of a body of empirical research characterised by results that are difficult to reconcile and are frequently contrary to expectations. Similarly, a historically narrow interpretation of participation has restricted the ability of the budget participation literature to examine the implications of different types or levels of participation on information transfer, thereby limiting its ability to produce *cognitive explanations* of the effects of participatory processes on managerial cognition and capacity for judgement and decision making.

Accordingly, the specific research question investigated in this thesis is:

How do management control systems influence the development of managers' causal mental models; and how do managers' causal mental models influence the development of management control systems?

1.4. Research Approach

In order to answer the above research question, I undertake a qualitative embedded case study of a medium-sized residential aged care service provider ('ResCare'), in the Australian state of New South Wales. The case of ResCare was selected as it has a set of theoretically-indicated conditions (Miles, Huberman & Saldaña 2014; Yin 2009) and provides an unusually rich source of data relating to my research question (Eisenhardt 1989; Patton 2002).

The fieldwork component of this study was undertaken over a period of 15 months, during which time data was collected from numerous sources. Organisational-level data was collected through three sources; extensive ethnographic-style observation of organisational activity, semi-structured interviews, and examination of extensive archival documentation. In order to collect data relating to the individual level constructs of causal mental models, I used a research method from psychology enabling examination of macrocognition – Cognitive Task Analysis (CTA) (Crandall, Klein & Hoffman 2006; Klein & Hoffman 2008).⁴ This involved conducting 11 specific knowledge elicitation interviews of executive and operational level managers using purpose-built software (CMAP Tools), in which I produce a digital representation of their cognitive model of cause-and-effect relationships.

I analyse both the organisational level data and the individual level data by drawing on qualitative data analysis methods. This includes pattern-matching to understand the drivers and implications of variation in these 'cognitive maps' with respect to participants' exposure to and engagement with management control systems. I then use these findings to develop a theoretical model and a theoretical explanation of the relationships between the use of management control systems and the development of managers' causal mental models. Finally, I reflect on the implications of this explanation for the four management accounting literatures on which the study is motivated.

⁴ To my knowledge, Cognitive Task Analysis has not previously been adopted as a research method within the management accounting literature, with the closest example of this approach being a study by Abernethy et al. (2005). This study sought to produce a "map" of critical success factors for a case organisation, and trialled three "map-building" methods including computer-based analysis of causal links, ethnographic analysis of interview data, and interactive mapping with expert participants. While the interactive mapping technique bears some resemblance to the method used in this thesis, it involved the use of pre-defined success factors and was intended to generate data relating to the organisation or business-unit level, rather than seeking to elicit and represent individual-level mental representations.

1.5. Contributions

In this thesis I make contributions to each of the four streams of management accounting literature which formed the basis of the motivation for the research.

1.5.1. *Cognitive effects of strategic performance measurement systems*

This thesis makes two contributions to the body of research that investigates the cognitive effects of strategic performance measurement systems. My first contribution to this literature is the generation of direct insight into the *content and composition* of managers' causal mental models by developing the causal mental models construct for application and operationalisation in a management accounting context. I decompose the causal mental models construct into three constitutive dimensions: understanding of organisational priorities; knowledge of organisational activities; and beliefs about the cause-and-effect relationships that link drivers and outcomes of performance. By identifying specific dimensions relating to the *content* of a causal mental model, I enable the development of significantly more detailed theoretical explanations relating to the determinants and consequences of each dimension with respect to the relationship with the use of management accounting and control systems. More detailed conceptual specification may also facilitate the accommodation of much greater diversity and complexity of mental models; this is more reflective of the cognitive representations of decision makers in naturalistic environments than that which was previously possible given the conceptual and methodological constraints affecting prior research.

The second contribution of this thesis to this stream of research on strategic performance measurement systems is my explanation of how management accounting and control systems influence the development of managers' causal mental models, and how managers' causal mental models influence the development of management accounting and control systems. Based on a review of the relevant psychology and accounting literatures, I develop a preliminary conceptual framework. This provides initial sensitising concepts relating to both the use of management control systems (specifically: system components, system-generated information, and system-facilitated interaction) and the features and patterns of variation within participants' causal mental models (understanding of organisational priorities, knowledge of organisational activities, and beliefs about the cause-and-effect relationships linking drivers and outcomes of performance). In building the explanation I first consider the relations between the components of senior managers'

causal mental models and their use of management control systems. I then consider the relations between the components of operational managers' causal mental models and the use of management control systems. I also demonstrate how the use of management control systems can mediate the relationship between senior and operational managers' causal mental models which in doing so facilitates additional socio-cognitive outcomes such as learning about causal relations as well as effective intra-group communication.

1.5.2. Accounting judgement and decision making

The theoretical model and associated theoretical arguments that I develop in the thesis also contribute to the broader accounting judgement and decision making literature by providing an explanation of one specific relationship between management accounting and control systems, mental representations, and individual decision making. Specifically, the model represents a previously missing link in the argument for a mediating relationship between management control systems and judgement and decision making activity. While it is well established that cognitive representations act as a critical input to judgement and decision making, it has not been clearly demonstrated that the use of management control systems can influence cognitive representations. This is largely due to the conceptual and methodological limitations discussed earlier, which have historically constrained the stream of research in this respect. The approach taken in this thesis may also go some way to resolving a fundamental and confounding problem in the accounting judgement and decision making literature – that the provision of accounting information is often intended to inform judgement and decision making, but rarely does in practice (Bruns & McKinnon 1993; Mintzberg 2009; Tengblad & Edvin Vie 2012). Identifying a new causal pathway between the use of management accounting and control systems and the development of a decision makers' mental representation allows for the temporal and spatial separation of the inputs to decision making and the decision making activity itself, and opens up avenues for research to identify additional new relationships between the use of management accounting and judgement and decision making practice within organisations.

The empirical approach that I develop in this thesis also represents a distinct methodological contribution to the accounting judgement and decision making literature. The lack of prior management accounting studies that attempt to observe causal mental models directly necessitated the development of a novel approach to eliciting participants' causal mental models within their

naturalistic work context. The approach taken in this thesis is modelled on the Cognitive Task Analysis (CTA) technique of cognitive mapping, a data elicitation and visualisation technique commonly used in naturalistic decision making and organisational behaviour research but not previously adopted within management accounting. I use the cognitive mapping technique to elicit managers' causal mental models within the context of a longitudinal quasi-ethnographic case study, in order to understand the *content and composition* of the mental models within their natural *organisational context*. Together, the conceptual and methodological development relating to the causal mental models construct undertaken in this thesis allows for the direct observation of the content of causal mental models, and more nuanced theorisation relating the use of management accounting and control systems to mental representations, judgement and decision making outcomes, and ultimately, managerial and organisational performance.

1.5.3. Interactive control and learning

In addition, I contribute to the literature on interactive control by providing a theoretical explanation of the learning processes that result from the interactive use of control systems. Using my theoretical model and additional empirical data, I demonstrate that the theory and concepts associated with the development of managers' causal mental models provide a coherent theoretical framework within which to explore the underlying socio-cognitive dynamics of the interactive control construct. By applying the refined theoretical model directly to the concept of interactive control, I generate a set of explanations of the cognitive mechanisms underlying the interactive use of results-control oriented management control systems.

First, I explain why the mechanism of signalling alone is sufficient to facilitate the translation of senior managers' beliefs about strategic priorities into operational managers' causal mental models as operational priorities, yet is insufficient to ensure that operational managers' interpret and execute operational priorities in a way that is congruent with senior management's strategic priorities and vision. Second, I explain why at least one type of learning that occurs during the interactive use of management control systems relates to the development of managers' causal mental models of their operating environment. Third, I explain why interaction is critical for managers to learn about underlying causal relationships, as it facilitates the articulation, challenge and generation of specific causal attributions by diverse groups of managers.

The explanations that I develop in the thesis extend Simons' mechanisms of signalling and learning by providing a coherent framework within which to understand the effects of interactive control on managerial cognition, learning, and ultimately performance. This identification of more specific causal mechanisms within the framework (the "why" of a theory (Whetten 1989)) provides a logical basis for the evaluation of different conceptualisations of the interactive control construct. Specifically, I use the explanations that I generate to argue that all five dimensions of interactive control identified by Bisbe, Batista-Foguet and Chenhall (2007) are required for interactive control to have the hypothesised effects on managerial learning and organisational performance, and provide support for their position that interactive control should be treated as a multidimensional, emergent construct, as opposed to a latent or unidimensional construct. In this way, the application of the causal mental models construct and surrounding theory may also facilitate the reconciliation of some of the inconsistent findings within this literature with respect to the effects of interactive control on organisational learning and performance.

1.5.4. Cognitive effects of budget participation

Finally, this thesis makes a contribution to the literature on budget participation by expanding the notion of participation and explaining how this facilitates a deeper understanding of the information transferred during participative processes and therefore its effect on managers' cognition and capacity for judgement and decision making. I apply my theoretical model to the specific phenomenon of budget participation and generate a set of three specific insights. First, I explain how the definition of participation can be expanded in order to more completely capture the potential of budgeting for information sharing; second, I explain the theoretical value of conceptualising job-relevant information in terms of the components of managers' causal mental models; and third, I explain how budget participation can facilitate the transfer of causal knowledge and beliefs between levels of management.

The findings and insights generated in this thesis may help to resolve inconsistencies that have previously frustrated the advancement of theoretical arguments in this area. By broadening the definition of participation to include forms of budget-facilitated interaction other than setting targets, it becomes possible to build a more complete picture of the information transferred during participative budgeting processes. The use of the concept and operationalisation of causal mental models, as developed in this thesis, enables researchers to unpack the notion of "job-relevant

information” and start to incorporate these nuances into theoretical arguments relating to the role of participative budgeting processes in information transfer and coordination. Finally, the explanations that I develop using the theoretical model may help explain the consistently inconsistent empirical findings in this literature, as these specify the conditions under which budget participation is likely to lead to improved managerial performance, as well as explain why performance may not improve despite the implementation of participative processes.

1.6. Thesis Outline

This thesis will proceed in the following structure. In Chapter 2 I review literature from various disciplines relating to the development and use of causal mental models in order to develop a preliminary conceptual framework within which to investigate the relationship between the use of management control systems and the development of managers’ causal mental models. This conceptual framework is then used as the basis for the development of the study’s research design, which I explain in detail in Chapter 3. In Chapter 3 I also provide an overview of the set of knowledge elicitation and data visualisation techniques known as Cognitive Task Analysis, which have been developed for the purpose of studying cognitive phenomena in the field and have informed the development of the research method in this thesis.

In Chapters 4 and 5 I present a description and analysis of the empirical data from my case study of residential aged care service provider ResCare. In Chapter 4 I provide a detailed description of the empirical data as it relates to the organisational-level constructs in the research question; specifically, the organisational context and key features of the design and use of management control systems by study participants. Then, in Chapter 5 I present the empirical data relating to the individual level constructs of participants’ causal mental models, as well as preliminary analysis of the characteristics and patterns of variation in the cognitive maps generated by each of the participants in the study.

In Chapter 6, I integrate the data and findings relating to the organisational- and individual-level constructs. I perform additional pattern-matching analysis of the entire data set in order to develop an understanding of how the use of management control systems at ResCare has contributed to the development of participants’ causal mental models, and how participants’ causal mental models influenced the design of management control systems. I then abstract out of the empirical findings

to develop a general theoretical model of these relationships, and reflect on the implications for existing literature that considers the cognitive effects of strategic performance measurement systems. In Chapter 7 I extend the theoretical model by applying additional theory relating to the group-level socio-cognitive effects of the relationship between management control systems and managers' causal mental models. Specifically, I then apply the theoretical model and additional insights from the group-level analysis to consider the implications of my theoretical explanations for the interactive control and budget participation literatures.

Finally, in Chapter 8, I provide a summary of the research undertaken for this thesis, and articulate how the thesis has addressed the research objective, research question, and specific research motivations. I conclude with a discussion of the limitations of the study and the implications of these for future research, as well as some brief final observations regarding the findings of the study.

Chapter 2: Conceptual Framework

2.1. Introduction

The aim of this chapter is to develop and define the constructs of causal mental models and management control systems in order to inform the empirical approach and theoretical analysis undertaken in this thesis. In Section 2.2 I explain the nature of causality and human causal reasoning in order to better understand the inputs to and implications of causal mental models for cognition. I then examine the prior research that has investigated the concept of mental models, focusing on the mechanisms associated with their development and use. Based on this literature, I first provide a definition of the causal mental models construct and then decompose it into three specific components that are relevant to their operation within an organisational context. Finally, in Section 2.3, I identify a compatible conceptual framework within which to define and study management control systems; I then decompose this construct into three key components which will inform the research design.

2.2. Causal Mental Models

Causal mental models are the product of numerous cognitive processes and functions, including perception, comprehension and organised knowledge (Doyle & Ford 1999; Klein & Hoffman 2008), and are implicated in the types of goal-directed cognitive work that is critical to the successful operation of organisations (Klein & Hoffman 2008). In order to understand how causal mental models relate to the use of management control systems – themselves oriented toward ensuring the achievement of organisational goals – it is necessary to first clarify what is meant by causality, and how this is reflected in human causal reasoning. In the following section I provide an overview of the main philosophical traditions that have investigated the notion of causality, and explain how these traditions contribute to our contemporary understanding of how we learn about and reason with our knowledge of cause-and-effect relationships in our environment.

2.2.1. *Causality and causal reasoning*

The notion of causality is central to all human efforts to diagnose, predict and explain phenomena. Causality is constantly invoked when we reason about our worlds and is frequently and easily

referred to in our communication with others. However, the nature of causality is itself the subject of ongoing debate amongst philosophers and scientists, and has thus far eluded clear definition or consensus. As contemporary philosopher James Woodward (2003) observes, the notion of causality continues to be treated in vastly different ways by different philosophical traditions, and by applied fields such as econometrics and cognitive psychology. Some philosophers seek to explain cause and effect with reference to ‘general laws’, while others appeal to a tacit, ‘conversational’ notion of causality as a benchmark for assessing contributions to theory in this field. Causality may be an elusive concept, but it is one with which nearly every human is already fluent.

Regularity theory of causation

Most attempts to define causality focus on identifying the necessary conditions for the existence of a causal relationship. An early example of this kind of philosophical reasoning is that of David Hume, who, curiously, provided two distinct and often quoted definitions. The first definition is an example of what is generally referred to as the regularity theory of causality. Hume’s regularity definition of causality is: “We may define a cause to be an object followed by another, and where all objects, similar to the first, are followed by objects similar to the second” (Menzies 2009). This view is more often formulated as “A is a cause of B if and only if A belongs to a minimal set of conditions that are jointly sufficient for B, given the laws” (Menzies 2009). A modern formulation of this regularity view of causality is the deductive-nomological model of (causal) explanation, advanced significantly by Carl Hempel, with Paul Oppenheim. This model also appeals to the notion of natural covering laws; it prescribes that for an explanation to be valid, the phenomenon to be explained must be derived deductively from the premises, which must include reference to a natural law capable of producing the phenomenon as a logical consequence.

This regularity or ‘covering law’ view has a number of well-known problems, and is open to counterexamples including explanatory irrelevancies and pre-empted causes. An often cited example of the problem of explanatory irrelevance is credited to Wesley Salmon. Consider the premises, (1) that men who take birth control pills regularly fail to become pregnant, and (2) that John Jones is a man who has been taking birth control pills regularly. Following the regularity view of causal explanation, these premises are sufficient to explain why John James fails to become pregnant – a conclusion which clearly violates a more conversational notion of causality. The

possibility of pre-empted causes also presents a challenge to the regularity view of causality. A cause is pre-empted when it could be expected to produce a given outcome but for the occurrence of a second cause. A well-known example of pre-empted cause is that of two highly-skilled assassins, each of whom succeed in killing their target on every attempt. If both assassins shoot at the same target simultaneously, the regularity view would not be able to differentiate between the two assassins as to who actually caused the death of the target. Subsequent philosophical treatments of causality and causal explanation appear to be better equipped to deal with these two counterexamples, as well as others.

Counterfactual theory of causation

The second of David Hume's definitions is more in line with the more contemporary counterfactual account of causality, which has presented a challenge to the regularity view in modern philosophy (Menziez 2009). Hume's second definition states that a cause exists "where, if the first object had not been, the second never had existed" (Menziez 2009). Formally, the basic idea of counterfactual theories of causation is that the meaning of causal claims can be explained in terms of counterfactual conditionals of the form: "if A had not occurred, C would not have occurred" (Menziez 2009).

The best known analysis of the counterfactual account of causality is the theory of David Lewis (Lewis 1973b). A central idea in this theory is that of *causal dependence* between events. Specifically, Lewis argues that where A and B are two distinct possible events, B causally depends on A if and only if, if A were to occur B would occur; and if A were not to occur, B would not occur. In the case that both A and B have actually happened, the first part is necessarily true. This means that the latter part, the counterfactual, is the crucial condition for causal dependence. Lewis' explanation is as follows: "We must think of a cause as *something that makes a difference*, and the difference it makes must be a difference from what would have happened without it. Had it been absent, its effects – some of them, at least, and usually all – would have been absent as well." (Lewis 1973a p.161).

The direction of causation is argued to be the direction of causal dependence, which is typically of later events on earlier events rather than the other way around. According to Lewis, causal dependence is sufficient for causation but not actually necessary. This is to allow for *causal transitivity*, or rather, the possibility of a causal chain. Transitivity allows for earlier events in a

causal chain to be considered the cause of later events, even if they are not directly connected by a dependence relationship. Probability can also be incorporated into the theory through the following formulation: “Where A and B are distinct actual events, A causally depends on B if and only if, if A were not occurred, the chance of B’s occurring would be much less than its actual chance.” (Menzies 2009).

The features of causal dependence and causal transitivity in Lewis’ counterfactual theory of causality go some way to addressing the problems raised by regularity theory and the deductive-nomological model. In the John James example, the incorporation of causal dependence means that we can no longer draw the conclusion that John James fails to become pregnant because he has been taking birth control pills. Rather, the counterfactual element of the definition of causal dependence argues that if John James has failed to become pregnant, the taking of the birth control pills would only be considered a cause if John James *would have* become pregnant without them. While this is clearly a more satisfactory analysis in terms of our intuition about causality, it is still not entirely robust to counterexamples. Similarly, allowing for causal transitivity helps with the problem of pre-empted causes. In the case of the two assassins, we may assign causality to the assassin who pulled the trigger on the gun which fired the bullet which caused fatal injury to the target. There is no such causal sequence in the case of the other assassin, who would have hit and killed the target *but for* being pre-empted by the first. Again, this explanation is also subject to critique but nonetheless represents advancement in the theory.

The counterfactual theory has several limitations of its own. Most significantly, it overlooks the inherent context-sensitivity of causation. As causation is highly sensitive to context, any number of factors that brought the current situation about could be identified as a cause of an event. While common sense can distinguish between causes and conditions, the theory is unable to do so. A cause may be thought of as a factor which makes the difference between two situations, while background conditions are thought of as those factors which are common to the two situations. In different contexts of enquiry, the contrast situation may be framed in different terms. A more precise formulation that takes into account issues of context might be: “If A* (a variation on A) had occurred instead of A, then B* (A variation on B) would have occurred instead of B”. Other limitations relate to Lewis’ incorporation of causal transitivity, leading to counterexamples of double prevention and further issues relating to pre-empted causes.

Manipulability theory of causation

As with many philosophical pursuits, proponents of both the regularity and counterfactual theories of causation seek to define the notion of causation exclusively in analytical terms, which are universally generalizable, and do not typically concern themselves with the practical utility of the thesis. As a result, neither of these theories are able to offer an explanation of how and why humans reason about causal relationships. This disconnection between a philosophical account of causality, and the more everyday notion with which nearly all humans are fluent, has motivated some contemporary philosophers of science to develop theories of causation which can explain why causal knowledge can be practically useful (that is, what differentiates it from descriptive knowledge) and what makes it useful to human actors (Woodward 2003). This is precisely the agenda of philosopher James Woodward, who develops and explicates a *manipulability theory* of causation in his 2003 book, *Making Things Happen*. The basic premise of his account of causation is that human interest in causal relationships and explanation grows out of a highly practical interest in manipulation and control, and that this interest in manipulation is what distinguishes causal explanation from simple description.

Woodward (2003) argues that a having clear sense of the purpose of a notion of causality is an important starting point for developing a definition of causal explanation. Differences in perspective of the purpose of a notion of causality drives much of the gap between the different philosophical treatments and theories; where this purpose is grounded in ‘disinterested intellectual curiosity’ it is little wonder that the resulting theories (such as the regularity and counterfactual views) are limited in their ability to describe the construction and use of causal explanation in science and everyday life. If we take instead the more commonsensical view that the purpose of a notion of causation is to describe the mechanisms that we can use in order to make things happen, then the purpose of a theory of causation will also shift from focusing on regularity and prediction to a more active emphasis on potential to control.

The distinction between descriptive knowledge and causal explanation is one of the central tenets of the manipulability theory of causation. Woodward (2003) argues that explanation hinges on the provision of information which is relevant to manipulating, controlling, or changing nature; if not in a literal sense, then at least in principle. Where descriptive knowledge may be useful for classifying and even predicting phenomena, explanation involves the identification of factors or

conditions that can be manipulated in order to produce changes in the phenomenon or outcome being explained. Put more formally, manipulability theory argues that a causal relationship exists when an independent variable X (the *explanans*) can be manipulated or changed in such a way that it produces a change in the causally dependent variable Y (the *explanandum*). In another sense, this definition reflects the “something that makes a difference” notion that underpins much of David Lewis’ (1973b) counterfactual theory, but with the additional requirement that the “something” could itself be manipulated or changed in principle.

Within manipulability theory, the objective of causal explanation can thus be understood as identifying the factors and relationships that – if manipulation of those factors were possible – would allow for the manipulation of the phenomenon of interest. This definition has several implications for the characteristics of information that is relevant to causal explanation. Specifically, Woodward (2003) appeals to the two interrelated notions of intervention and invariance. Woodward’s (2003) notion of an intervention positions it as an “ideal experimental manipulation” of the value of an independent variable in order to assess its effect on a dependent variable, such that the intervention is not correlated with any other cause of the dependent variable. It is not necessary for this intervention to actually be possible, nor does it depend on notions of human agency to achieve it. Invariance is a property of a causal relationship, such that the nature of the relationship between an independent and dependent variable does not change as a result of an intervention on the value of the independent variable. Formally, the necessary and sufficient condition for the existence of a causal relationship within manipulability theory is that the relationship is invariant under an appropriate set of interventions (Woodward 2003).

Causal reasoning

Each of the philosophical accounts outlined in this chapter attempt to define causation in terms which are analytically generalizable and allow for discussion of the causal concepts using clear and consistent terminology and meaning. While philosophical theories of causation are increasingly concerned with having descriptive validity with respect to the way notions of causality are deployed in scientific pursuits and everyday use, they are essentially normative in nature. Nonetheless, these theories are informative for positivist research agendas in applied fields such as cognitive psychology, that seek to describe the manner in which individuals understand, represent and reason about causal relationships.

Cognitive psychologist Steven Sloman argues that people are designed to learn and reason with causal models (2005). In his book, *Causal Models: How People Think About The World and Its Alternatives*, Sloman asserts that at the heart of causal models is the human capacity for agency; causal models represent not just passive information about the environment, but *knowledge* of how to intervene in the world and change it. The account of causality implicit in the causal model framework developed by Sloman (2005) shares many of the features of Woodward's manipulability theory, made clear in the following summary:

What's unique about the causal model framework is that it gives us a way to think about the effect of action in the world. It makes the claim that the cognitive apparatus that people use to understand the world has a specialised operation that encodes certain changes in the world as the effect of agency, of intervention. ... And what's so useful about them is not only that they give us a way to represent action but that they also give us a way to represent imagined action, how we think about the way the world could or would be if such and such were different. (Sloman 2005 p.7)

Sloman's (2005) project has both normative and positive elements, and as such provides a bridge between the development of the causation concept in philosophy and research in cognitive psychology. This has generated empirical experimental research on the human cognitive processes that are involved in reasoning about causal relations. Sloman's (2005) causal model framework has three main elements. The first component is the causal system in the world, which we are attempting to represent. The second component is the algebraic probability distribution which describes the likelihood of particular events occurring, and the likelihood of them occurring together. The final component is the graphical representation of the causal system.

It is important to note that, like Judea Pearl's (2000) ground breaking work on structural equations, the causal model framework is proposed primarily as a language for representing causal systems, and may or may not be reflected in actual psychological processes. However, work has already begun on validating the different components of the framework in applications to human thinking and reasoning. For example, early research suggests that the qualitative causal structure represented by nodes and arrows in the graph has a stronger influence in decision making than reference to a quantitative probability distribution (Sloman 2005).

Learning about causal relations

A key component of Sloman's (2005) conception of causality is the notion of selective attention and invariants. Selective attention, while sometimes thought of as a limitation of human cognition, is crucial to our ability to learn and function in our environment. Instead of becoming overwhelmed by hundreds of thousands of details, sensations and relations, we generally attend only to information that is relevant to our interests and current goals. Of the information that we attend to, only that which is important and meaningful is stored and the remainder is forgotten – another important function which is easily mistaken for a cognitive defect. Sloman (2005) argues that what we selectively attend to, and typically remember, is information that is *invariant* to context and doesn't change from instance to instance. Invariance in the causal model framework is used in much the same way as the concept of invariance within manipulability theory; relations that are invariant may be considered a causal mechanism. Sloman's (2005) central thesis is that the invariant that guides human reasoning and learning about events is causal structure, and that knowledge of causal structure is essential to prediction, explanation and action.

Expertise can be understood as knowledge about invariants: those aspects of a field that represent the stable, consistent and reliable properties that can be expected to hold across different contexts. While humans are perfectly able to reason about causality without any knowledge or understanding of the causal mechanisms that facilitate the relationship, knowledge of causal mechanisms will typically increase the sophistication and accuracy of our reasoning (Pearl 2000). Prediction requires detailed knowledge of these properties, such that the future value of variables can be determined based on current values; control requires even more sophisticated understanding of causal relations in order to select an action that is most likely to produce a desired outcome. Pearl (2000) views causal reasoning tasks as sitting within a natural hierarchy: simple prediction requires a bare minimum of causal information (such as a joint distribution function); the analysis of intervention/manipulation requires knowledge of causal structure; and finally, the processing of counterfactuals requires information about functional relationships and any omitted factors.

The concepts of invariance and intervention embedded in manipulability theory and the causal model framework are also central to understanding how humans acquire knowledge of causal relations from information cues in the environment. Probability theory is able to represent the main issues of causality, but does not provide any insight into the phenomenon of causal learning.

Instead, probability theory implies that causal learning could only occur in closed, controlled environments – though this is never the case in reality. Every natural learning environment is subject to uncontrolled and unanticipated influences, which have the potential to confound causal relations and severely inhibit the acquisition of causal knowledge.

However, children and other learners do not only acquire causal knowledge from observation. In differentiating naïve human learners from a statistician seeking to make causal inferences from data, Pearl (2000) notes that they have at least two alternative sources of causal information: manipulative experience, and linguistic advice. Manipulative experience comes from wilfully intervening in the environment in order to observe the consequences. The advantage of this kind of observation, relative to more passive observation, is that the learner is more certain of the cause and the effect, having instigated the cause through their own volition and action. In the many cases where manipulative experience is not possible, however, linguistic advice can be provided by other knowledgeable individuals (such as parents and teachers, in the case of a child). Pearl observes that while this seems an unremarkable and mundane way to learn about causality, linguistic advice probably makes up the bulk of our causal knowledge. Further, the kinds of explicit causal sentences that constitute this kind of linguistic advice are rarely constructed in the quantitative vocabulary of probability theory but are generally more qualitative in nature.

There are a number of different levels at which causal mechanisms and relations can be analysed. Those who take the philosophical position of determinism (or causal determinism) understand events in the world as being invariably and entirely determined by prior events, conditions, and the laws of nature (Hoefer 2010). To such a person, the entire world can be interpreted as a single, very large, extremely complex causal system. However, it is possible to think about causal systems both different levels of granularity, and different levels of abstraction. Sloman (2005) uses the example of a human body to illustrate the different levels of granularity. At a coarse level of granularity, the human body can be described in terms of the different physiological systems that interact in order to function. At a finer level, each of these physiological systems could be described in terms of their own biological mechanisms. These mechanisms themselves can be decomposed into yet finer descriptions – and so forth. Causal mechanisms may also vary by level of abstraction – at one level, a model may seek to describe a general causal principle, while at another, the model may represent a specific (realised) causal mechanism.

Summary

The philosophy of causation has progressed from the early regularity theory of David Hume (Menzies 2009), to the influential counterfactual theory of David Lewis (1973a, 1973b), and most recently to the manipulability theory of James Woodward (2003). This philosophy of manipulability and intervention underpins the graphical theory of Pearl (2000) and the subsequent psychology theory of causal models espoused by Sloman (2005). Sloman's (2005) causal models theory has considerable implications for understanding how individuals acquire their beliefs about cause-and-effect relations as part of their causal reasoning and decision making processes. Specifically, Sloman (2005) identifies the notion of selective attention and invariants as crucial to human learning about cause-and-effect, which can occur either through passive observation, direct manipulative experience, or – most commonly – through linguistic advice.

These philosophical traditions contribute to our contemporary understanding of how we learn about cause-and-effect relationships in our environment. However, in order to *use* causal knowledge in order to intervene in a system and achieve a goal, decision makers must be able to integrate their knowledge with other cognitive processes, including perception and comprehension (Klein & Hoffman 2008). This integration is made possible through the development and use of *mental models*, which I discuss in detail in the following section.

2.2.2. Mental models

The concept of mental models has had wide application in fields ranging from system dynamics, to naturalistic decision making, and cognitive psychology. The wide application of the concept has presented challenges in its development and use, as its interpretation tends to vary from discipline to discipline and, indeed, from scholar to scholar. The 'loose' use of the term to describe a range of cognitive phenomena is partly the result of ambiguity in early definitions (Rouse & Morris 1986), and a general reluctance in the literature to settle on a more bounded definition of the concept prematurely (Doyle & Ford 1998).

Early definitions of mental models focused on the role of organised knowledge in understanding the function and behaviour of systems. Veldhuyzen and Stassen (1977), researchers in the field of manual control, define mental models in terms of a specific type of system knowledge. They conclude that a human's mental model includes knowledge about the system to be controlled,

knowledge about the properties of disturbances likely to act on the system, and knowledge about the criteria, strategies etc., associated with the control task (cited in Rouse & Morris 1986 p3). However, while organised knowledge is a necessary component of a mental model, the mental model concept is considered more than and different to the knowledge it contains (Doyle & Ford 1998; Klein & Hoffman 2008).

Other researchers focus their definitions instead on how and why mental models are used. Rouse and Morris (1986) provide a seminal functional definition of mental models as “the mechanisms whereby humans are able to generate descriptions of system purpose and form, explanations of system functioning and observed system states, and predictions of future system states” (p7). This definition provides a useful outline of what mental models are used for, but does not represent progress in clarifying what a mental model is, what it looks like, and how it works. Were the term “mechanism” to be exchanged for the term “model”, this definition would, in fact, be entirely circular (Klein & Hoffman 2008).

Doyle and Ford (1998) attempt to provide a more comprehensive definition of mental models for use in the context of system dynamics research. They review research that uses the mental model concept within the system dynamics, psychology, and cognitive science literatures, and synthesise the many different and often conflicting definitions presented. Their definition of mental models of dynamic systems (MMODS) takes the following form: “A mental model of a dynamic system is a relatively enduring and accessible, but limited, internal conceptual representation of an external system whose structure is analogous to the perceived structure of that system.” (Doyle & Ford 1998, 1999). With this definition, Doyle and Ford sought to take an explicit position on a number of controversial issues regarding the use of the mental model construct. For example, there had been some debate about whether mental models are stable or unstable cognitive structures; whether they are accessible to introspection or operate outside conscious awareness; whether they are conceptual or image-based; and whether they are abstract or representational. Many of these issues remain unresolved in the various literatures that Doyle and Ford (1998, 1999) review.

More recently, Klein and Hoffman (2008) seek to relate the concept of mental models to the study of macrocognition; specifically, the cognitive functions of situation awareness and naturalistic decision making. At the most general level, Klein and Hoffman (2008) conceptualise mental models simply as mental representations, but highlight a number of additional or refined

characteristics. They add that mental models are: representations of “something in the world”; accessible to consciousness; the product of perception, comprehension and organised knowledge; relatively enduring but dynamic; and shaped by regularities, laws and principles. These characteristics are essentially consistent with the characteristics suggested by Doyle and Ford (1998) a decade earlier.

The definition of mental models for the purposes of the current research will be the conceptualisation proposed by Klein and Hoffman (2008). This definition is consistent with the conceptualisation of mental models in system dynamics research, complex problem solving, and the field of macrocognition and naturalistic decision making. The definition is not incompatible with the way that the concept is used within mainstream cognitive psychology (such as the work of Gentner & Stevens 1983; Johnson-Laird 1983; Markman & Gentner 2001), but has been developed with a view to understanding how the development and use of mental models supports primary macrocognitive functions such as decision making, sensemaking and planning. Given the emphasis in the current research on understanding how the development and use of mental models is related to goal-directed causal reasoning within an organisational context, this definition would seem to represent a neat conceptual fit.

Mental models, therefore, will refer to mental representations of something in the world that is: accessible to consciousness; the product of perception, comprehension and organised knowledge; relatively enduring but dynamic; and shaped by the regularities, laws and principles that are believed to govern the relationships (Klein & Hoffman 2008). Each of these characteristics will now be discussed in further detail.

Mental models are representations of “something in the world”

A key characteristic of mental models is that they represent something that exists (or could exist) in the external world – often, some kind of dynamic system (Klein & Hoffman 2008). Mental models can represent spatial relationships, conceptual relationships, causal relationships, organisational relationships, and potentially other forms of relations between concepts (Klein & Hoffman 2008). Doyle and Ford (1999) clarify their definition of “external system” to include any systems either existing, projected or historical. They maintain their position, which Klein and Hoffman (2008) appear to also hold, that the mental model must have some kind of external referent. This leads to the methodological implication that the study of mental models necessarily

involves three levels of ‘models’: the object of the mental model in the external world; the individual’s conceptual model of that object (mental model); and the researcher’s conceptualisation of the mental model.

Mental models are accessible to consciousness

This is an important characteristic of mental models, which differentiates them from other implicit models or knowledge structures that are entirely tacit and cannot be articulated by the individual. Klein and Hoffman (2008) propose that mental models are a cognitive phenomenon or “presentation” to consciousness that are accessible by the individual and able to be explicated. This characteristic holds particular significance for associated methodology, which relies upon the declarative nature of mental models in order to study them directly. To this point, Klein and Hoffman (2008) assert that (because they are accessible to consciousness) mental representations can be inferred from empirical data (p64). The studying of mental models empirically – as with any knowledge elicitation efforts – requires the design of research methods that minimise the potential for reporting and recording errors.

Mental models are the product of perception, comprehension and organised knowledge

Mental models draw on perception, comprehension and organised knowledge, but can be distinguished analytically and empirically from each of these cognitive processes and structures. Mental models are cognitive structures, as distinct from cognitive processes (such as perception and comprehension), which manipulate information during decision making and problem solving (Doyle & Ford 1998). Knowledge is foundational to any mental model, but the mental model should be conceptualised as more than a simple collection of beliefs (Klein & Hoffman 2008). Rouse and Morris (1986) suggest that mental models might be productively thought of as a “special type of knowledge” (p5). Doyle and Ford (1998) argue that one of the key features of mental models that differentiate them from the more general construct of “knowledge” is the mental model’s structure. Their use of the term structure is to imply *organisation* of knowledge in the sense of also incorporating representations of how different concepts are connected and related to one another (p20).

Mental models are relatively enduring but dynamic

Mental models are relatively enduring in the sense that they denote cognitive structures that are stored in a potentially permanent state in long-term memory (Doyle & Ford 1998). Further, the

complete mental model is stored in memory as a unit, rather than as separate components that are aggregated during decision making or problem solving (Doyle & Ford 1998). However, mental models are also dynamic, as the detail of the model can change over time – even during the flow of a conversation (Forrester 1971). Parts of the model can change as new information is received and beliefs about the component concepts and relationships are updated. The result of this process is a mental model that endures over potentially long periods of time, but is not necessarily static in nature (Klein & Hoffman 2008).

Mental models are shaped by regularities, laws and principles

Mental models are shaped by the regularities, laws, and principles that are known or believed to govern the “something in the world” that it is being represented (Klein & Hoffman 2008 p.64). Doyle and Ford (1999) specify that the structure of the mental model is analogous to the perceived structure of the external system that is being represented. Similarly, knowledge of the regularities, laws and principles that govern the external system will be incorporated into the model to explain or predict changes in the external system based on simulation of events using the mental model. Where the “something in the world” is a dynamic system, the principles that govern the system and are incorporated in the model will often be causal in nature.

2.2.3. Use of mental models as a cognitive process

As internal representations of an individual’s understanding of the systems and structures in their environment, mental models provide crucial input into primary cognitive functions such as sensemaking, decision making, and planning. Mental models are the source of our expectations (Wickens 1984), without which we would be entirely unable to make sense of events (Klein & Hoffman 2008). Mental models form the basis of any attempts to describe, explain and predict a system and its behaviour (Rouse & Morris 1986).

Mental models allow the individual to describe an external system, by way of reference to their own internal representation of that system. This representation consists of knowledge of what elements or components are relevant, and knowledge of how these components are related. Knowledge of the relevant elements of the system can be used in directing attention and classifying information in the perception process (Endsley 1995). For example, a well-developed mental model can effectively direct an individual’s attention to relevant cues in their environment without

being distracted by signals or noise that is not relevant to the immediate goal or task. Mental models allow individuals to describe the purpose of a system, as well as the form, i.e. what it looks like (Rouse & Morris 1986).

Mental models are also necessary for comprehension of the system, and allow an individual to explain both how a system works as well as the current state of the system. Mental models enable comprehension by providing a structure or framework within which informational cues can be interpreted and understood (Endsley 1995). Mental models provide a basis for explanation of observed events through the integration of governing regularities, laws and principles with the components and relationships that are incorporated in the mental models.

Mental models also contribute to an individual's ability to predict future events and system states (Doyle & Ford 1998, 1999; Endsley 1995; Klein & Hoffman 2008; Rouse & Morris 1986). The ability to predict future states of the system is enabled by an understanding of the system components, the relationships between the components, and the governing regularities, laws and principles that make up the system dynamics (Endsley 1995). Klein and Hoffman (2008) note that the very word "model" can be interpreted metaphorically to invoke "a dynamic 'runnable' event that can be mentally inspected, thought about and projected into the future" (p.65). Finally, the "modelling" aspect of mental models can allow individuals to engage in "what-if" reasoning to generate expectancies and evaluate possible courses of action (Klein & Hoffman 2008).

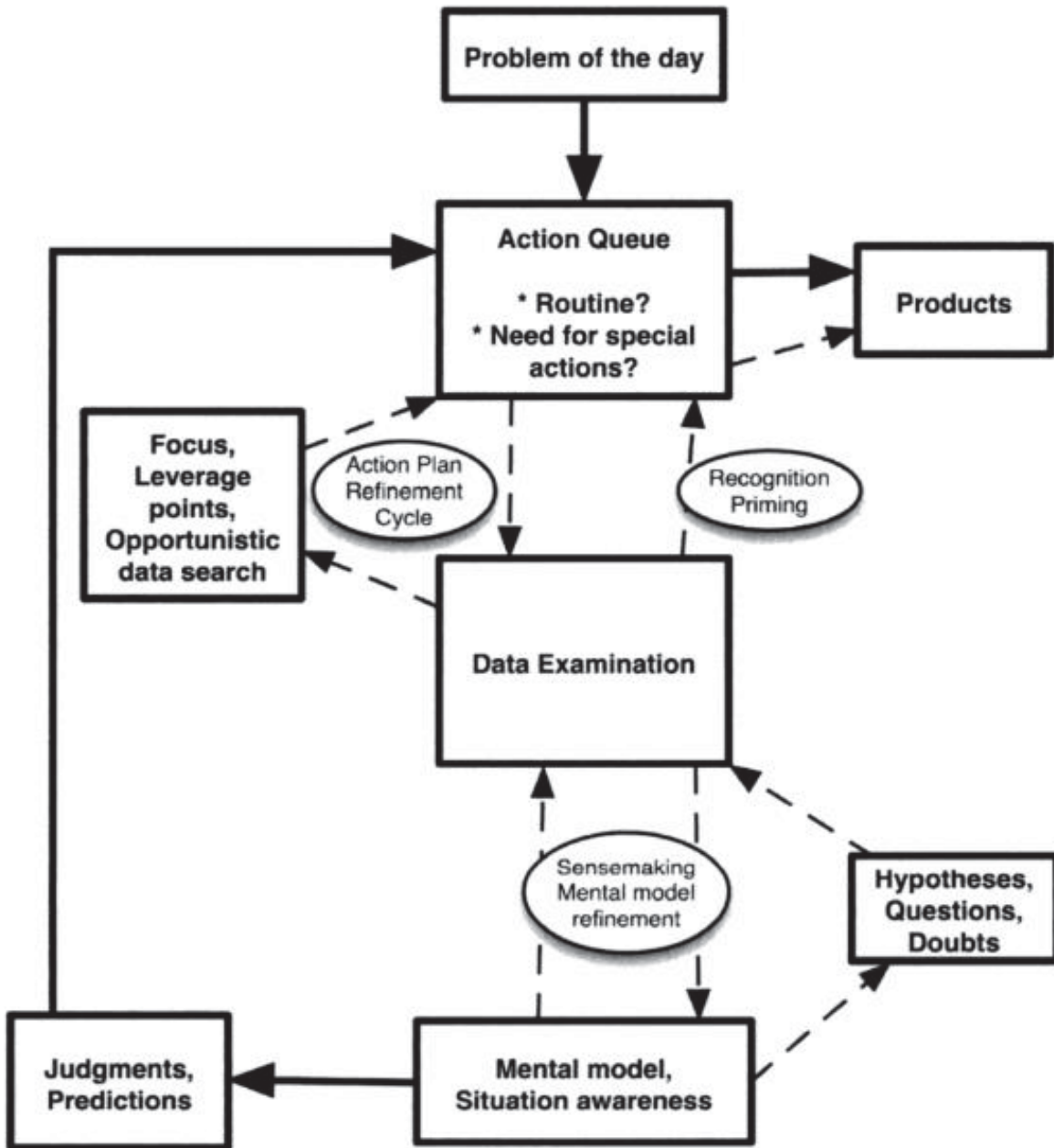
Use of mental models in decision making

Naturalistic decision making is the first of the set of cognitive functions incorporated within the macrocognition framework, in a chronological sense as much as in terms of conceptual significance. The original mission of naturalistic decision making was to understand how people make decisions under difficult conditions, and how to help them do a better job (Schraagen, Klein & Hoffman 2008). However, developing an understanding of how people make decisions under difficult conditions necessitates more than just the examination of the decision making process – it has become increasingly important to understand related cognitive functions such as sensemaking and planning, and supporting cognitive processes such as the development of situation awareness, and the maintenance of "common ground" between members of teams (Schraagen, Klein & Hoffman 2008).

Mental models have been theorised to support naturalistic decision making primarily through their relationship with situation awareness. Situation awareness is the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future (Endsley 1995). Recalling the function of mental models as supporting the description, comprehension and projection of systems, it should already be clear that mental models and situation awareness are closely related cognitive phenomena. Without situation awareness, mental models are limited in their usefulness for decision making or problem solving in a particular context. Without mental models to integrate perceptual information, the development of even a rudimentary level of situation awareness is virtually impossible.

One model of the relationship between mental models, situation awareness, decision making and action is the “Base Macrocognitive Model” (Klein & Hoffman 2008) (Figure 1). This integrative model incorporates a number of core ideas and models from the literature such as the mental model refinement cycle, recognition priming, and rational decision analysis (Hoffman & Militello 2009). In this model, mental models and situation awareness jointly inform judgements and predictions and are themselves informed by examination of available data and information cues in the environment. The relationship between available data and mental models/situation awareness is interactive, in the sense that the data is interpreted within the framework of the mental model, and may also be used to refine the mental models when pre-existing beliefs are challenged and updated.

Figure 1: Base macrocognitive model

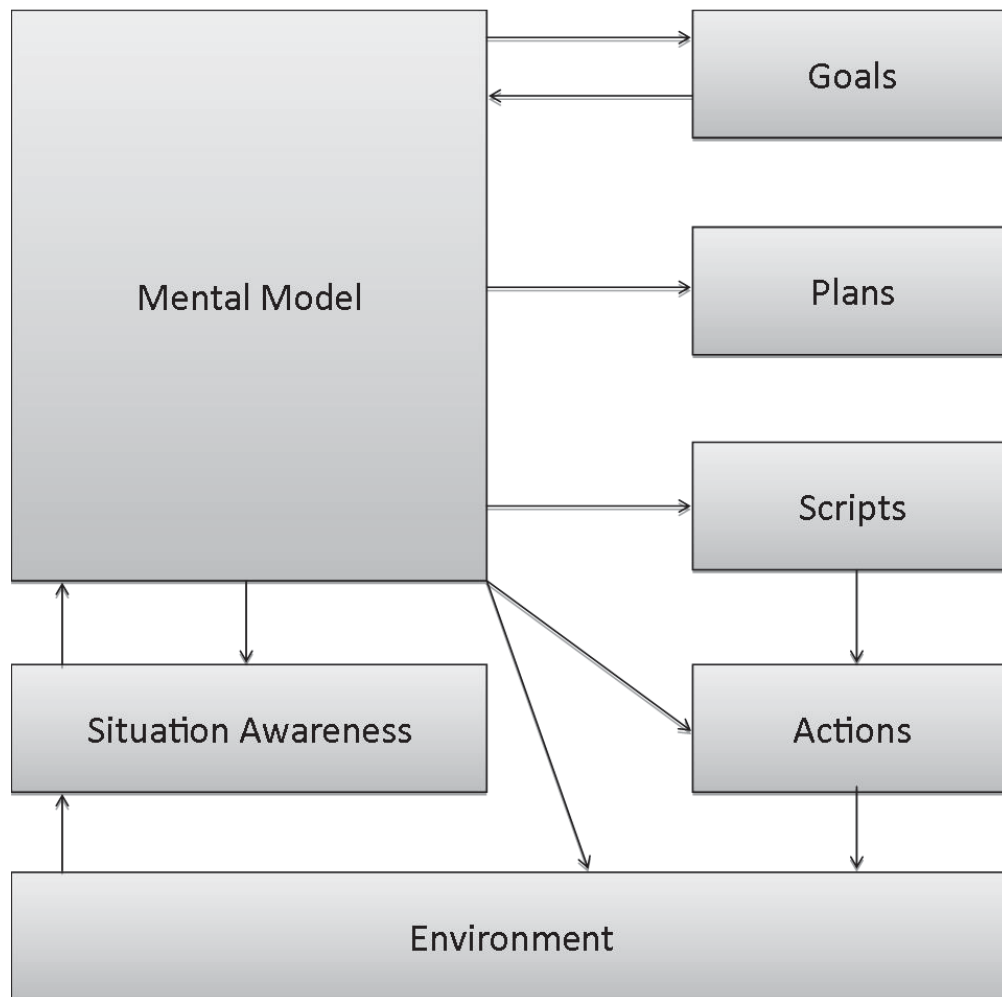


Source: Klein and Hoffman (2008)

The relationship between mental models and situation awareness is also highly interdependent and iterative in nature. This relationship is depicted in Figure 2, which represents an adapted version of Endsley's (1995) model of the relationship between goals, mental models, and situation awareness. This model indicates that there are a number of mechanisms whereby mental models

may influence decisions and actions, while there are also a number of inputs to the initial selection and ongoing development of the mental model. The initial selection of a mental model is directed by two factors: (a) the goals of the immediate task or activity, and (b) situation awareness, or more specifically, the individual's current situation model (i.e. knowledge of the current state of the system). These inputs indicate both the current state of the system and the desired state – the mental model is then required to integrate this knowledge with knowledge of the system structure (description), how the system can be expected to behave (explanation/comprehension), and knowledge of how to intervene with the system to produce the desired state (prediction/projection).

Figure 2: Use of mental models in decision making



Source: Endsley (1995)

Once the relevant model is selected, a plan for action can be formulated by (1) drawing on the knowledge of how to intervene with the system that is contained in the model; and (2) being able to project future system states as a result of this intervention. The plan that is selected will be the one whose projected state best matches the desired state of the system (Endsley 1995). Endsley (1995) also observes that some types of plans will have predetermined scripts that are associated with them that can be deployed without the additional step of translating the plans into specific action.

While they are active, the current mental model and situation model will continue to interact in a mutually constructive relationship. The active mental model provides knowledge of the critical elements of the environment and directs attention to changes in key features of the system. Any perceptual information that is received is interpreted within the framework of the mental model. Where new information is consistent with the expectations generated by the active model, this information is incorporated into the current situation model. When new information is received that is inconsistent with expectations, the conflict will necessitate a change in either the current goal (if the situation is sufficiently altered to prompt a revision of expectations), a revision of the mental model (if a revision of beliefs about the structure and behaviour of the systems is sufficient to resolve the inconsistency), or the selection of a new mental model (if it becomes apparent that the initially selected model is no longer appropriate) (Endsley 1995).

Finally, the constant comparisons that are made between the predictions of the active mental model and the current state of the system, as represented in the situation model, provides the individual with feedback on the accuracy of the mental model and its projections. This feedback process allows for the progressive refinement of the model over time, as the individual develops more specific categorisation functions, more detailed characterisations of the elements of the system, and better representations of system dynamics (Endsley 1995). The interactive nature of the relationship between the mental model (stored in long-term memory) and the situation model (stored in working memory) is what allows the mental model to be both relatively enduring and dynamic.

2.2.4. Development of mental models

Mental models develop as the result of training and experience in a given environment or with a given system (Endsley 1995). Whenever a mental model is being actively used in support of cognitive processes and functions, the individual will be constantly trying to integrate new information from the current situation, reflection or even discussion into the model, either confirming existing beliefs about system structure or provoking refinement and change. It seems reasonable to expect that individuals with more experience with a particular system and, subsequently, their internal representation of the system, will come to have a more refined mental model of that system. Specifically, experience with a system will make recurring situational components more apparent, as well as recurring associations and causal relationships (Endsley 1995).

Mental models will also include relevant knowledge of the regularities, principles, laws and dynamics that govern the external system. Knowledge of governing regularities, laws and principles can be acquired either by passive observation, active manipulative experience, or linguistic advice (Pearl 2000). Manipulative experience comes from wilfully intervening in the environment in order to observe the consequences. The advantage of this kind of observation, relative to more passive observation, is that the learner is more certain of the cause and the effect, having instigated the cause through their own volition and action. Finally, linguistic advice can be provided by other knowledgeable individuals. It is likely that the majority of an individual's knowledge of governing regularities, laws and principles is acquired through instruction or discussion with more knowledgeable or experienced individuals (e.g. parents transfer causal knowledge to children, supervisors transfer causal knowledge to junior employees etc.) (Pearl 2000). In an organisational context, such knowledge may also be grounded in organisational systems, or may be inherently socially embedded in a way of doing things that cannot be fully articulated.

2.2.5. Summary

The definition of mental models adopted by the current research is the definition developed by Klein and Hoffman (2008) for use within in the field macrocognition and the study of naturalistic decision making. This conceptualisation defines mental models as mental representations of something in the world that are: accessible to consciousness; the product of perception,

comprehension and organised knowledge; relatively enduring but dynamic; and shaped by the regularities, laws and principles that are believed to govern the external system.

Mental models are the mechanisms which enable individuals to describe, explain and predict the structure and behaviour of an external system. As such, mental models underpin many (if not all) of the cognitive functions and processes that are incorporated within the macrocognition framework. Of particular relevance to the discussion of mental models is the notion of naturalistic decision making, which depends on both mental models and situation models as inputs into judgement and decision processes. Mental models require situation models as inputs regarding the current state of a system; situation awareness requires mental models to integrate and make sense of perceptual information.

Mental models develop as the result of experience and training with a particular environment or system. However, the general regularities, laws and principles that govern the behaviour of systems can often be abstracted and acquired separately from a specific mental model. Knowledge of governing regularities, laws and principles can be acquired either from passive observation, active manipulative experience, or linguistic advice. In an organisational context, such knowledge may also be embedded in organisational systems, processes, or even tacitly in behaviour.

2.3. Conceptual Framework

The primary research question that I seek to address in this thesis is: *How do management control systems influence the development of managers' causal mental models; and how do managers' causal mental models influence the development of management control systems?* This research questions contains two primary constructs: causal mental models, and management control systems. In this section I identify the key components of each of these constructs and use these to construct an overarching conceptual framework, which will then be used to inform the development of the empirical approach in Chapter 3.

2.3.1. Causal mental models

In this thesis, I investigate a specific type of mental model: causal mental models. While mental models can represent any kind of system of relationships, causal mental models specifically represent *networks of cause-and-effect relationships* between drivers and outcomes in a complex

causal system. Causal mental models integrate causal knowledge with situation awareness, in order to enable reasoning about how to intervene in a system in order to achieve a specific goal.

Three key components of causal mental models are of particular importance to goal-directed cognitive activity, such as decision making and problem solving. The first component is the goal (or set of goals) that is relevant to the individual's current task or overarching context. This goal (in conjunction with situation awareness) is what triggers the selection of a relevant mental model (see Figure 2, Endsley 1995). The second component is the individual's knowledge or beliefs about the cause-and-effect relationships relevant to the achievement of that goal (Endsley 1995; Klein & Hoffman 2008; Sloman 2005). The final component is the individual's choice of activities, the selection of which is informed by both the goals and beliefs about the cause-and-effect relationships that contribute to their eventual achievement (Endsley 1995). As such, a causal mental model is made up of an individual's current goals, the available activity set, and the causal beliefs which link them.

Within an organisational context, the most significant causal beliefs for managerial causal reasoning are those that link actions or organisational activities with the achievement of organisational priorities. These causal mental models can be expected to support the type of goal-directed decision making that is a core component of managerial work. Consequently, this study will focus on three specific components of managers' causal mental models: organisational activities, organisational goals, and the causal beliefs that connect them.

Organisational activities refer to managers' knowledge of the relevant activities that drive organisational outcomes and success. These may include any routine or ad-hoc tasks, processes, or aspects of a role that are performed either by the manager themselves or by others within the organisation. In this thesis I do not distinguish between plans, scripts or actions (see Figure 2, Endsley 1995); instead, I aggregate all possible forms of "intervention" in a causal system into the construct of "activities". Activities therefore represent a more abstract understanding of the actions that could be taken (immediately, in the future, or hypothetically; routine or ad-hoc; by self or by others) in order to affect a desired outcome.

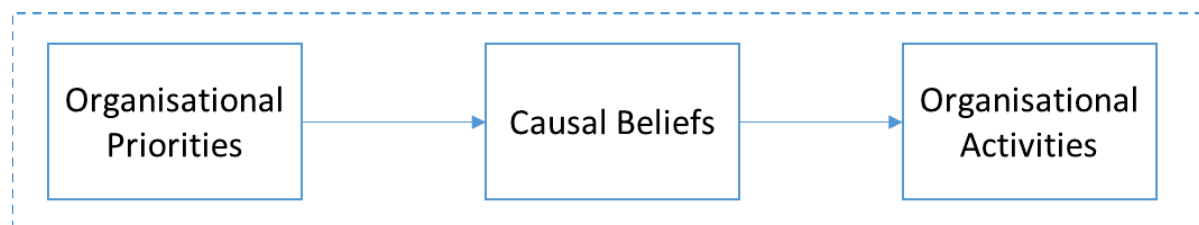
Organisational priorities refer to those outcomes or aspects of success that managers identify as being related to the goals or objectives of the organisation. Recognising that organisations typically

have multiple, interrelated and sometimes competing goals that operate simultaneously (Sundin, Granlund & Brown 2010), it would seem important to understand not only how individuals identify and internalise goals, but also how the goals are ranked in terms of importance, and how managers think about any necessary trade-offs between them. As such, I incorporate the construct of “organisational priorities” (as opposed to the more uni-dimensional “organisational goals”) into my conceptualisation of causal mental models.

Finally, causal beliefs refer to managers’ knowledge of the causal structures relating the drivers (activities) to outcomes (priorities) of organisational success. These causal structures are informed by the notions of *invariance* and *intervention* (Sloman 2005); that is, causal structures are those that do not change across contexts, and reflect mechanisms that can actually be manipulated in order to effect change in the outcome variable (Woodward 2003). Causal beliefs can be framed either as positive or negative relationships (that is, some activities may be understood to *decrease* rather than *increase* the likelihood of the achievement of a goal). Furthermore, it is expected that any given activity or priority can have a range of causal beliefs associated with it, such that managers may be aware of multiple effects of a given activity, or multiple causes of the achievement of a priority. In some cases, activities may be related to other activities via causal beliefs, and the achievement (or failure to achieve) of a priority may be related to other priorities. Each of these scenarios would meet the requirements of invariance and intervention, and be considered to fall under the construct of “causal beliefs” in this conceptualisation of causal mental models.

The three components of causal mental models, and an indication of the expected relations between them, are illustrated in Figure 3.

Figure 3: Causal mental model dimensions



2.3.2. Management control systems

In this thesis I focus on the use of management control systems, as opposed to the operation of other forms of control (such as strategic or operational control). Broadly, management control is concerned with the decisions and actions of *managers* in seeking to ensure the achievement of organisational goals. Anthony (1965) makes an explicit distinction between strategic, management, and operational control, and defines management control as “the process by which managers ensure that resources are obtained and used effectively and efficiently in the accomplishment of the organisation’s objectives”. While some scholars have found this distinction to be constraining (Langfield-Smith 1997), in the context of this study it is helpful to limit the range of controls studied to those that individual managers can – and do – use to effect change in the organisation. This emphasis on *management* control enables consideration of how individual managers engage with control systems, and how such engagement might contribute to the development of both their causal mental models and the control system itself.

Management control *systems* have been defined in a variety of ways in the literature, many of which overlap or are interchangeable with other related concepts such as management accounting, management accounting systems, and organisational controls (Chenhall 2003). For this study I adopt the definition of management control systems advanced by Simons, which considers management control systems to be the “formalized procedures and systems that use information to maintain or alter patterns in organizational activity” (Simons 1987, p. 358). These systems broadly include (but are not limited to) formalised procedures for such things as planning, budgeting, environmental scanning, competitor analyses, performance reporting and evaluation, resource allocation, and employee rewards.

This definition aligns with the research question in this thesis in three main respects. First, the definition requires that management control systems be formalised, and emphasises the use of *information* as a mechanism of control, as opposed to other types of mechanisms such as direct supervision or norm-based control. As such, this definition excludes more informal control mechanisms such as social (Hopwood 1972), clan (Ouchi 1979), socio-ideological (Alvesson & Kärreman 2004), and cultural controls (Malmi & Brown 2008). This feature is important given the cognitive orientation of the research question, and the expectation that information will play a central role in the acquisition and refinement of managers’ causal beliefs. While it is no doubt

possible that informal controls may also contribute to the development of managers' causal mental models, limiting the scope of the present study to those formal systems that are clearly visible and relatively objective (Langfield-Smith 1997) will enable the development of an initial theoretical explanation which can be extended in future research.

Second, the purpose of management control system use is specified in relatively broad terms, compared to other approaches in the literature. Where other definitions frame the purpose of management control systems in terms of improving goal congruence and/or increasing the likelihood of achieving organisational objectives (Abernethy & Chua 1996; Flamholtz, Das & Tsui 1985; Malmi & Brown 2008; Ouchi 1979), Simons states that these systems are used simply to "maintain or alter patterns in organizational activity" (1987). The advantage of this broader framing is that it allows for the effective operation of management control systems even where organisational goals may not be pre-determined, explicit, or agreed upon by some or all organisational members. Under these conditions it is possible that managers' causal mental models – specifically, managers' understanding of organisational priorities – may play a particularly significant role in both the design and use of management control systems.

Finally, the definition is broad enough to allow for the inclusion of any potentially relevant systems that emerge in an empirical setting (Eisenhardt 1989), and does not require the ex-ante specification of the specific types of management control systems to be examined in the study. This feature of the definition is important given the exploratory nature of the research question, as the literature is not sufficiently developed with respect to the relations between management control systems and managers' causal mental models as to permit the development of specific hypotheses.

However, within this definition of management control systems I make an additional distinction between those systems oriented toward *results control*, and those oriented toward *behaviour control* (Merchant & Van der Stede 2011; Ouchi 1977, 1979).⁵ This distinction is theoretically important in the context of understanding managers' causal mental models, as the key difference between the circumstances under which each form of control can be applied is the extent to which

⁵ I do not explicitly consider the associated dimensions of input and/or clan control, as these dimensions are essentially incompatible with the definition of management control systems adopted for the study and are therefore outside its scope.

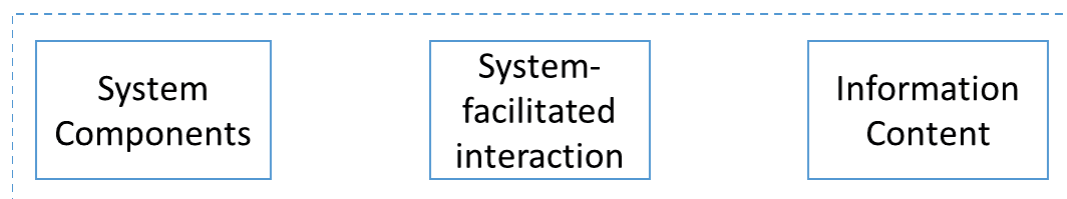
the organisation possesses knowledge (or at least, agreement) as to the means-ends relationships through which inputs are transformed into outputs (Ouchi 1977). Behaviour control involves the explication of how work activities are to be performed, and is only possible when the process by which goals can be achieved is known and procedures can be programmed in advance. Output control, on the other hand, only requires that the goal is known and its achievement is measurable; the means by which the goal is achieved do not need to be specified ex-ante. When goals are known and measurable, *and* behaviour can be programmed in advance, then either behaviour or output control may be appropriate (Ouchi 1977).

The different conditions under which behaviour and results control operate are likely to have implications for the relationship between the use of the management control system and the development of managers' causal mental models. Specifically, the role of management control systems in the generation, articulation and transfer of causal attributions will be different depending on the extent to which the organisation already possesses knowledge of the cause-and-effect relationships linking drivers and outcomes of goal achievement. Further, prior literature suggests that behaviour control and results control operate at different hierarchical levels, and vary in the extent to which they are "transmissible" between levels of management (Ouchi 1978). For this reason, I will consider results control-oriented management control systems and behaviour control-oriented management control systems separately in my analysis.

Construct dimensions

Prior literature provides insight into the specific dimensions of management control systems that are most likely to be relevant to understanding the relationship between management control systems and the development of managers' causal mental models. The three dimensions that will be the focus of this study are: the components of each management control system; the information content of each system; and the nature and frequency of interaction facilitated by each system. These three dimensions are represented in Figure 4.

Figure 4: Management control systems dimensions



First, the components of a management control system refer to the overarching *design features* of the system in question. These design features make up the template or architecture of the control system, and will vary by type of system. For example, the components of a performance measurement system would refer to the specific measures that are incorporated in the system (without regard to the actual measurement), where the components of an operational budget would refer to the specific line items that make up the budget (irrespective of their value in any given reporting period). Similarly, the components of a set of policies and procedures would extend to the topics or tasks covered, as opposed to the instructions each policy or procedure contains. The components of a system can indicate those activities or outcomes that are considered important within the overarching organisational context, and as such may contribute to the development of managers' knowledge of strategic or operational priorities. Research within the strategic performance measurement literature finds evidence of such a relationship between the components (as opposed to the content) of management control systems and managerial cognition, such as the well-established 'common-measures' bias (Banker, Chang & Pizzini 2011; Banker, Chang & Pizzini 2004; Humphreys & Trotman 2011; Lipe & Salterio 2000), and the incremental cognitive effects of the provision of strategy information in the form of a causal chain or strategy map (Cheng & Humphreys 2012; Farrell, Luft & Shields 2007; Farrell, Kadous & Towry 2012; Kelly 2010; Tayler 2010; Vera-Muñoz, Shackell & Buehner 2007). Together, this stream of research demonstrates that the components of a management control system can affect managerial cognition both jointly with and separately to the content of the system, and will therefore be considered separately in my analysis.

The second component is the actual *information content* generated by the system when in use. In the case of performance measurement, information content would include actual current and historical key performance indicator (KPI) data (as distinct from the underlying performance measure structure). In the case of an operating budget, the information content could refer to periodic budget reports containing actual performance information relative to ex-ante line-item targets, while the information content of a policy or procedure refers to the specific instructions it provides to users of the system. To the extent that this information provides managers with improved awareness of the current state of the organisation (situation awareness, see Section 2.2.3) or of specific means-ends relationships, the provision of information through the management control system can be expected to influence the managers' causal mental models. That the

provision of information through management control systems would influence managerial cognition is a foundational assumption within the management accounting literature, and it would seem reasonable to expect a relationship between the information provided directly by a system and the development of managers' cognitive representations – specifically, their causal mental models.

Finally, system-facilitated interaction refers to discussion (either face-to-face or otherwise) that is focused on either the components or content of a management control system, and can take place either within or between levels of management. The inclusion of this dimension is based on the notion of interaction as it is conceptualised within Simons' levers of control framework, as well as the concept of participation within the budgeting literature. Simons' argues that the interactive use of control – characterised by face-to-face discussion between senior and operational managers – provides a platform for the evaluation of causes and implications of current system information; this dialogue stimulates the organisational learning that will lead to the development of emergent strategies (Simons 1987, 1990, 1995a). In the case of budget participation, involvement of subordinate managers in the budgeting process can lead to a potentially multi-directional transfer of information across hierarchical levels by means of interaction between superior-subordinate manager dyads (Campbell & Gingrich 1986; Chong & Chong 2002; Chong, Eggleton & Leong 2006; Kren 1992; Latham & Saari 1979; Magner, Welker & Campbell 1996; Parker & Kyj 2006; Shields & Young 1993). Similarly, longitudinal field studies of the use of strategic performance measurement systems demonstrate that interaction around the development and use of performance measures can lead to the articulation of previously tacit local knowledge, specifically of the cause-and-effect relations that link activities and measures (Tuomela 2005; Vaivio 2004). In each of these streams of research, interaction between managers that is facilitated by the management control system is theorised to have cognitive effects relating to learning and information transfer. For this reason, system-facilitated interaction is included as an explicit dimension in the framing of this study.

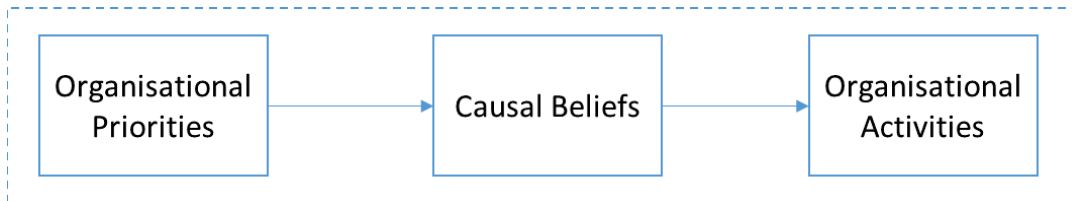
2.3.3. Conceptual framework

In the previous section, I decomposed the causal mental models construct into three specific components: organisational priorities, beliefs about cause-and-effect relations, and organisational activities; and I similarly decomposed the management control systems construct into its own three

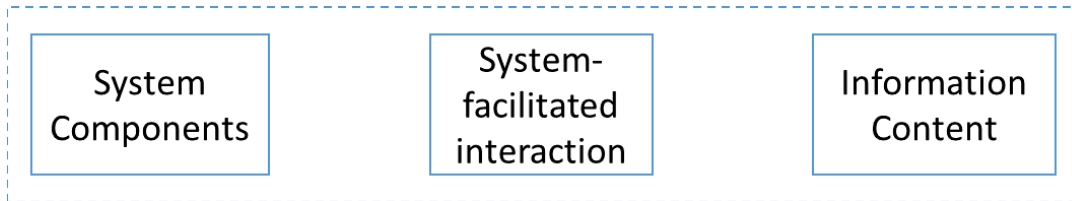
key components, namely: the components of the system, system-facilitated interaction, and the information content of the system. Together, the two decomposed primary constructs form the conceptual framework which will be used to develop the empirical approach and analysis in the remainder of this thesis. The conceptual framework is reproduced in Figure 5

Figure 5: Conceptual framework

Management control systems



Causal mental models



The conceptual framework allows for the building of a theoretical explanation of the relationship between management control systems and managers’ causal mental models at the level of their *components*. As the literature is not currently sufficiently advanced to support the development of specific hypotheses regarding these relationships, the conceptual framework is intended to provide initial sensitising concepts while allowing specific mechanisms to emerge from the empirical component of the study.

2.4. Conclusion

In this chapter I drew on prior literature in order to develop and define the two primary constructs of causal mental models and management control systems. In Section 2.2, I outlined several philosophical traditions with differing notions of what constitutes a cause-and-effect relationship. Of these traditions, the notion that appeared to be most compatible with the manner in which humans identify and reason about causal relationships is the theory of manipulability, which emphasises the identification of factors whose manipulation can “make a difference” to the

dependent variable. This perspective gave rise to the idea that human causal reasoning depends on the identification of relationships that are invariant across contexts, as well as knowledge of how to intervene in a system in a way that provokes a desired or predicted consequence. In Section 2.2 I also provided a detailed overview of the mental models construct, and explained how mental models develop in response to new information or exposure to the underlying real-world system, as well as explaining how mental models are then used to support other macrocognitive functions such as decision-making and problem recognition. Then, in Section 2.3, I developed a definition of causal mental models and decompose this construct into three specific components: organisational activities; organisational priorities; and beliefs about cause-and-effect relations. Also in Section 2.3, I identified Simons' information-oriented definition of management control systems as the most appropriate approach to understanding the relation between management control systems and causal mental models, and differentiated between control systems oriented toward control of results and control of behaviour. Finally, I decomposed the management control systems construct into its own three key components, namely: the components of the system, the information content of the system, and system-facilitated interaction. In the next chapter I explain the empirical approach developed and used in this thesis to investigate these constructs and address the research question.

Chapter 3: Research Method

3.1. Introduction

The aim of this chapter is to explain the empirical approach developed and used in this thesis in order to address the primary research question. First, I outline the key considerations of my overall research strategy, including the choice of a qualitative case study method, within-case theoretical replication, the use of Cognitive Task Analysis techniques, and the need for cross-case analysis of multiple embedded cases. Second, I explain how this strategy was reflected in the research design, in particular, in the selection of the case organisation, the study participants, and the types and sources of empirical material. Finally, I provide a detailed discussion of specific procedures used to collect and analyse the empirical material that lead to the findings presented in the remaining chapters of the thesis.

3.2. Research Strategy

The overall research strategy is informed by three key features of the research question that I am seeking to address. These features are: the framing of the question as “how” or “why”; the incorporation of constructs which operate at different levels; and the difficulty associated with separating the constructs of interest from their natural context. As will be detailed below, I have accommodated these features by adopting a qualitative case study method within which I use theoretical replication and specific Cognitive Task Analysis techniques. This, in turn, enables systematic cross-case analysis of the variation in managers’ causal mental models and patterns of use of management control systems.

3.2.1. Qualitative case study method

In this thesis I use a qualitative case study method to bound data collection and analysis, and to establish the context within which the constructs of interest operate. A case study is characterised by a focus on understanding the detail, complexity and dynamics of a single setting (Eisenhardt 1989; Patton 2002; Yin 2009), and generally involves the collection and analysis of data from multiple sources (Yin 2009). There are three reasons that make a qualitative case study particularly appropriate for examining the research question presented in this thesis.

First, a case study is well-suited to the nature of this thesis' primary research question, which is *how* management control systems influence the development of managers' causal mental models; and *how* managers' causal mental models influence the development of management control systems. Case studies are considered appropriate when a "how" or "why" question is being asked (Yin 2009), as this method allows for the tracing and study of a phenomenon over time. Qualitative forms of inquiry are well-suited to research with a "discovery-orientation" (Patton 2002) and are often advocated where the purpose of the research is theory-building (Eisenhardt 1989) or hypothesis development (Miles, Huberman & Saldaña 2014). While prior research has indicated the existence of a relationship between management control systems and the development of managers' mental models, this literature has yet to generate sufficient insight into the nature of this relationship to permit the development and testing of specific hypotheses relating to their *content* and *composition*. A case study of this phenomenon allows us to remain open to the existence of potential explanatory constructs and mechanisms that emerge during the course of the study. In the case of causal mental models, the lack of conceptual specification of the construct as it currently exists in the literature makes the use of a qualitative, exploratory case study method especially appealing.

A second reason for using a case study method is that the research question contains constructs which operate at different levels within an organisational context. Management control systems primarily operate at the organisational level, while causal mental models are cognitive constructs which operate at the individual level. In order to understand the relationship between constructs at different levels, I have proposed a "cross-level" model which considers the interactive effects of organisational and individual level factors in determining the development of managers' causal mental models (Luft & Shields 2003). By adopting a case study approach, I can study embedded units of analysis (Yin 2009) which will enable me to observe the operation of constructs at both levels as well as the interaction between them.

Third, a qualitative case study method is appropriate given the difficulty in meaningfully separating the central phenomenon of this thesis from its natural context (Yin 2009). Mental models develop over long periods of accumulated experiences, changing subtly as new information is received and beliefs about the component concepts and relationships are updated (Klein & Hoffman 2008). While mental models incorporate more abstract, declarative knowledge of general

laws, regularities and principles, the mental models themselves cannot be meaningfully separated from the context in which they are developed, activated and used. The approach taken in this study is a form of “naturalistic inquiry” (Patton 2002), in which the phenomena of interest are investigated in their natural context. A naturalistic approach involves allowing the phenomena of interest to unfold organically in their real-world settings, without any attempt by the researcher to control or manipulate the course of the study (Patton 2002). This represents a fundamentally different approach to that taken in laboratory or other experimental settings, in which the experimental environment is carefully designed and controlled to eliminate any possible source of variation other than those variables being operationalised and manipulated by the researchers. While the identification of abstract, precisely specified relationships between variables is a valuable contribution of experimental research, naturalistic inquiry is a holistic approach which can help us understand a phenomenon *within* its natural context (Patton 2002). Studying causal mental models using a case study approach allows for preservation of the context in which mental models are developed and used (Crandall, Klein & Hoffman 2006; Hoffman & Militello 2009; Klein & Hoffman 2008).

3.2.2. *Within-case theoretical replication*

Within the single case study I have examined multiple embedded units of analysis (Yin 2009). The overarching case is a single organisation, and the embedded units are a selection of individual managers. These individuals can be thought of as “mini case studies”. As mentioned above, one of the aims in using an embedded case design is to observe constructs operating at different levels within a given organisational setting (Luft & Shields 2003). An embedded case study design allows for close attention to be paid to both the salient organisational-level (management control systems) and individual-level factors (e.g. educational background, prior work experience) which could affect the individual-level construct of interest (mental model development).

In addition, by introducing systematic variation in organisational and individual factors, an embedded case study approach counteracts the tendency of more holistic designs to produce findings that are inherently abstract (Yin 2009). This is achieved through appropriate, theoretically-driven selection of the mini-cases (to be detailed in Section 3.3.2 below), such that the choice of “mini-case maximise the likelihood of observation of the constructs of interest and the conditions under which they operate (Eisenhardt 1989; Miles, Huberman & Saldaña 2014).

The selection of embedded mini cases is not oriented toward representativeness or generalisation to other settings in the same way a sampling logic might, but rather aims to develop and refine theory through *theoretical replication* (Yin 2009). By selecting embedded cases using a theoretical replication logic, based on individual-level factors and organisational-level sources of variation in mental models, it is possible to identify interactive effects and the variation attributable to the constructs of interest in the primary research question.

3.2.3. Cognitive Task Analysis

The naturalistic study of *cognitive phenomena* requires a specific approach to data collection and analysis. The research strategy used in this thesis draws on a set of techniques developed specifically for this purpose, collectively known as Cognitive Task Analysis (CTA) (Crandall, Klein & Hoffman 2006; Hoffman & Militello 2009; Klein & Hoffman 2008). Having developed alongside the fields of naturalistic decision making and the study of expertise, Cognitive Task Analysis is a response to the limitations of traditional laboratory-based methods for capturing complex, situated macro-cognitive processes. At a general level, Cognitive Task Analysis is concerned with “having the tools and the toolkit to understand how people think: how their minds work, what they struggle with, and how they manage to perform complex work adeptly and pluck inventive solutions out of difficult, sometimes dangerous, situations”. (Crandall, Klein & Hoffman 2006, p. 1). As such, the purpose of a study involving Cognitive Task Analysis methods will usually involve an attempt to understand how a practitioner makes sense of events, exercises judgement, and makes decisions in the course of their work.

The use of Cognitive Task Analysis methods to study cognitive phenomena in field settings is recommended where it comprises the initial exploration of a cognitive process or strategy that is not well understood (Crandall, Klein & Hoffman 2006). While the development of the mental models construct has largely taken place in laboratory experiments, Crandall, Klein and Hoffman (2006) explicitly argue that field research will be crucial for producing a naturalistic account of the development and use of mental models. In this study, I incorporate established Cognitive Task Analysis techniques within the overarching qualitative case study design, in order to develop an understanding of how managers’ mental models are developed within their natural “cognitive context”. Specifically, I engage the individual managers selected as embedded “mini-cases” not as experimental subjects, but rather as “collaborators in a joint venture of discovery” (Crandall, Klein

& Hoffman 2006, p. 245) in seeking to generate a visual representation of their specialised, context-specific knowledge and beliefs.

While Cognitive Task Analysis methods have not previously been adopted within the management accounting literature, these techniques can be used to strengthen the design of case studies by enabling the robust and systematic collection of cognitive-level data from participants, while also preserving the “cognitive context” in which the participants’ mental models are developed and used.

3.2.4. Cross-case analysis

The final component of the overarching research strategy in this thesis is the cross-case analysis required to make sense of the empirical material and integrate findings relating to the multiple levels and units of analysis. This leverages the variation inherent in the embedded case design to allow greater depth and specificity in the eventual analytic conclusions (Miles, Huberman & Saldaña 2014). Contrary to the logic of a sampling approach, data from multiple cases, selected using a replication logic, is not pooled for analysis, but rather treated as discrete “experiments” comprised of their own unique set of data points (Yin 2009). Empirical data from each “mini case” are first analysed individually to produce a set of findings for each case, and only then can these findings be compared across cases: each (mini) case that produces consistent findings provides additional support for the underlying or emerging theoretical propositions, while contradictory cases provoke revision of the propositions and modification of the theoretical framework (Yin 2009). The production of individual case descriptions is essential to this process, as it allows the unique dynamics of each case to emerge before these are generalised across cases (Eisenhardt 1989).

3.3. Research Design

In this section I outline how these broader considerations have been reflected in this study’s research design. First, I will explain the basis on which the case organisation for the study was selected, and then how the embedded cases (individual managers) were identified. Then I will provide an overview of the different types and sources of data collected as part of the study, and explain the rationale for the inclusion of each.

3.3.1. Selection of the case organisation

The single case organisation investigated for this study is ‘ResCare’ (pseudonym) – a medium-sized provider of residential aged care services in the Australian state of New South Wales. ResCare was selected as the focal case organisation through a purposive sampling approach (Eisenhardt 1989; Miles, Huberman & Saldaña 2014; Patton 2002; Yin 2009). Prior to entering the field, I identified five case-selection criteria based on the initial theoretical framing of my thesis, namely: strong financial and non-financial performance; relatively large organisational size; a decentralised management structure; presence of a range of formal management control systems; and a strongly interactive style of use of management control systems. As detailed below, the presence of all five criteria at ResCare indicated that it would likely be an appropriate site to explore my research question (Eisenhardt 1989; Patton 2002).⁶

First, ResCare has a history of strong financial and non-financial performance, and is recognised as an industry leader for excellence in internal management processes. This is significant insofar as it speaks to the likelihood that ResCare’s management control systems operate effectively. The study of success is important as it allows researchers to develop theoretical propositions relating to the effectiveness of the systems and processes which contribute to successful operation (Malmi & Granlund 2009). Ultimately, such theory-building would aim to articulate the general principles as well as boundary conditions of the causal mechanisms identified.

Second, ResCare is a relatively large organisation. While the size of ResCare is not a particularly important feature of the case design of its own accord, imposing a minimum size on the organisations being considered for the study increases the likelihood that the remaining theoretical criteria (decentralisation, range of formal management control systems, and interactive use) would be met. Small-to-medium sized organisations were considered more likely to centralise management and decision-making authority, as the scope of operations remains within the ‘view’ of an individual or small team. For the same reason, sufficient management control may be accomplished using a narrower range of management control systems.

⁶ I was able to pre-screen potential case organisations by reviewing survey responses from a pre-existing study. Using the quantitative survey data, I identified ResCare as not only meeting my five criteria in a binary construction, but as being the highest ranked organisation in the data set with respect to theoretical suitability. This finding seemed to indicate that ResCare would be a theoretically ideal site for the study, which was confirmed during preliminary fieldwork activities.

Third, ResCare employs a decentralised management structure. It operates nine geographically differentiated residential aged care facilities, each of which is treated as an independent business unit with its own local management structure. The decentralised management structure at ResCare is a significant feature of the case study design for two reasons. The first reason is that the delivery of a consistently high level of service across the nine business units is a key concern for ResCare senior management. Incorporating multiple, independent business units into the research design enables the examination of the effects of standard management control systems and processes in a number of different local contexts.⁷ Through this process it is possible to identify features of the relationship between management control systems and the development of managers' mental models that are consistent across the business units, and those which appear to be idiosyncratic or attributable to other more local factors. The second reason is that operational managers of the business units are afforded significant discretion with respect to their management of the local site. The clear decentralisation of decision-making authority at ResCare means that local managers' knowledge and decision-making capacity is of critical importance to the success of the organisation as whole.

Fourth, senior management at ResCare make use of a wide range of formal management control systems. The use of a wide range of formal (and informal) management control systems at ResCare is another important factor in its selection as a case organisation, as the open-ended nature of the research question leaves open the possibility of any type or combination of management control system being related to the development of managers' mental models in practice. Choosing a case organisation which makes use of a wide range of management control systems maximises the possibility of such a relationship being identified, as well as potentially identifying the variety and complexity of the causal mechanisms implicated in the relationship.

Finally, ResCare uses its management control systems in what appears to be a highly interactive manner. This aspect of the sampling criteria flows from the theoretical framing of this project, which identifies an interactive style of use as having greater potential to influence the development of managers' mental models relative to diagnostic or other styles of use. Selecting a case organisation which exhibits highly interactive use of its management control systems is also

⁷ In this respect the research design in this thesis is comparable to Ahrens and Chapman's (2004) study of Restaurant Division, in which standard systems and materials were used to replicate a standard business model across more than 200 local sites, of which the researchers visited 15.

expected to maximise opportunity to observe the manifestation of the phenomenon of interest; namely, a relationship between management control systems and the development of managers' mental models. As such, ResCare provided an ideal site for "theory discovery" aimed at mapping novel, dynamic and/or complex phenomena that have not received adequate consideration in the prior literature (Keating 1995).

3.3.2. Selection of study participants

Within ResCare, eleven individual managers from across the head office and two residential care facilities were selected as participants for the study, each of which represented a discrete "mini-case" embedded within the overarching case study design. Like the selection of the organisation, selection of the study participants was theoretically driven (Miles, Huberman & Saldaña 2014) and used a replication logic designed to maximise the likelihood of observation of the constructs of interest and the conditions under which they operate (Eisenhardt 1989). Given the study's emphasis on *managers'* mental models, only managerial staff, as opposed to including operational or administrative staff, were considered for the sample. Bounding the potential population of participants in this way also reduces idiosyncratic variation and allows for more specific cross-case comparisons.

Within ResCare there are two principal levels of management: senior (central) management, and local facility-level management. Senior management at ResCare includes a Chief Executive Officer (CEO), Chief Financial Officer (CFO), and Group Managers of Operations (GOM), Clinical Care (GCM), Accommodation (GAM), and Administration (EA), as well as a marketing consultant. The local management team of each individual residential aged-care facility consists of a local Operations Manager (OM), a Clinical Manager (CM), and an Accommodation Manager (AM).⁸

The eleven participants selected for the study include the entire senior management team⁹ and the entire local management team of two different facilities (referred to as 'North' and 'South'). As shown in Table 1, this sample of 'mini-cases' covers a set of theoretically meaningful categories:

⁸ The management structure at ResCare also includes a relationship manager (associated with the in-home care business) and other dedicated project managers.

⁹ I did not include either the Executive Assistant or external marketing consultant in the study, though these roles are considered by organisational participants to be included in the composition of the senior management team.

the level of management (senior, local); the functional area (operations, clinical care, accommodation); and educational background (nursing, business/management).¹⁰

Table 1: Theoretical selection of study participants

	Operations	Clinical Care	Accommodation
Senior Management			
<i>Nursing</i>	CEO	GCM	<i>n/a</i>
<i>Business/Management</i>	GOM CFO	<i>n/a</i>	GAM
Local Management			
<i>Nursing</i>	OM (North)	CM (North) CM (South)	<i>n/a</i>
<i>Business/Management</i>	OM (South)	<i>n/a</i>	AM (North) AM (South)

These categories are theoretically meaningful as they each potentially relate to the development of managers' mental models. As previously explained, this theoretical sampling approach provides opportunities for theory development by enabling systematic cross-case comparisons of individual level data within and between the categories (Eisenhardt 1989). For example, in **Error! Reference source not found.**, the Clinical Care Manager of the North Facility (CM North) will fall into the categories of local management, care function, and nursing. Within category analysis involves comparing this manager's representations to other managers in the same category (or categories), such as other local managers, other care managers, and other managers from a nursing background. Alternatively, this manager's representations can be compared to managers who overlap on some dimensions but not others, such as local *accommodation* managers, or *senior* clinical managers. In this way, I can control for variation across different dimensions when developing and testing theoretical propositions during cross-case comparison.

In addition, the within-category samples include the entire local management teams of the North and South facilities. The decision to limit the sample to only two facilities provides additional control for extraneous variation within the sample. That is, selecting the entire local management

¹⁰ It was not possible (or meaningful) to observe some categories empirically as these did not manifest in the case setting; for example, no accommodation managers had a clinical or nursing background.

team from two facilities – as opposed to a random sampling of local managers across the ResCare group – means that any idiosyncrasies in the local contexts can be more easily detected and considered in analysis. It also helps to bound other data collection activities, such as observation and collection of archival documentation relating to local management and operational work activities.

The North and South facilities were chosen from the potential pool of nine facilities based on additional criteria and the expert advice of ResCare’s CEO (Patton 2002). Given my focus on the relation between management control systems and the development of managers’ mental models, my primary consideration was to select facilities where the team of managers had likely developed such links. Therefore, I deliberately selected facilities whose local management structure had recently been relatively stable; that is, all local management positions were filled with permanent, as opposed to temporary, appointments, and no new appointments had been made since I commenced the study. Furthermore, I also selected the local management teams which were led by particularly experienced operations managers.

3.3.3. *Data sources and uses*

Typical of most case study designs, the empirical material of thesis was collected from multiple sources, using multiple collection techniques. The use of a variety of sources and types of data is necessary to ensure that sufficient data would be collected to enable the generation of insight into the focal constructs and relation of my research question. Empirical material relating to both the overarching case organisation as well as the individual mini-cases was collected using a range of data collection techniques, including cognitive mapping exercises, semi-structured interviews, direct observation, and review of archival documentation. Table 2 provides an overview of each of the sources of data, the methods of data collection, and the data analysis strategies (detailed later in this chapter).

Table 2: Overview of data sources and uses

Unit of analysis/ Data source	Data collection method	Within-case analysis
Individual participants	Cognitive mapping exercise	Within-case analysis of characteristics of participant's causal mental models (e.g. mental model complexity, mental model content).
	Semi-structured interviews	Within-case analysis of idiosyncratic factors that influence mental model development (e.g. professional background, experience). Within-case identification of patterns of personal engagement with management control systems.
	Focused observation	Within-case analysis of context within which participant's causal mental model is developed and used. Within-case identification of patterns of personal engagement with management control systems.
Organisation	General observation	Identification of primary management control systems present in the case and their key design features. Analysis of general patterns of use of management control systems.
	Semi-structured interviews	Analysis of intended and actual patterns of use of management control systems.
	Archival documents	Identification of primary management control systems present in the case and their key design features.

The empirical component of the study consisted of four distinct phases. The first phase focused on developing an understanding of the overarching case organisation, and involved observation of organisational activity as well as the collection of archival documents relating to the organisation's structure and processes. An additional objective of this phase was to identify and approach individual managers for inclusion as study participants. The second phase focused on developing an understanding of the mental models of individual participants, undertaken through cognitive mapping interviews. In this phase I also conducted semi-structured interviews with participants (in most cases, in the same session) in order to understand the nature of their engagement with the management control systems present in the organisation. The third phase returned the focus to the organisational level of analysis, and involved continued observation of both structured and unstructured work activity. The final phase involved the analysis of all data collected while

maintaining engagement with the case organisation. Table 3 outlines the phases of the study and the specific data collection and analysis activities associated with them.

Table 3: Study phases and activities

Time period	Study phase	Activities
May–June 2015	Case selection.	Background reading to develop understanding of case setting.
June 2015	Entry into the field.	Negotiation of access to case organisation Initial observation of organisational activity.
July 2015	Familiarisation with case setting.	Observation (organisation level). Collection and review of archival documents.
August–September 2015	Selection of participants. Primary data collection (participant level).	Cognitive mapping exercises. Semi-structured interviews. Observation (participant level). Observation (organisation level).
October 2015 – January 2016	Primary data collection (organisation level).	Observation (organisation level).
February–July 2016	Consolidation and analysis.	Data analysis. Collection and review of archival documents.

3.4. Data Collection and Analysis Procedures

In this final section, I detail the data collection and analysis procedures undertaken in the study. Specifically, I explain the nature and purpose of each of the techniques used to collect the various sources of empirical data listed above. This is followed by an explanation of the cycles of coding and data analysis used to collate and transform this material into case findings and theoretical implications.

3.4.1. Data collection

As listed in Table 2 above, during the study I collected various forms of empirical data. In this section I detail the cognitive mapping exercise conducted with each study participant; the semi-structured interview format and questions; the process and products of my field observation activities; and the types and extent of archival documentation collected for the study.

Cognitive mapping exercise

The primary source of data relating to the embedded cases – each individual participant – is a specific exercise in which I worked collaboratively with participants, one-on-one, to produce a

visual representation of their causal knowledge and beliefs. This exercise is a form of Cognitive Task Analysis referred to as cognitive (or concept) mapping (Crandall, Klein & Hoffman 2006). Cognitive maps are diagrams that are used to represent and convey knowledge (Crandall, Klein & Hoffman 2006, p. 43), and consist of nodes relevant to the domain which are connected by meaningfully labelled links. Any two linked nodes in the diagram represent a specific proposition. Cognitive mapping is an interview-based knowledge elicitation technique, in which participants are given a focus question and are encouraged to generate as many ideas and propositions as they are able, prompted by the researcher when necessary. Traditionally, cognitive maps have been produced using manual tools such as pen and paper, or posters and stick-on notes; however, contemporary studies more often use software tools to generate and visualise the cognitive map (Crandall, Klein & Hoffman 2006).

Cognitive mapping is one of many established Cognitive Task Analysis techniques for eliciting mental models¹¹, and is an example of a Think Aloud Problem Solving (TAPS) paradigm.¹² Klein and Hoffman (2008) suggest that the choice of technique for studying mental models empirically should be informed by two interrelated criteria. First, the choice should reflect the type of relationships that constitute the mental model. As this study is specifically interested in mental models of cause-and-effect relationships, a *modified cognitive mapping approach* was considered the most appropriate technique as it allows participants to produce open-ended responses, allows for the identification of non-linear relationships, and allows for the identification of multiple causes and/or effects of a given event. Second, the choice should reflect the purpose of the research. In the case of this study, the use of cognitive mapping/TAPS reflects the exploratory nature of the research question as it allows for the generation of comparable data from multiple participants in order to understand the *content* and variation in their causal mental models (Klein & Hoffman 2008). Klein and Hoffman (2008) observe that this use of comparison is common

¹¹ Established techniques include “directed inquiry” (in which participants are asked about their approach to problem solving or decision making), “nearest neighbour” (in which participants are presented with several causal mechanisms and are asked to select the one that best reflects their beliefs), “cognitive intervention” (in which participants are asked to use a particular model or metaphor for a task), “glitch detector” (in which deliberate decision errors are made in order to observe if participants notice), and “oddity” (in which normal work activities are observed and notes made of any unusual or unexpected patterns) (Klein & Hoffman 2008).

¹² One of the most widely cited TAPS methods was developed by Ericsson and Simon (1993) and is combined with a data analysis method called protocol analysis. However, not all TAPS studies adopt protocol analysis, and are instead associated with a range of types of data and analysis methods (Klein & Hoffman 2008).

within existing Cognitive Task Analysis studies of mental models, and is used in order to contrast the sophistication of different types of participants' mental models.

In this study, the cognitive mapping exercise involved prompting individual participants to engage in TAPS by asking them a simple focus question, and encouraging them to share their reflective thought processes aloud. The focus question given to each participant during the mapping exercise was: "What activities are important for the success of ResCare, and why?". As the participant discussed the focus question, each individual concept mentioned and any propositions linking them were captured by the researcher¹³ electronically in a cognitive map generated by purpose-built software.¹⁴ Related concepts are linked with a simple, unlabelled directional arrow. As this study is particularly concerned with *causal* mental models, the development of the cognitive map was focused on propositions that reflect causal relationships; however, a typical cognitive map does not limit the range of terms that can be used as relational links. While other relational links were not necessarily excluded, participants were encouraged to express cause-and-effect relations where possible.¹⁵

Significantly, the cognitive map was generated collaboratively and in view of the participant, such that it is developed, referred to and built upon during the course of the interview. Unlike in controlled laboratory conditions, there is no requirement for each cognitive mapping session to follow exactly the same sequence; rather, a well-conducted cognitive task analysis interview aims to be responsive to the interaction between participant and interviewer (Crandall, Klein & Hoffman 2006, p. 261). However, in order to minimise variation in the cognitive maps that could be attributed to the manner in which the exercise was conducted, I developed a flexible interview guide that was used for all participants.¹⁶ Prior to commencing each cognitive mapping exercise, I asked a series of questions relating to the participant's background and experience of the

¹³ I was present and conducted the cognitive mapping exercise for all interviews. In two cases a second interviewer (PhD supervisor) was also present, who took additional notes and contributed some prompts.

¹⁴ I used CMAP Tools, a free and open-licence program made available by the Florida Institute for Human and Machine Learning.

¹⁵ A detailed but not exhaustive list of potential relational links and categories compiled by Crandall et al. (2006) includes "causal relations (e.g. "leads to", "produces"), classificational relations (e.g. "includes", "is an example of"), nominal relations (e.g. "is known as"), property relations (e.g. "can be", "has defining feature", "consists of"), explanatory relations (e.g. "is a reason for"), procedure or method relations (e.g. "results in", "is done by", "is a way to do"), contingencies and dependencies (e.g. "requires", "often is"), probabilistic relations (e.g. "is more likely", "rarely is"), event relations (e.g. "comes before"), and uncertainty or frequency relations (e.g. "is more common than")." (p60)

¹⁶ An indicative cognitive mapping interview guide is included in Appendix A.

residential aged care industry in order to establish rapport and an initial context to guide the rest of the session. I then explained what the cognitive mapping exercise involved, and posed the initial focus question to the participant. Participants then reflected on the question out loud until they appeared to have nothing more to say, at which point I prompted them to continue identifying additional causes or effects of the nodes present in the developing map until they were confident that they had nothing further to add. I would then ask the participant to consider the map that had been generated and confirm that it adequately represented what they had described. After the session, no changes were made to the content of the cognitive maps beside the correction of typographic errors.

Semi-structured interviews

In addition to the cognitive mapping interviews, I also conducted semi-structured interviews with each of the study participants.¹⁷ The aim of the semi-structured interviews was to develop an understanding of each participant's exposure to and involvement in the various management control systems observed at ResCare, and to clarify the features and use of the systems themselves. That is, this component of the interview session provided evidence relating to both the individual and organisation level units of analysis; collectively they provided an opportunity to inquire about the features and use of management control systems at ResCare, while also establishing each participant's individual knowledge of and pattern of engagement with those systems.

In most cases the semi-structured interviews were conducted in the same session as the cognitive mapping component, but care was taken to sequence the various components of the interview in order to minimise the risk of framing effects or desirability bias arising from alerting participants to the topics in which I was especially interested. To do so I prepared and referred to an interview guide.¹⁸ This encompassed two sets of interview questions posed to participants. The first set was asked at the beginning of the interview session, *prior* to conducting the cognitive mapping session. This set of questions was primarily biographical in nature, and was intended to set participants at ease as well as elicit information about the individual's personal background, experience, and training. The second set of questions was asked *following* the cognitive mapping component. These

¹⁷ I also conducted one additional preliminary semi-structured interview as part of the familiarisation phase of the study.

¹⁸ The use of an interview guide ensured sufficient data was collected from each participant to enable robust analysis of each individual case.

were targeted at understanding how the primary management control systems present at ResCare affected the participant. Specifically, I asked each participant about their engagement with ResCare's operating budget, the Scoreboard (balanced scorecard/KPI) system, and formal policies and procedures, and encouraged depth in their responses using a set of prompts (see Appendix B). Where time permitted, I also asked a final, open-ended question relating to what the participant viewed as the challenges or difficulties in their role.

The interview sessions produced various forms of empirical material. In addition to the cognitive maps, I developed detailed interview notes during the session, which I added to immediately after each session. Also, all interviews (with two exceptions)¹⁹ were digitally recorded and transcribed; the accuracy of transcriptions was checked by listening back to the audio recordings and cross-referencing any ambiguities with the original interview notes.

Observation of organisational activity

In contrast to primarily interview-based field studies, the primary source of data collected for the organisation-level component of this study was direct observation. Direct observation of organisational activity allowed for the development of first-hand insight into the use of formal systems and processes within the case organisation by different participants²⁰, as well as the identification of patterns of interaction between the participants themselves. In the early part of the field work, the primary objective of direct observation was to develop an understanding of the case organisation as a whole. As the fieldwork progressed, observation of activities became more focused on exploring how the organisational-level constructs (i.e. management control systems) are manifested and relate to patterns of organisational activity. An important function of this early observation strategy was also the development and management of relationships with organisational members (Patton 2002). I developed a detailed observation schedule on a week-by-week basis, depending on what opportunities emerged and the pattern of activities that were occurring in ResCare.²¹

¹⁹ Two interviews were not recorded (or only partially recorded) due to a failure of the recording equipment. The other empirical material from the session (the cognitive map, and detailed interview notes, were not affected.

²⁰ These primary observations were then confirmed or clarified through the use of semi-structured interviews, described in the previous section.

²¹ I was invited to attend all routinely scheduled meetings, and was given access to the electronic Corporate Calendar so that I could identify additional meetings and events that I would like to observe.

Table 4 outlines the list of observational activities I undertook over the course of the study, which came to a total of 44 visits to the case sites and 186.75 hours observing activity within the case organisation.²² For a number of site visits early in the project, a research supervisor also attended as a ‘second pair of eyes and ears’, as well as for events or meetings thought likely to provide particularly rich insight into the phenomenon of interest. This approach was particularly helpful as it enabled the supervisor to also become familiar with the participants and events at ResCare, allowing the supervisor to provide input into the unfolding observation strategy and selection of study participants.

Table 4: Observation activities

Site visit	Timing	Site/Facility	Event	Duration
0	June 2015	ResCare Facility – Other	All-Staff Planning Day ²³	
1	July 2015	ResCare Facility – Other	Communications Roadshow (x2) Observation of facility work activities	4.75hrs
2		ResCare Corporate Office	Leadership Team Meeting	2.25hrs
3		ResCare Corporate Office	Administration Forum	5hrs
4		ResCare Facility – Other	Accommodation Services Forum	6hrs
5		ResCare Corporate Office	Management Team Meeting Observation of corporate office work activities	8hrs
6		ResCare Corporate Office	Leadership Team Meeting	3.25hrs
7		ResCare Corporate Office	Care Services Forum	7.5hrs
8		ResCare Corporate Office	Leadership Team Meeting Observation of corporate office work activities	8hrs
9	August 2015	ResCare Corporate Office	Leadership Team Meeting	2.75hrs
10		ResCare Facility – North	Initial Centre Visit Tour of Facility	1hr
11		ResCare Facility – North	Shadowing of Operations Manager Local Leadership Team Meeting Observation of facility work activities	7hrs
12		ResCare Facility – North	Shadowing of Operations Manager Shadowing of Clinical Manager Observation of facility work activities	3.5hrs
13		ResCare Corporate Office	Leadership Team Meeting Observation of corporate office work activities	4.5hrs
14		ResCare Facility – North	Observation of facility work activities	6.5hrs
15		ResCare Corporate Office	Operations Management Forum	3.25hrs

²² I was present for every site visit listed, with the exception of the first visit (in June 2015) which was attended by one of my PhD supervisors due to a scheduling conflict.

²³ I did not attend this event, which was instead observed by a research supervisor due to a scheduling conflict.

Site visit	Timing	Site/Facility	Event	Duration
16		ResCare Accounts Office	Leadership Team Meeting	2.25hrs
17		ResCare Facility – South	Initial Centre Visit Tour of Facility	1.25hrs
18		ResCare Facility – South	Shadowing of Operations Manager Observation of facility work activities	8hrs
19		ResCare Accounts Office	Board Advisory Committee Meeting Observation of accounts office work activities Finance Team Meeting	6.75hrs
21		ResCare Corporate Office	Leadership Team Meeting	3.75hrs
22		ResCare Corporate Office	Management Team Meeting	5hrs
23		ResCare Corporate Office	Leadership Team Meeting Observation of corporate office work activities	7hrs
24	September 2015	ResCare Corporate Office	Leadership Team Meeting Observation of corporate office work activities	7.5hrs
25		ResCare Facility – South	Local Leadership Team Shadowing Observation of facility work activities	5.75hrs
26		ResCare Corporate Office	Leadership Team Meeting	4hrs
27		Off-site Conference Facility	All-Staff Planning Day	6.5hrs
28		ResCare Corporate Office	Leadership Team Meeting	3.75hrs
29	October 2015	ResCare Corporate Office	Leadership Team Meeting	2.75hrs
30		ResCare Corporate Office	Leadership Team Meeting	2.25hrs
31	November 2015	ResCare Corporate Office	Leadership Team Meeting Observation of corporate office work activities	4.25hrs
32		ResCare Corporate Office	Leadership Team Meeting	2.25hrs
33		ResCare Corporate Office	Operations Management Forum	3.25hrs
34		ResCare Corporate Office	Leadership Team Meeting	2.25hrs
35		ResCare Corporate Office	Management Team Meeting	7.5hrs
36		ResCare Corporate Office	Leadership Team Meeting	2.25hrs
37		ResCare Corporate Office	WHS and Risk Management Forum Corporate Office Orientation Observation of corporate office work activities	7.25hrs
38	December 2015	ResCare Corporate Office	Leadership Team Meeting	4.75hrs
39		ResCare Corporate Office	Leadership Team Meeting	2.75hrs
40		ResCare Corporate Office	Leadership Team Meeting	2.5hrs
41	January 2016	ResCare Corporate Office	Leadership Team Meeting	2hrs
42		ResCare Corporate Office	Leadership Team Meeting	1.5hrs
43	February 2016	ResCare Corporate Office	Leadership Team Meeting	2.5hrs
44		ResCare Corporate Office	Leadership Team Meeting	2hrs
			TOTAL DURATION	186.75hrs

As part of my direct observation of ResCare activities, I spent time at a number of different offices and aged care facilities. My observation of work activities at the corporate offices included attending meetings, conferences and staff inductions. I took care to introduce myself to the chair of meetings beforehand and explain my presence, and was usually introduced (or given an opportunity to introduce myself) to each group as a research student who is studying ResCare as a whole and would be taking notes on the meeting. This process was assisted by the support of ResCare's CEO, who explained my presence to senior managers early in the project and encouraged them to treat me (and colleagues) as if we were new senior members of staff.

While most of my visits to ResCare sites coincided with scheduled events or meetings, I was also able to observe work activities and interactions in less formal settings from the vacant work station which I occupied while on site at the corporate office. As organisational members became accustomed to my presence, I engaged in frequent casual conversations with many different staff members in the corporate office. I also took part in group events, such as lunches, morning teas and other celebrations when they took place while I was on site.

My observations of both formal and informal activities at ResCare were recorded in detailed field notes (Patton 2002). During my attendance at meetings and events I took raw notes by hand in a small notebook, in order not to be overly conspicuous and cause participants to become uncomfortable. I endeavoured to type up and elaborate on my raw notes as soon after a site visit as possible. During this process, I would add additional detail to my descriptions based on my recollection of the events, as well as incorporating reflective or analytical notes which were made either in distinct notation or in a different section of the document. During periods where I was observing routine work activity (rather than meetings or events), I was generally able to record my notes directly into an electronic case database. By the conclusion of the empirical phase of the study, I had produced a corpus of typed field notes totalling 105,530 words, or approximately 302 pages.

Observation of specific participants

As part of my program of direct observation, I collected data relating to the individual participants in the study. After the familiarisation phase, I continued to visit the corporate office to attend meetings and for more informal periods of observation and focused my data collection activities on those meetings and events which were attended by or had the potential to affect any of the

eleven study participants selected for my embedded “mini-cases”. I also expanded my observation to two new sites: North Facility and South Facility. At the facility level, my observation was guided less by formally scheduled events and more by ‘hanging around’ and trying to understand what was going on with respect to the operations of those two residential aged care facilities.

My observation at both facilities was focused on the three local managers included as study participants. In both cases, an initial visit was made by two researchers (myself and a supervisor) in order to meet with the local management team and explain the general purpose of the study.²⁴ In these meetings we outlined our planned approach to studying the facility: periods of “shadowing” the operations manager during a normal day’s work (Czarniawska-Joerges 2007); time to spend “hanging around” in common spaces (Silverman 2011); and formal interviews with each of the local managers. Both of the groups expressed their interest in the study, and indicated that they were happy to participate. In each case, we were given a tour of the facility and arrangements were made for me to return for the observation component of the study.

I subsequently visited each facility several times over a period of two weeks.²⁵ The first day of my observation in each facility was spent “shadowing” the operations manager as they went about their usual tasks and activities.²⁶ While the operations manager was involved in office-based work, I sat opposite their immediate work space and made observations and analytical notes in a small, discreet notebook. This time also provided occasions for casual discussion, as the managers frequently commented what they were working on and offered their opinions on a range of topics relating to their role and facility. Where I felt it was appropriate, I used these discussions as informal conversational interviews (Patton 2002) by asking additional questions of the manager in order to better understand their experiences at ResCare.

Whenever the operations manager was “on the floor” – doing rounds of the facility, or speaking with staff or residents – I walked with them, sometimes engaging in casual conversation and at

²⁴ We were conscious of and careful not to “give away” our research question when explaining our presence to organisational members, in order to reduce the risk of compromising the naturalistic nature of the data (Baxter & Chua 1998).

²⁵ My observation of the two facilities was performed sequentially, not simultaneously.

²⁶ Shadowing has been described as “fieldwork on the move” (Czarniawska-Joerges 2007) as this is an approach to observation that involves focusing on a single individual and following them as they move from place to place during the course of their normal activity.

other times withdrawing slightly as appropriate.²⁷ Observation of this type of activity was essential in developing an understanding of the nature and frequency of the managers' interactions with other managers and staff members during the course of a normal work day. While my shadowing activity was primarily focused on the operations manager of each facility, the close confines within which the local management team worked ensured that this provided considerable opportunity to observe the work activities of other study participants as well.

Collection of documentation

I was fortunate to be granted essentially unrestricted access to ResCare's internal document drives and staff intranet. This included the corporate policy and procedure library, position descriptions, organisational charts, research and reference material, meeting agendas and minutes, annual reports and other publications, strategy documentation, performance reports, as well as other centrally stored digital material. While only a selection of these files and documents were included in the formal data analysis for this thesis, the broader array of files was instrumental in developing contextual understanding early in the project, and for cross-checking references to systems and processes made by participants during periods of observation and formal interviews. The particular documents selected for analysis for this thesis include:

- Documents distributed and referred to during meetings that were observed (where possible; in some cases documents were only displayed electronically in which case additional notes were taken by the researcher)
- Documents that were specifically mentioned during meetings and/or interviews with key participants
- Documents relating specifically to the positions and role requirements of key participants
- Ad-hoc inclusion of documents thought to provide insight into the design and operation of management systems and processes (e.g. exemplars of policy documentation).

A breakdown of the specific types of documents collected during the study is contained in Table 5.

²⁷ On several occasions, I offered to "disappear" for a period such that the operations manager could have a private discussion in the office with a staff member or the relative of a resident; this offer was taken up twice. This was for the comfort of the other party in the conversation; on these occasions, the operations manager explained the nature of the meeting to me either in advance or after the fact.

Table 5: Types of archival documents collected and reviewed

Item	Description
1	Meeting agendas (all formal meetings attended)
2	Meeting minutes (all formal meetings attended)
3	2015/2017 Strategic Plan
4	2015 Corporate Organisational Chart
5	Project Plan template
6	2015/2016 Operational budget
7	2015/2016 Budget assumptions package
8	Monthly Profit and Loss Variance reports (corporate and facility level)
9	Leadership team progress notes
10	Position descriptions (all positions)
11	Specified Care and Services Manual
12	Corporate Policy Library (all current corporate policies and procedures)
13	ResCare Resident Handbook
14	Monthly KPI reports (and underlying data)
15	Quarterly quality benchmarking reports
16	Industry benchmarking reports
17	Forum/Meeting Terms of Reference (all forums)
18	2013-2014 Annual Report

3.4.2. Data analysis procedures

The embedded case study design and use of multiple types of data necessitated several stages of analysis in order to first develop within-case findings before attempting to integrate the cases to produce theoretical explanations of the phenomenon of interest. In this section, I first explain my strategies for organising and reducing the large volume of data collected during the study, the most significant of which was coding the data electronically to allow ease of access and identification of categories and themes. I then outline my approach to analysis of the data relating to individual study participants and the development of their causal mental models. Next, I explain how I analysed the organisational-level data and produced findings relating to the design and use of management control systems at ResCare. Finally, I explain how I integrated the findings of the “mini-cases” into the overarching organisational case study in order to develop a theoretical explanation for the effects of the use of management control systems on the development of participants’ causal mental models.

Coding strategies

All data collected as part of the case study (archival documentation, observational field notes, cognitive mapping transcripts, and semi-structured interview transcripts) were stored and analysed within the software package NVivo (v10), a specific type of computer assisted qualitative data analysis software. This central electronic storage and coding of data enabled structuring and organisation of the data in a way that facilitated both the separation and then the integration of data relating to the different units of analysis.

This incorporation of a variety of sources and types of data is a significant feature and advantage of the case study method, as this allows the researcher to consider the object of study from a number of different perspectives (Yin 2009). Such diversity of data types, however, implies that a single coding method is unlikely to be appropriate or sufficient for all of the data that makes up the corpus as a whole. For this reason, I adopted a ‘purposefully eclectic’ coding method (Saldaña 2012) which incorporates specific coding strategies for each primary data source over the course of three successive coding cycles. An overview of coding cycles and strategies is presented in Table 6 and Table 7, and discussed in greater detail in the following sections.

Table 6: Overview of coding cycles

	First cycle	Second cycle	Third cycle
Archival documents	Attribute Coding Holistic Coding	n/a	
Observational field notes	Attribute Coding Structural Coding	Descriptive Coding Initial Coding Values Coding Versus Coding In-Vivo Coding	Pattern Coding Axial Coding
Cognitive mapping interview transcripts	Attribute Coding Structural Coding	Values Coding	
Semi-structured interview transcripts	Attribute Coding Structural Coding	Initial Coding Values Coding Versus Coding In-Vivo Coding	

Table 7: Overview of coding strategies

Data source/type	Potential coding strategies	Purpose of coding scheme	Example codes
Archival documents	Attribute Coding	To index and manage data sources	Date, Title, Type etc.
	Holistic Coding	To capture the ‘essence’ of the document for subsequent coding/analysis	Position Description: Operations Manager
Observational field notes	Attribute Coding	To index and manage data sources	Date, Place, Type, Participants etc.
	Structural Coding	To designate discrete ‘chunks’ of data for subsequent coding/analysis	General Observations, Meetings, Interactions, other context
	Descriptive Coding	To capture ‘topic’ of conversation/meeting/interaction/activity etc.	Residents, Events, Challenges, Finance etc.
	In-Vivo Coding	To capture memorable or ‘sticky’ phrases in participants’ own language	“Do a Mortein”, “Getting kicked”
	Initial Coding	To indicate potential analytical leads for further exploration	Open coding strategy
	Values Coding	To identify participants’ values, attitudes and beliefs	V: Transparency, A: Finance as enemy, B: Communication leads to success
	Versus Coding	To identify conflicts between individuals, groups, values, beliefs etc.	Clinical VS Non-clinical, “Right thing” VS “Easy thing”
Cognitive mapping interview transcripts	Attribute Coding	To index and manage data sources	Date, Place, Type, Participant etc.
	Structural Coding	To designate as a discrete ‘chunk’ of data for subsequent coding/analysis	Cognitive Mapping Exercise
	Values Coding	To identify participants’ values, attitudes and beliefs	V: Transparency, A: Finance as enemy, B: Communication leads to success
Semi-structured interview transcripts	Attribute Coding	To index and manage data sources	Date, Place, Type, Participant etc.
	Structural Coding	To designate discrete ‘chunks’ of data for subsequent coding/analysis	Background, Budget, Scoreboard, Meetings etc.
	In-Vivo Coding	To capture memorable or ‘sticky’ phrases in participants’ own language	“Do a Mortein”, “Getting kicked”
	Initial Coding	To indicate potential analytical leads for further exploration	Open coding strategy
	Values Coding	To identify participants’ values, attitudes and beliefs	V: Transparency, A: Finance as enemy, B: Communication leads to success
	Versus Coding	To identify conflicts between individuals, groups, values, beliefs etc.	Clinical VS Non-clinical, “Right thing” VS “Easy thing”

First cycle coding

The purpose of the first cycle of coding was to allow for the organisation, indexing, and filtering of data across the data corpus during subsequent cycles of coding and analysis. This cycle was also intended to assist the researcher to develop a familiarity or ‘closeness’ with the data corpus as a whole, and to refine the coding system through reflection and the generation of analytic memos (Saldaña 2012).

Archival documents

In the first cycle, all archival documentation selected for inclusion in the data set (see previous discussion) was subjected to attribute coding and holistic coding. Attribute coding is a grammatical coding method (Saldaña 2012) which can be used to index and manage data where it relates to multiple participants and takes a variety of forms. Here, attribute coding was used to note identifying information such as the document title, location, access date, modification date, and author (where relevant). Holistic coding is an exploratory coding method (Saldaña 2012), in which a single code is used to capture the ‘essence’ of a large unit of data. In this case, a single holistic code was applied to each document in the data set which captures what is particularly interesting or relevant in the context of the study (where this is not already evident in the attribute codes). This holistic coding was intended to act as a flag for potential review and cross-referencing during second- and/or third-cycle coding, and further analysis.

No specific second-cycle of coding was undertaken for the archival documentation, which was referred to on an ad-hoc basis during subsequent analytic processes (discussed in Section 3.4.2).

Observational field notes

First cycle coding of observational field notes involved attribute coding as well as structural coding. Here again, attribute coding was used to index and manage data by identifying essential contextual information. Contextual information in the case of observational field notes included: date of observation, the location, and key participants present. Structural coding was then used to designate discrete ‘chunks’ of data within each unit of observation notes for further coding in subsequent cycles. Structural codes differentiate, for example, observation of meetings from observation of general work activity, and indicate instances of interaction between participants or informal conversations.

Cognitive mapping interview transcripts

As in the case of observational field notes, the first cycle of coding of the cognitive mapping interview transcripts involved attribute and structural coding. Attribute codes were used to indicate essential contextual information relating to the interviews, including: interview date, participant name, participant position, interview location. Structural coding was used to differentiate the ‘cognitive mapping’ component of an interview from the less formal, semi-structured component.

The primary output of the cognitive mapping exercise was the ‘cognitive map’ produced collaboratively by the researcher and participant during the session. During this session, the participant’s responses were essentially coded simultaneously by the researcher, who recorded all activities mentioned as nodes in the cognitive map, and all espoused cause-and-effect relationships as links between these activities (nodes). The developing cognitive map was shown to the participant during the session to enhance transparency and accuracy. This cognitive mapping process bears resemblance to both process and causation coding; process coding identifies activities and their outcomes by using gerunds to denote action, where causation coding identifies causal attributions in participant data. The final cognitive maps represent both activities and causal attributions graphically, and these graphical representations are what will be used for further analysis. The cognitive maps produced during these interviews were analysed separately (discussed in detail later in this chapter).

Semi-structured interviews

The first cycle of coding of the semi-structured interviews proceeded in the same manner as the cognitive mapping interviews. These were coded for attributes (interview date, participant name, participant position, interview location) as well as given a structural code to differentiate this material from any cognitive mapping component. Structural coding was also used to indicate where participants were responding to specific questions posed by the researcher (e.g. questions about specific management control systems).

Second cycle coding

The second cycle of coding represented the first attempt to apply detailed, content-based codes to the data corpus. This process was intended to produce early analytic insight into potential themes and categories relating to the organisational level constructs (i.e. the operation of management control systems) and individual level constructs (i.e. managers’ causal mental models). Second

cycle coding was applied to all previously coded data, with the exception of archival documentation which was only subject to additional coding on an ad-hoc basis.

Observational field notes

In the second-cycle of coding of observational field notes, I developed a coding scheme consisting of elements of descriptive, initial, values, versus, and in-vivo coding. The diverse range of coding approaches was necessary given the diverse range of contexts in which observations took place. Settings observed and recorded in field notes include formal meetings, casual one-on-one conversations with participants, incidental interaction between participants, and general work activity. Further, the coding scheme used in second cycle coding needed to be sensitive to potential analytic insight at both the individual level (pertaining to participants' beliefs, causal attributions, and personal differences) as well as at the level of the organisation (pertaining to the operation of management systems and processes and the context in which they operate).

More specifically, two coding approaches were employed specifically to capture relevant elements of the organisational context: descriptive coding, and initial coding. Descriptive coding was used here to indicate the overarching 'topic' of a chunk of data, rather than representing its specific content. This allowed for more detailed organisation and indexing of field notes during the final coding cycle. Initial coding was used to capture any data with potential to generate additional insight into the operation of management control systems (as a central construct in the research question) in the case organisation. The open-ended nature of initial coding reflected the open-ended nature of the research question, and allowed the codes generated to be relatively unconstrained by prior theory or pre-determined constructs. The relation between these codes and a potential theoretical framework was considered during the final cycle of coding and subsequent analysis.

A second subset of coding approaches was used to capture insights pertaining to the individual participants in the study: values and versus coding. Values coding is used in qualitative studies to identify and explore the values, attitudes and beliefs of participants (Saldaña 2012); in this study, values coding was used to capture the causal attributions made by participants with respect to the strategy and operations of their work environment. This use of values coding ensured that the cognitive representation constructed during analysis was as complete as possible. Versus coding,

used in conjunction with values coding, was used to ascertain any significant differences or conflicts in the cognitive representations of different participants.

Finally, *in-vivo* codes were used to capture any memorable or ‘sticky’ phrases used by participants, especially where these quotes represent statements that were surprising or even confusing for the researcher. This use of In-Vivo codes was intended to ensure that potential dis-confirming or apparently irreconcilable data was considered in the writing of analytic memos and during the third cycle of coding, as well as to highlight any particularly interesting or illustrative quotes that have potential for use in written outputs of the analysis process.

Cognitive mapping interview transcripts

Second- and third-cycle coding of the products of the cognitive mapping interviews was minimal, due to the quasi-experimental nature of the cognitive mapping exercise. However, in second-cycle coding the transcripts of the cognitive mapping interviews were subject to the same values coding applied to the set of observational field notes. This ensured that any qualifying or complementary values or attitudes were captured along with the associated causal attributions.

Semi-structured interviews

Second-cycle coding of the semi-structured interview data followed an approach similar to that used in the second-cycle coding of observational field notes, incorporating initial coding, values coding, versus coding, and *in-vivo* coding. As in the case of second-cycle coding of observational field notes, the focus of initial coding was on the operation of management control systems in the case organisation; specifically, with respect to the way in which the participant themselves relates to and interacts with these systems.

At the same time, a combination of values and versus coding was used to capture the values, attitudes and beliefs of the participant with respect to their work environment. This process used elements of causation coding to ensure sensitivity to participant’s beliefs about cause and effect (in addition to those expressed during a cognitive mapping exercise), and to capture any explicit or implicit conflicts between participants or between a participant and ‘the organisation’.

Third cycle coding

The third cycle of coding was designed to enable more advanced analysis of both individual- and organisational-level constructs by suggesting possible categories and relationships between

categories and their constitutive codes. This process was necessary to enable analysis of the relationship between the individual-and organisational-level constructs, in a way that made it possible to develop an answer to the overarching research question.

Third cycle coding was applied across the entire data corpus and all codes generated during the first- and second-cycles of coding. During this process, a combination of pattern and axial coding was used to explore possible relationships between codes and categories at a general level. First, pattern coding was used to analyse the set of codes relating to the organisation-level constructs. This process enabled the identification of ‘meta-codes’ and organisation of codes into themes and constructs, categories and subcategories. Second, axial coding was used to analyse codes relating to the individual level constructs, particularly those relating to participants’ causal mental models. Axial coding is a technique which can be used to identify and describe a category’s properties and dimensions (Saldaña 2012), and contributed to the identification and description of the characteristics of participants’ mental models.

Analysis of individual-level data

I commenced my analysis of the individual level data by producing a case description for each of the eleven mini-cases or study participants. The original process of generating the cognitive maps, in collaboration with study participants, involved both data collection and analysis simultaneously; the researcher was required to effectively “code” the participant’s statements in real time in order to visualise their causal attributions as a network of linked (or unlinked) nodes that could be shown to and validated by the participant during the session. While the transcripts of the cognitive mapping sessions were also coded and included as part of the wider data corpus, the primary data source for the purpose of analysis of participants’ causal mental models were the cognitive maps themselves.

The individual case descriptions were informed by the writing of analytic memos (Saldaña 2012) regarding each individual participant, in which I noted any remarkable or surprising features of the cognitive map that occurred to me as I reflected on the cognitive map and reviewed the associated transcript. The first analytic memos produced in this fashion were relatively unstructured, but as I progressed through the analysis my observations became more specific and structured, and I began to draw comparisons and identify points of contrast between the cognitive maps (Eisenhardt 1989). These observations eventually coalesced into three ‘topics’: cognitive map complexity; activities

and processes; and characterisation of success. These topics then formed the basis of the individual case descriptions.²⁸

I then conducted a series of cross-case analyses using a pattern-matching approach (Eisenhardt 1989; Miles, Huberman & Saldaña 2014; Patton 2002; Saldaña 2012) in order to identify similarities and differences in the features of the cognitive maps of managers from each hierarchical level. Given that each participant was embedded within the same overarching context and was prompted with the same question, it is the points of difference between the cognitive maps that provided the most valuable insight into the factors that influence the development of each managers' causal mental model. Having established the patterns of similarity and difference *within* each management group, I then continued with the pattern-matching technique in order to identify patterns of variation *between* the management groups. I conducted cross-case analysis of different subsets of the sample, in order to check for variation that could be explained by other factors such as management function, physical proximity of teams, professional background, and role tenure/experience.²⁹

Analysis of organisational-level data

My analysis of the organisational-level data involved a detailed examination of the codes, categories, and underlying data relating to the design and use of management control systems at ResCare. This process involved working across the entire data corpus to develop a detailed description of the ResCare case as a whole. This description is presented in Chapter 4 and incorporates discussion of the context in which ResCare operates, an overview of ResCare's recent history and organisational structure, and detailed descriptions of the three primary management control systems that were identified during the familiarisation phase of the study. Each of these components relied to varying extents of different elements of the data and preliminary analysis.

In order to generate a description of ResCare's operating context, I reviewed all coded data relating to the broader aged care industry and supplemented this with the collection and review of external documentation (such as Australian Government publications) in order to confirm assertions made

²⁸ While I developed individual descriptions of each participant's cognitive map based on these three dimensions, the underlying descriptions are not presented in full in Chapter 4; rather, I present cross-case descriptions of the relevant groups of participants to avoid unnecessary repetition.

²⁹ This process did identify physical proximity as a factor driving variation, which informed the development of the arguments relating to face-to-face interaction in Chapter 6.

by participants and augment the detail of the description. In similar fashion, I developed a description of ResCare's history, business model, and management structure through an iterative review of the coded data relating to each aspect of the case; this was supplemented with the collection and analysis of additional archival documentation from ResCare in order to clarify ambiguities and provide additional empirical support for conclusions drawn based on observational data and interview quotes.

The development of descriptions of the three primary management control systems was informed by the pattern codes developed during the third cycle of coding. These pattern codes functioned as categories, which I used to structure the descriptions and ensure that all relevant dimensions of the management control system were analysed and presented within the empirical material in the thesis. For example, the pattern codes developed relating to the descriptive code "budgeting" were: "budget: development"; "budget: ex-ante use"; "budget: ex-post use"; and "budget: attitudes". I reviewed all of the data coded under each of the pattern codes to develop each section of the budget description; where necessary, I used the technique of "codeweaving" to develop a narrative using the finer-grain codes associated with each category (Saldaña 2012). Where appropriate, I used attribute codes to 'filter' the data to ensure that separate descriptions were developed relating to the use by different levels of management.

Integrating the units of analysis

The next stage of analysis required the integration of my analysis of the organisational-level case description and findings relating to the use of management control systems, with my individual case descriptions and cross-case analyses relating to participants' causal mental models. This process also involved pattern-matching, but required attention not only to the relationships between organisational level factors and individual level outcomes, but also the likelihood of interaction effects between them (Luft & Shields 2003). I structured this analysis by management level, and began by reviewing my findings relating to: each group of managers' pattern of engagement with management control systems; the characteristics of their cognitive maps; and the individual-level drivers of variation in the cognitive maps already identified. I then related the patterns of engagement with management control systems to the unexplained variation in the characteristics of cognitive maps in order to make preliminary assertions about possible relationships.

For each possible relationship I identified in this fashion, I then went back to the data corpus to ‘sense-check’ my findings by reviewing the relevant data chronologically. This process allowed me to develop a richer narrative based on the empirical material, and identify additional nuances in the dynamics of the relationships. This also suggested that in some cases, the chronology indicated that individual-level constructs were actually driving variation in the organisational-level constructs. That is, there were empirical examples in which managers’ causal mental models served as inputs to the development of components of primary management control systems. These examples are discussed in depth in Chapter 6.

During the process of integrating the units of analysis, an additional construct emerged as relevant to explaining the relationship between the use of management control systems and the development of managers’ mental models. This additional construct related to the group-level mental model dynamics that became apparent within the different management teams present in the sample. In order to investigate this emergent aspect of the theoretical explanation, it became necessary to review additional literature relating to group-level mental model dynamics and overlay existing theoretical frameworks to make sense of the data. For this component of the analysis, I worked backwards from the observed outcomes of group-level mental model dynamics (specifically, cross-understanding) to aspects of the use of management control systems that appeared to facilitate them in order to identify potential mediating variables that would explain the patterns observed in the data. Here I worked closely with the underlying data to demonstrate how this mediating relationship was evident in the empirical material.

Theoretical model development

Finally, I use the analytic technique of *explanation-building* (Eisenhardt 1989; Yin 2009) to iteratively develop an explanation for how the patterns of engagement with management control systems relate to the unexplained variation in participants’ causal mental models. This process involved using the general findings from the integration of the organisation- and individual-level units of analysis described in the previous section, and comparing these findings to each theoretical replication, or “mini-case”, in succession. This comparison allowed me to modify the emerging theoretical arguments to accommodate the unique conditions present in each case. The theoretical selection of my “mini-cases” was crucial to this process; each case had slightly different theoretically-relevant features that could be used to tease out additional conditions and constraints

relating to the relationship between the use of management control systems and the development of managers' causal mental models. The result of this iterative, explanation-building process is the development of a refined theoretical model. I then compared the insights developed from my refined theoretical model to the theoretical arguments that sit within the four bodies of existing literature that frame or 'enfold' my study (Eisenhardt 1989).

First, I attempted to reconcile the predictions of the theoretical model to the findings from the literature that considers the cognitive effects of strategic performance measurement in order to evaluate and improve the external validity of the theoretical explanations. Adding the construct of causal mental models as a mediating variable between the information provided by strategic performance measurement systems and the characteristics of individual managers' decision making allowed for the development of more detailed explanations of how, why, and under what circumstances these systems are likely to systematically affect the quality of judgement and decision making outcomes at the operational level.

Second, I considered the cognitive effects of budget participation by identifying the operating budget as the specific management control system of interest within the model. In this more specific model, the construct of system-facilitated interaction can be more precisely identified as the participation of subordinate managers in the budgeting process. In this case, the relevant system components can be interpreted as the targets embedded within the budget, and the relevant information content will relate to the performance information and variances contained within budget reports. As a primarily results-control oriented management control system, several of the theoretical arguments associated with the refined theoretical model become relevant to understanding the relationships between the design and use of an operating budget and the development of managers' causal mental models.

Finally, by incorporating the development of managers' causal mental models into Simons' levers of control framework, it is possible to generate more specific theoretical explanations of how, why, and under what conditions the interactive use of control systems would lead to increased effectiveness of the decisions, actions, and experimentation of operational managers, and ultimately into new, emergent strategies. Managers' mental models of the causal relationships within their operating environment are a crucial input to their judgement and decision making; to the extent that senior managers' use of management control systems can influence the development

of operational managers' causal mental models, senior managers' are able to influence otherwise autonomous strategic behaviour at the operating level of the organisation. Furthermore, by decomposing the causal mental model construct into its three components, the specific effects of the mechanisms of signalling and learning proposed by Simons (1995b) can be identified and used to advance theoretical arguments about the expected effects of interactive control.

3.5. Conclusion

In this chapter I explained the research method developed and used in this thesis. I have adopted a qualitative case study approach within which I use theoretical replication and specific cognitive task analysis techniques to enable systematic cross-case analysis of the variation in managers' causal mental models and to relate this to patterns of management control systems use. In this chapter, I first discussed these four interrelated choices, and then explained how I implemented my approach through the selection of ResCare as a case organisation and the identification of 11 individual managers as the embedded "mini-cases", or study participants. I also provided an overview of the main types and sources of data used to collect evidence of these two units of analysis. Data collection procedures were explained in detail in Section 3.4. Specifically, I explained the nature, purpose and technique of the cognitive mapping exercise conducted with each study participant; provided an overview of the semi-structured interview format and questions; outlined the process and products of my field observation activities; and indicated the types and extent of archival documentation collected for the study. Finally, I described my strategies for organising and reducing the empirical data in the first instance, and the four stages of my analysis which proceeded from the production of individual participant-level and organisation-level case descriptions, through to the integration of the levels of analysis and use of explanation-building to abstract out of the empirical setting to produce a refined theoretical model and set of theoretical arguments.

Chapter 4: Management Control Systems

4.1. Introduction

The aim of this chapter is to present my organisational-level empirical data relating to ResCare³⁰ and the design and use of its management control systems. In Section 4.2, I provide an overview of ResCare and its position within the Australian aged care industry. I outline ResCare's strategy and business model, management structure, and other salient features of its operations that form the context of this study. In Section 4.3, I describe the three primary management control systems observed during the case study. First, I discuss the design and development of ResCare's annual operating budget and explain how this is used by each of the hierarchical levels of management. I then provide a similar overview of ResCare's KPI monitoring and reporting tool, known as Scoreboard. Finally, I describe the development and use of ResCare's library of policies and procedures, which form the basis of efforts to standardise operations across the decentralised business units.

4.2. Background and Overview

ResCare is a medium-sized aged care service provider based in New South Wales, Australia. Its core business is the provision of residential aged care, providing care for approximately 880 older people across nine different facilities. ResCare offers care on both a permanent and respite basis, with several of its facilities also operating specific secure wings for the care of residents affected by dementia. In addition to residential care, ResCare also operates day care facilities for older people with care needs, as well as a home care service which provides older people with the assistance they require in order to remain living in their own homes.

Established as a family business operating a single residential care facility in 1966, ResCare is currently owned by a single shareholder who occupies the position of Director. In 2015, ResCare's total revenues exceeded \$90 million and it employed almost 1000 staff across the group. ResCare's financial performance compares favourably to the largest private providers in the industry

³⁰ ResCare is a pseudonym.

(Gresham Investment House 2015), and it is widely acknowledged as an industry leader with regard to service quality and reputation (ResCare 2013/2014 Annual Report; see Table 5).

4.2.1. Aged care industry

The aged care industry in Australia is experiencing a period of sustained growth owing to an ageing population and substantial disruption caused by the ongoing rollout of federal government reforms (RSM Bird Cameron 2015). The industry consists of a mix of commercial and not-for profit providers, with a combined total annual revenue of \$17 billion and approximately \$1 billion industry annual profit as at June 2015 (RSM Bird Cameron 2015). The projected annual growth rate for the next five years is 5.3%, with total industry revenues predicted to reach \$22 billion by 2019–2020 (RSM Bird Cameron 2015).

In 2012, the Australian Government announced a package of major reforms to the aged care system, known as ‘Living Longer Living Better’ (LLLBB). The stated goal of this reform program is to improve the sustainability of the aged care system in the face of rapidly increasing demand driven by an ageing population (Australian Government Department of Health 2016). The reform also seeks to ensure that consumers have choice and flexibility in relation to the care that they receive, and that services are accessible and affordable for all Australians.

The implementation of the reforms package is being undertaken progressively over a ten-year period, from 2012 through to 2022. Some of the reform initiatives which have already been rolled out include adjustments to pricing and payment options for consumers; additional funding for construction of new facilities and refurbishment of existing facilities; updating of regulations relating to the provision of specified and additional care and services; and increased transparency to consumers. A core component of the reform is the notion of ‘consumer-directed care’, which allows consumers to work with providers to tailor their care and services to their own unique needs, giving them greater say in what services are delivered and how. As of 2015, consumer-directed care has been implemented in the home-care sector, with a view to implement it in the wider residential aged care in the near future.

4.2.2. ResCare strategy and business model

The high government involvement in the residential aged care sector is reflected in ResCare's income stream. A large proportion of ResCare's total income (almost 70%) is derived from various government subsidies (ResCare 2015-2017 Strategic Plan). Foremost of these government subsidies is the Aged Care Funding Instrument (ACFI) subsidy, which is a daily rate that is determined by each individual resident's assessed care needs.³¹ For concessional³² residents, ResCare also receives an accommodation supplement, which provides additional funds for the maintenance and improvement of the physical infrastructure of the facilities. The remaining proportion of ResCare's income comprises consumer contributions from non-concessional residents. These consumer contributions consist of two components: a basic daily care fee and an accommodation contribution determined by means testing of a prospective resident's income and assets.

ResCare explicitly targets the 'high-care concessional market' when accepting new residents into its facilities on a permanent basis. Focusing on this target market reflects both its orientation as a provider of service to vulnerable segments of the community, as well as a nuanced strategy for managing the complexity of the revenue flows associated with different types of residents, who vary in their financial means and care needs. As a result, ResCare is extremely attentive to its 'client mix', ensuring that it does not vary outside certain target parameters. As an example, in order to remain eligible for the highest rate of the government subsidised accommodation supplement, each ResCare facility must ensure that they maintain a minimum proportion (40%) of concessional, rather than non-concessional, residents.

At a corporate level, ResCare's current direction is driven by growth as it seeks to become a significant competitor in the industry. This growth is pursued through two parallel programs. First, growth is achieved through construction and acquisition of new residential facilities. For example, in 2016, construction began on a new flagship facility in north-western Sydney; ResCare is also considering developing or acquiring several additional facilities to target new geographic markets.

³¹ Residents that are assessed as having high-care needs (e.g. requiring assistance with daily activities such as feeding, dressing, cleaning and mobility) attract a higher daily subsidy than those with lower assessed care needs. The assessment is conducted when a resident first arrives at a facility and then reviewed periodically by representatives from ACFI, who refer to documentation kept by ResCare about the care needs of each resident.

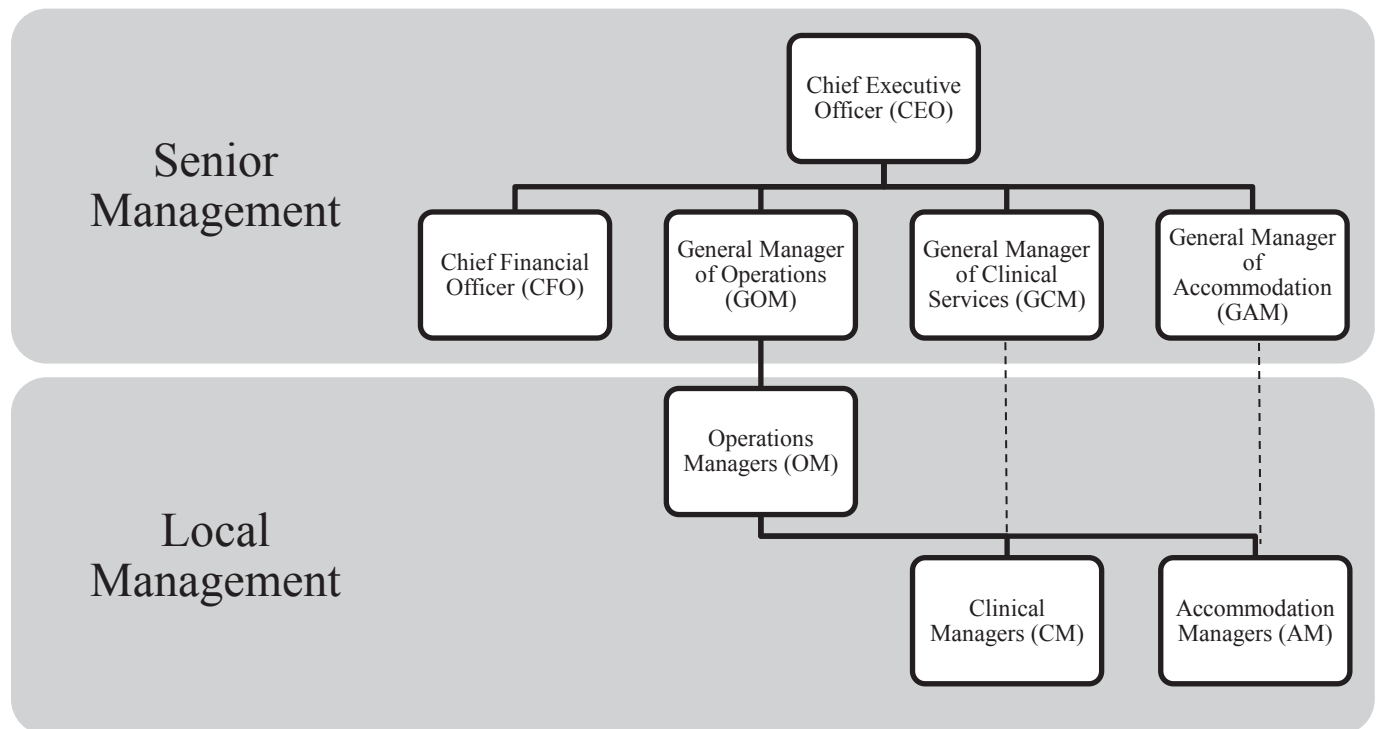
³² 'Concessional' residents are fully supported financially by the Australian Government, having been assessed as having insufficient personal financial resources to contribute to their care directly.

Second, ResCare has continued its focus on vertical integration into the wider aged care system. For example, ResCare recently developed a new business unit providing in-home services to aged clients, as well as day care facilities for clients being cared for in private homes. ResCare also offers short-term residential respite care for such clients, which in many cases operates as a pathway into permanent residential care.

4.2.3. Management structure

ResCare’s management structure can be described as a functional matrix with hierarchical reporting structures laid across standardised functional responsibilities.

Figure 6: Simplified depiction of ResCare’s two-tiered management structure



Hierarchical management structure

The hierarchical management structure can be roughly separated into two tiers: corporate (‘senior’) management, who typically reside in ResCare’s corporate headquarters³³; and business unit

³³ There is also a team of administrative support staff located at the corporate headquarters.

(‘local’) management, which consists of nine decentralised, geographically-separated residential aged care facilities.³⁴

The senior management team at ResCare consists of a Chief Executive Officer (CEO) and then a senior management team that report directly to the CEO. The CEO is ultimately accountable for group performance and reports to a Board Advisory Committee, consisting of the single shareholder Director and three external Advisors. The senior management team includes the Chief Financial Officer (CFO), who is supported by a small finance team, and three General Managers who are responsible for each of the three areas of functional responsibilities across the group³⁵. The General Manager of Operations (GOM) provides strategic leadership and coordinates the operations across the different business units, and directly supervises all of the local operations managers. The General Manager of Clinical Services (GCM) is responsible for the delivery of care and clinical-related services across the group. Finally, the General Manager of Accommodation (GAM) is responsible for supporting local accommodation managers, managing the ResCare’s physical infrastructure (including its capital expenditure, property development, and acquisition strategies), as well as delivery of non-clinical services (e.g. maintenance, catering, laundry).

At a local level, each facility is administered by a standardised local management team, whose functional responsibilities mirror that of the senior management team. There is a local Operations Manager (OM), who is responsible for the performance of the centre as a whole. Within ResCare’s decentralised corporate structure the OMs have considerable discretion regarding key operational decisions such as staffing, programs, community outreach, and resident admission. Consequently they are held responsible for ensuring that the centre is fully compliant with all of the requirements under the *Aged Care Act 1997* (Cwth). Each centre also has a local Clinical Manager (CM), who oversees the provision of care and related services by a team of staff, including registered nurses,

³⁴ ResCare also has a tenth, smaller, business unit relating to its Home Care business; however, this aspect of ResCare’s operations fell outside the scope of the project, which focused instead on the operations and management of the residential aged care business units. All references to local or business unit management will refer to the nine residential aged care units.

³⁵ During the latter phases of the period of observation for this study, the decision was taken to duplicate the role of General Manager of Operations (GOM) in order to reduce the workload of the GOM to a more manageable size, and allow for more personal contact and coaching of local operations managers. Reporting relationships and accountability for performance was divided geographically, with oversight of five centres remaining the responsibility of the existing GOM, and four facilities assigned to a newly promoted second GOM. The second GOM had previously worked for ResCare as local operations manager, and trained as a Deputy General Manager over the preceding six months. For the sake of parsimony in the description and analysis, the GOM will be presented as a single role.

assistants-in-nursing, physiotherapy aides, dietitians, wound management specialists, and other providers. The final member of the local management team is the Accommodation Manager (AM), who is responsible for the delivery of hospitality, leisure and lifestyle services to residents. Specifically, the AM is responsible for activities such as the maintenance of the centre’s physical environment, provision of catering services, facilitation of recreational activities, management of equipment and other assets, and assisting with resident admissions.

Organisational forums and meetings

The functional matrix of ResCare’s management structure is operationalised through a schedule of regular ‘forum’ meetings. Some forums facilitate meetings between managers at the same hierarchical level; however, most forums are organised around common functional groups, such as accommodation or clinical services. These typically comprise of the relevant managers and employees from different organisational levels. There are eight primary forums, each with their own corporate-initiated meeting dates and terms of reference. These are listed in Table 8.

Table 8: Overview of ResCare management forums

Forum	Members/attendees	Meeting frequency
Senior Management Team	CEO, CFO, GOM, GCM, GAM, Head of Administration, Marketing Manager	Weekly
Combined Management	Senior management team, local management teams, senior administrative staff, representatives from other forum groups	Monthly
Local Management Team (for each centre)	OM, AM, CM	Monthly (or ad-hoc, as required)
Operations Managers	All OMs, GOM, Finance Team representatives	Monthly
Clinical Managers	All CMs, GCM, representatives from Registered Nurses forum	Bi-monthly
Accommodation Managers	All AMs, GAM, representative from cleaning and maintenance subcontractor	Monthly
Administration Team	All administration assistants, Head of Administration, representatives from Finance Team	Bi-monthly
Work Health and Safety	CEO, GOM, GAM, OMs, a WHS representative from each centre.	Bi-monthly

Other smaller forums are also operated within ResCare, such as forums for finance, marketing, registered nurses, catering, leisure and lifestyle, physio aides, and others. These are scheduled less

formally, and typically operate at the local level rather than being organised and facilitated by corporate staff. An all-staff forum is also held annually, with representatives from all of the above mentioned forums invited to participate in a conference-style planning day that is usually held at an off-site location.

The chair of each forum, which is typically the most senior team member, is also expected to provide support to forum members outside of the scheduled meetings. This supports the underlying philosophy of the functional matrix structure that “everyone had two hands to hold” (CEO): that of their direct hierarchical supervisor, and that of the head of their functional forum. This is intended to prevent the development of problematic dyad-relationships between supervisors and staff, to reduce the risk of staff becoming alienated from the organisation, to provide alternative channels for information flows, and to assist with the resolution of conflict. Specialised support is also essential where direct supervisors do not share a functional background, such as operations managers who are not clinically trained yet supervise the local clinical manager. In this case, local clinical managers can seek professional guidance from their forum and forum chair (the General Care Manager) while looking to their local operations manager for direction with respect to local management issues.

4.3. Management Control Systems

Management control at ResCare involves a range of formal and informal control mechanisms, which work together to ensure the maintenance of compliance with regulatory obligations and the achievement of ResCare’s performance-related goals and objectives. Of the formal control systems observed at ResCare, three systems appeared to be used particularly actively by managers at each hierarchical level and as such were considered most likely to affect or be affected by managers’ causal mental models. These three primary management control systems are: the annual operating budget; the KPI dashboard known as *Scoreboard*³⁶; and an extensive library of formal policies and procedures. However, a number of additional formal management control systems in operation at ResCare should be acknowledged. These included a 3-year strategic plan (updated on a rolling basis), corporate project Gantt charts, a strategy map (underpinning the Scoreboard system, see Section 4.3.2), and compensation systems. Further to these formal systems, ResCare also

³⁶ This is a pseudonym for the proprietary software used for KPI tracking and reporting at ResCare.

demonstrated significant reliance on informal controls such as a strong organisational culture, norms and values; secure-base leadership; and the use of team-based capability management systems.

In order to limit the scope of the study, I elected to focus data collection and analysis on the three primary management control systems used most actively within the organisation. However, I also noted any relevant points of intersection with other management control systems (e.g. the relationship between ResCare's strategy map and the Scoreboard system). In the following sections I describe the processes through which each of the three primary management control systems is developed and then used at each hierarchical management level within ResCare.

4.3.1. Annual budget

ResCare relies on a consolidated annual budget as the main mechanism to ensure financial governance. It is prepared annually by the internal finance team, with input from senior and local management groups. After the annual budget has been finalised and communicated, the budget is used through the monthly variance reporting both within and between levels of management. A sample budget report template is presented in Appendix C.

Budget preparation and communication

The budget preparation process begins each year around April, with an initial set of budget assumptions produced by the CFO, the Financial Controller, and the internal finance team. Typically, these assumptions are then discussed with the relevant members of the senior leadership team; however, this depends on the time constraints of the senior leadership team at the time. For example, in 2014, during a more relaxed period of ResCare's business cycle, the budget assumptions document was prosecuted in detail by the senior leadership team in a single, face-to-face session, that resulted in a document that the entire team were happy and comfortable with. This process allowed every item to be debated at length in order to produce what was essentially a zero-based budget. In contrast, in 2015, a challenging economic environment meant that members of the leadership team were constrained in terms of the time they could invest in the budgeting process. As such the development of the budget was largely incremental, with adjustments for major regulatory and taxation changes and previously approved projects.

We had become so busy putting out spot fires that we missed – we stopped looking at – the big picture in that budget preparation piece ... It's not an excuse. It was poorly constructed by us. We didn't focus. We let it just go through. We did try to make – we made some realistic adjustments but we didn't actually review each item properly like we did [in 2014]. (GOM)

There is limited opportunity for local management to participate in the budget preparation process. OMs are occasionally approached to assist with forecasting key revenue-driving variables such as occupancy rates and per-resident funding levels, and will typically also have the opportunity, along with the accommodation managers, to request capital allocations for equipment purchases and property maintenance. These requests are filtered through the GAM, who is tasked with negotiating the capital budget with the finance team.

The type of information that we need from them is – it's not many variables that we need from them – but we need an estimate of occupancy. Occupancy is a key driver because that drives your revenue curve. ... Behind that we then also needed, or just to make sure that we had – we essentially built up a budget working on dollars per resident bed day. We just needed to make sure we had that right – we did an integrity check of the per dollar resident bed day numbers, just to make sure that they were reasonable. (CFO)

Once the budget assumptions have been finalised and the annual budget prepared, these documents are presented to the governing Board Advisory Committee for approval. The committee then review and discuss the budget in light of their expectations for the business and may request subsequent changes.

Once approved by the Board Advisory Committee, the budget assumptions are communicated to the rest of the organisation, via a presentation to the Combined Management Forum, typically around July. During the presentation of the budget assumptions that was observed during the study, the CFO and Financial Controller explained any major changes from the previous iteration of the budget, and pointed out any particularly significant or potentially challenging targets. However, for the CEO this discussion also represents an opportunity to interact and engage with local management teams about financial issues. During the presentation, the CEO was explicit about her expectation that the discussion would help the operations team to “understand the commercial aspects” of their care-oriented business, to “change the psychology” regarding resource

availability and financial performance expectations, and to encourage an “entrepreneurial spirit” within the team as they enter a new budget period (CEO).

I also observed that these discussions of the budget assumptions could lead directly in to conversations about how budget targets might be rendered achievable. For example, when the CEO drew the group’s attention to ResCare’s reliance on the volatile ACFI revenue stream, an animated discussion followed about the need for ensuring accurate and complete documentation of care activities within the centres in order to qualify for the higher rate given to high-care need residents, where appropriate. Significantly, both senior and local managers participated in this conversation, but in slightly different ways: senior managers tended to make more suggestions about how to approach the problem, with local management reflecting on how the suggested strategies might unfold operationally.

For example, one recommendation for improving the ratio of high-care residents in centres was that local managers take care to “pre-screen” potential new residents to ensure that only those whose care needs are likely to be assessed as high are permanently admitted to the centre. While the local managers agreed that this was a reasonable approach, one operations manager pointed out that this strategy often exacerbated the tension between managing occupancy (that is, the percentage of a facility’s places that are filled) and managing the average ACFI rate. Discussion among the group led to the emergence of two strategies for managing this tension. First, as suggested by the CEO, local managers could use temporary respite places as a way to make use of empty beds while also pre-screening potential new residents. While local managers had some hesitation about the possibility of having to turn residents away at the end of their respite stay, this issue was resolved by ensuring that respite stay durations were well defined and consistently communicated by all staff to residents and their relatives. A strategy of second resort was to simply keep the bed empty for up to 16 days while waiting for an appropriate resident application, before it became financially unfeasible to continue to do so.

Through this process, strategies for achieving the revenue targets were collaboratively refined and appeared to gain some level of acceptance by the local managers.

Budget use

The budget is used throughout the year, at different organisational levels, through monthly variance reporting and evaluation. Each month the finance team produces a pack of financial reports, including an aggregate report for the group as a whole, and reports for each of the individual centres. The pack is then distributed to the senior leadership team and to local management of each centre, and is included in the information produced for review by the Board Advisory Committee. These various groups appear to interact with the budget variance report in different ways.

Board advisory level

The Board Advisory Committee relies heavily on the budget reports as their primary source of information on the current status of the business, and their use of this system dominates their use of any other. As such, discussion of the budget report features heavily on the agenda at monthly Board Advisory Committee meetings. During these discussions, board advisors ask questions of the CEO and CFO in order to clarify how particular items have been constructed, and to point out items that are of particular importance or concern. In many cases, advisors' ideas about how to address these areas of concern are tempered by the executives, who explain the operational implications of each decision (such as cost cutting in non-core activities, or aggressive approaches to reducing liabilities). For example, a concern raised about high payments for third-party laundry services was allayed by the CEO, who provided a detailed explanation of the alternative business models that had already been considered by the senior leadership team and the trade-offs in efficiency that had been identified. In such cases, board advisors are generally satisfied having expressed their concerns and received assurance that the issue and its significance is not lost on senior management.

Senior management level

The senior management team appear to view the budget as more of a plan than a mandate; they are explicit about their perceived role as “counter-weighting” the Board Advisory Committee’s emphasis on aggregate, predominantly financial measures of performance, and appeared aware of the need to ensure that resources are used efficiently and that the business is able to continue delivering an appropriate return on the sole owner’s capital (CEO). In this sense, it appears the senior management team uses the budget as a somewhat aspirational set of operating constraints,

which triggers managerial attention when these constraints appear to be at risk of breach. One example of this ‘triggering’ was the deteriorating financial performance of one particular facility over the course of the study. This deterioration was made visible and quantifiable in the budget reports, and discussion of recovery strategies for that particular facility began to occupy an increasingly large proportion of senior management meetings until such time as the CEO was satisfied that the situation was back under control.

As such, discussions about the budget report at the senior management meeting typically occur in reference to one of four issues. First, the team as a whole attempts to pre-empt any concerns of the Board Advisory Committee, and seeks to develop satisfactory explanations for negative variances or possible corrective strategies. Second, the team discusses the implications of the budget report for strategies and projects that are already in place. For example, an ongoing project to improve the declining ACFI revenue stream was discussed in light of new positive variances at several centres; stabilisation of this trend was interpreted as an early sign of the project’s effectiveness. In other cases, negative variances are a trigger to ‘check in’ on the status of projects that have been set up to address a particular pattern. An example of this trigger was an unexpected increase in the use of external agency labour in one centre, despite management of this expense having been the focus of both senior and local managerial attention over the preceding several months. Third, positive variances not related to current strategies or active projects are also prosecuted, in order to better understand the drivers of unexpected success (such as a sustained period of full occupancy at one particular facility). Finally, the team decide upon which items or strategies local managers should be focusing their attention (at different times this was external agency usage, occupancy, ACFI, or other priorities), and also how this should be best communicated. Often this occurs via the GOM to local operations managers, either formally or informally through one-on-one and team meetings, or through the combined management forum.

Combined management level

In combined management meetings, the budget report is used to provide a high-level summary of the group’s performance, and to highlight those items or strategies that senior management have determined to be a priority. These priorities are then discussed in detail with reference to the relevant budget targets and performance data. It is unusual for individual centres to be singled out for having not met performance expectations during these discussions, and when this did come up

it was usually at the initiation of the local operations manager about their own centre's performance. The tone of discussions observed was consistently collegial, with senior management attempting to provide support and guidance, rather than attribute blame or issue directives to the local management teams.

In the rare case that senior management wished to issue a more explicit directive to an operations manager, this is typically done in one-on-one meetings. This strategy aims to ensure that the local manager perceives that they have ownership over the new strategy or initiative. In their communication with local managers, senior management is careful not to over-emphasise or appear to prioritise the 'financials' over operational matters, such as facility occupancy, staff coverage and rostering efficiency, and achievement against the centre's business plan. Thus, monthly budget reports are usually only discussed once these more pertinent operational issues have been covered. Financial reports are presented to local operations managers as tools for their own use, rather than yardsticks against which they will be measured.

The operations managers have monthly data that comes out that shows how well they're doing or not. So how they're managing their wages and their waste or their costs, their income versus their expenditure. (GAM)

We're very budget focused in terms of, like in my role all the OMs report to me. So every meeting with them is the first thing we look at is occupancy, their business plan, and then their financials. I never do financials first, ever. Never do financials first. (GOM)

Also, when financial report features or formatting are changed, the implications are carefully explained by a senior member of the finance team to ensure that local managers are equipped to understand and make use of the information. For example, the inclusion of several new schedules to the monthly budget report prompted an extensive presentation and discussion of the changes by the Financial Controller to the Operations Manager Forum. Operations Managers engaged with the new reports enthusiastically and expressed their gratitude to the Financial Controller for having taken the time to go through and explain the changes.

Local management level

At the centre level, budget reports are reviewed by the local management team as a standard item on the agenda for local management team meetings. Although the OM is ultimately accountable

for the centre's financial performance, both the CM and AM are responsible for certain budget items. For example, a significant component of the expense budget relates to wages, which is driven by rostering and management of absenteeism. Although staffing management is the domain of OM, it is common for the CM to play an active role in this task.

So I suppose it probably works easier for everyone if I'm doing the rosters then I might as well do the time care reports as well. So the time care reports basically involve checking people scanning on and off duty. Just making the necessary adjustments. So if for some reason they swap their shift or they're off sick or anything like that, so that's the time care report, but it all then transcends to our payroll office who pay us according to the time care report. That's why it's important for it to be done. (CM North)

Likewise, the management of the capital budget falls largely on the AM, who is expected to ensure that capital funds that were requested in the budget preparation period are spent in the month allocated.

So I have a monthly budget that I have to spend on these things, furniture or something. It's because of cash flow issues it's planned on a monthly basis. (AM South)

It appears there is variation in the degree to which local managers engage with the budget. Some local managers appear prepared to engage with the budget report as a tool for the management of their own centres, while others view the reports with greater suspicion. The OM North in particular expressed the sentiment that budget-related decisions have already been made by the time they are communicated at a combined management meeting, and that they do not pay the budget much attention in the management of their centres. Instead, that OM explained their choice to focus exclusively on service delivery with the view that getting operations right will lead to financial success, while failing at service delivery will almost guarantee poor financial outcomes.

Furthermore, some local managers appear aware of the principles on which out-of-budget funds are granted: as long as the local manager can convince the GAM and/or CEO that the equipment is required for the delivery of appropriate care and services, then it is purchased irrespective of the budget position.

4.3.2. Scoreboard

In addition to the budget reporting process, ResCare also measures and monitors performance using KPIs embedded in a dashboard – *Scoreboard*. The set of KPIs include financial, clinical and operational measures and, somewhat unusually, are changed relatively frequently. The performance data reported in Scorecard is updated regularly³⁷, and are collated into a monthly variance report that is distributed to each centre along with the financial budget report. A sample monthly variance report (for a single KPI) is presented in Appendix D.

Scoreboard development

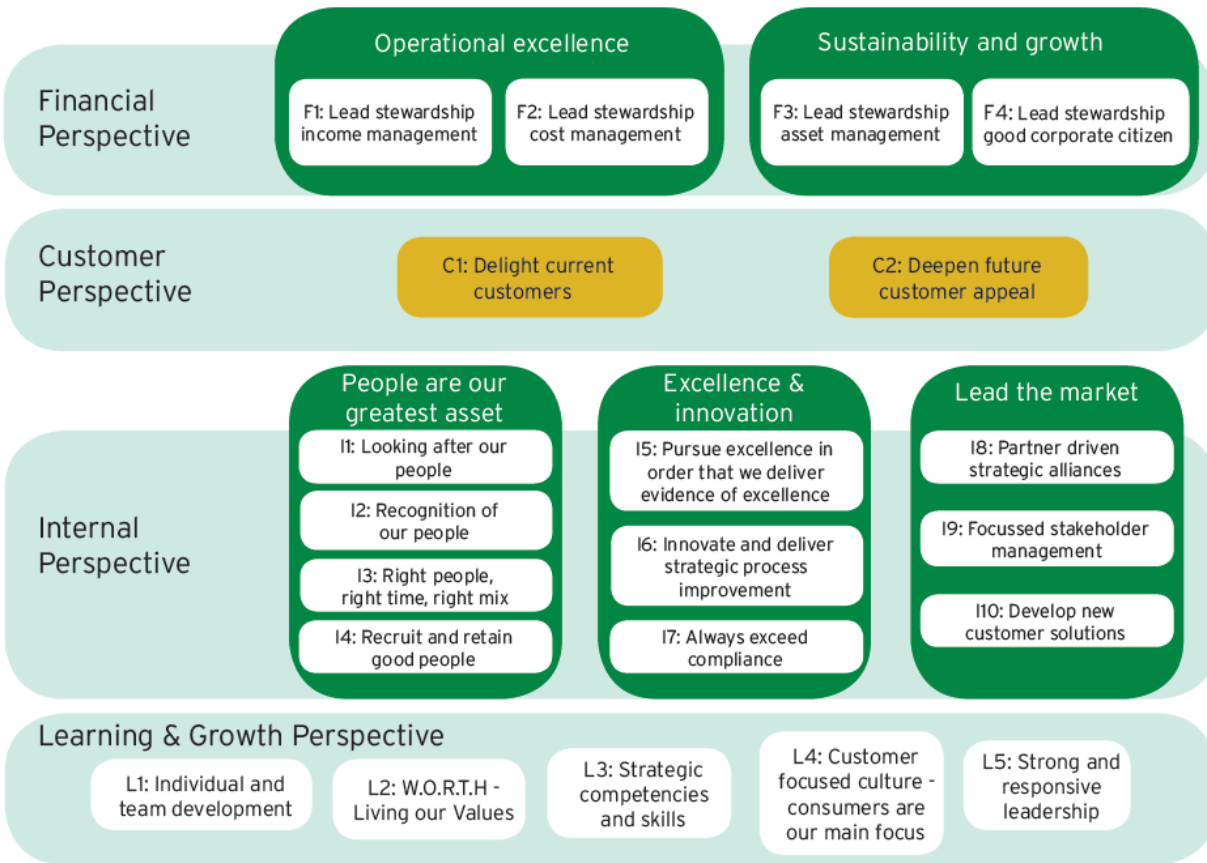
The web-based Scorecard system was introduced to ResCare in 2013. It replaced a previous system in which local operating managers received a monthly KPI variance report from the finance team and would then each produce their own report in response, providing commentary to the month's performance. The Scoreboard system was set up to display essentially the same measures that were previously captured by the variance report, but in a more user-friendly and interactive platform. All measures within the Scoreboard system are associated with targets, and are displayed as green when actual performance is currently meeting or exceeding the target and red when actual performance is not currently meeting the target. The measures can also show historical averages for individual centres or for the group as a whole, as well as trend data dating back to 2013.

The KPIs embedded in Scoreboard align to ResCare's strategy map (Figure 7), which is published in their annual report and displayed visibly throughout the organisation (such as on mousepads, leaflets, and desktop backgrounds).³⁸ The KPIs fall into four categories: financial, customer, internal operations, and learning and growth. While the underlying strategy map shows high-level causal relationships between objectives within each of these categories, the Scorecard system does not specify the relationships between lead and lag indicators – though both lead and lag indicators are captured by the system.

³⁷ Individual measures are updated on a weekly, fortnightly or monthly basis.

³⁸ ResCare's strategy map is also used as a framework for the prioritisation and classification of strategic projects, and allocation of capital resources.

Figure 7: ResCare's Strategy Map



Accountability for performance against each of the measures in Scoreboard is assigned to specific managers throughout the organisation. Most consolidated financial metrics are the responsibility of the CEO, and are visible only to the board and senior management team. Accountability for consolidated operational metrics is shared among members of the senior management team, while accountability for centre-level operational metrics rests within the local management team of each centre. Ultimately, however, centre level performance is the responsibility of the local operations manager, while group performance is the responsibility of the CEO.

The selection of KPIs included in the Scoreboard system is quite dynamic – changing to reflect senior management’s shifting strategic priorities. New measures are added when strategic priorities change, while old measures are removed once senior management feel that these variables are now under control. By way of illustration, in 2014/2015 a detailed cost analysis exercise prepared by the finance team revealed that laundry costs varied significantly between

centres, and increasing efficiencies in laundry processes became a strategic priority for the senior management team. To focus local management attention on this issue, a measure of laundry costs (\$ per resident per day) was added to the Scoreboard system; operations managers were also required to provide commentary that explicated the initiatives that they were trialling in order to meet efficiency targets. After twelve months of emphasising this particular measure, senior management became satisfied that laundry costs were being managed effectively and consistently across the nine centres, and removed it from the Scoreboard system in favour of measures relating to a new strategic priority – the management of employment agency use.

While the strategic priorities captured by Scoreboard are largely determined by senior management, there is usually opportunity for local management teams to have some input into how those measures are constructed and reported. Potential new measures are proposed by senior managers at the combined management forum, where local management teams discuss their usefulness and predict any unwanted implications of incorporating the measures into the accountability structure. This type of debate appears to vary in intensity depending on the source and rationale of the suggested measure. When a measure is suggested by the CEO it is typically accepted by the group without protest. However, when a suggestion originates from the finance team, a more robust debate is likely to ensue – regardless of the suitability and potential information value of the measure. For example, one finance-led suggestion to incorporate a measure of resident turnover was met with dismay and outright rejection by local management, such that there was no substantive discussion of this measure and the proposal was dropped.

A recent innovation to increase the usefulness of the Scoreboard system was to introduce a new dashboard display for “hot” measures. This display would be even more dynamic than the regular KPI dashboard, as it would include only those measures considered to be current strategic priorities and would track performance over a rolling 90-day period. These measures would be prioritised and updated as close to month end as possible, to ensure that local managers had the information they needed to focus on and effectively manage those operational activities. Once developed, the new “90-day tab” was presented to local managers who were invited to provide feedback and suggestions for how best it could be used. While there was some debate about what specifically would be included in this set of measures, local managers expressed great enthusiasm for the new addition when it was presented to them in an Operations Management meeting.

Scoreboard use

Similar to the budget, the use of the Scoreboard system appeared to vary by hierarchical level. While the underlying data in the web-based system is updated at regular intervals and available to managers immediately, summary reports are provided by the finance team to both senior and local management on a monthly basis (usually at the same time as the monthly budget report is distributed).

Board advisory level

The Board Advisory Committee had access to Scoreboard data but did not engage with the system at all. Instead, board advisors based their evaluation primarily on the budget and associated monthly financial reports, and relied on the detailed reports of senior management team members, as well as direct enquiry of the CEO during board meetings, to ascertain current operational performance.

Senior management level

The senior management team frequently reviewed and discussed Scoreboard performance information in their regular weekly meetings. The review of the KPIs appeared to be part of a discipline of constantly revisiting and problematising existing strategies and initiatives, with the phrase “you can’t manage what you can’t measure” being a common refrain. The data from Scoreboard is interpreted in conjunction with the underlying strategy map in order to identify “leverage points” that connect operational and capacity-building activities through to customer and shareholder outcomes (CEO).

So if you look at the strategy map, I’m always looking at the top line which is shareholder perspective. I’m thinking about, well, which is the leverage point? ... I always look to learning and growth. So if you know that ultimately you’re going to aim for growing revenue and profit, there will always be – you have to be on the journey to understand the drivers. ... If I’m not investing in that knowledge base, then how can I get them to connect with the internal processes then understand the connect to the customer value proposition and then we’ll get to those financial returns. (CEO)

It appears that that use of the Scoreboard by the senior management team varied depending on the level of difficulty of the targets. In the past, when targets were relatively relaxed, senior management did not pay as much attention to the Scoreboard system or results, referring to the dashboard as “a sea of green” (referring to their observation that almost all KPIs were in the ‘above target’ range). In that context, there was little urgency experienced with regard to the management of non-financial metrics.

On the other hand, the sudden change from relaxed to challenging targets with the start of the new budget year, as prompted by the shifting external environment, coincided with increased priority given to monitoring and managing the suite of KPIs incorporated in the Scoreboard. In a meeting early in the new financial year, the senior management team also identified a need to “reinvigorate” engagement with Scorecard at the local management level, and resolved to make this part of a “strategic conversation” with operations managers (CEO).

As such, in the current budget cycle, senior management – especially the general manager of operations – constantly monitors key operational measures across the group. When an unfavourable result or trend is identified relating to a particular centre (or group of centres), this is followed up almost immediately with on-on-one discussions with the responsible local manager. Rather than being antagonistic, the purpose of these conversations is generally to find out more about the context in which that result or trend has emerged, and to offer corporate-level support where relevant.

I think there's always open lines of communication. The phone is always ringing. You probably see I'm always on the phone. That's the same with occupancy. As soon as we notice a dip in occupancy, we'd be on the phone, is anything happening? What's wrong? What's going on? Anything we can do to help? (GOM)

These conversations also ensure that the local manager's attention is focused on the problematic result and any potential strategies or interventions to resolve it. When unfavourable results or trends relate to the group as a whole, these are raised for discussion in combined management meetings.

Yeah, [we get directives] through our meetings, through our management team meeting or through our OM meeting, like occupancy could be an issue across the group. So they'll get us to report on

why we think ... why is it, in our centres, that we're struggling with our occupancy. So then they get the big picture across everywhere and we're generally pretty much the same [in the South].
(OM South)

Local management level

Within the local management team it is primarily the operations managers, and to a lesser extent the clinical managers, who use the Scoreboard system. Engagement with the system by accommodation managers varies dramatically, with some reporting regularly against the measures for which they are accountable, and others not using the system at all. Nonetheless, across the group, local managers appear to engage with the Scoreboard system in several ways.

First, it is often the local management team who actually collect and report the data that are eventually fed into the Scoreboard system. For example, a significant amount of operational and clinical data is collected by the local clinical manager. This data is collated, cleaned and analysed by a third-party quality-management consultancy, who provide monthly reports and benchmarking information back to ResCare management. The resulting metrics are then fed into the Scoreboard system, and populate most of the operational and clinical KPIs in the dashboard.

Second, local managers use the system for the purposes of their own management. Local managers are able to view their facility's performance against the suite of operational, clinical and financial measures. Current performance is displayed relative to the target for each KPI, and can be overlaid with the trend data for that measure across the period that the information has been collected. Current performance can also be viewed relative to the rolling average for the centre, as well as current and average performance for any of the other eight centres in the group. Managers are expected to monitor the KPIs for which they are accountable and conduct their own investigations in order to better understand the causes of variation in performance. For example, an unusually high number of skin tears in a month would be followed up by the manager responsible for this clinical indicator (the local clinical manager), who would consider the effects of rostering changes, staff education and training, characteristics of residents, and any other potential contributing factors.

Third, local managers are held accountable for performance against specific KPIs by the senior management team, and as such are expected to provide commentary relating to any significant negative or positive variances. Initially, this commentary was visible only to the reporting manager

and the senior management team. However, a glitch associated with a software update resulted in all commentary being visible to all managers, who would have to “scroll through” all of the comments to make sense of the within-system conversation between themselves and the general manager of operations. While almost all managers spoke about the glitch as being an inconvenience, they also acknowledged that seeing other managers’ commentary had been helpful at times.

We might see that someone’s doing really well in something. That’s the beauty of it. We could always check everybody else’s before, before the thread thing started. We could always see everyone. But you can actually talk to people as well if you want to. But if you see somebody is doing something really well and you’re struggling with it, you can pick up the phone and say, hey, what are you doing to get such a good result? Can you help me? (OM South)

Like senior managers, local managers expressed a preference for the new Scoreboard system over the old manual reporting system. Some managers remarked on the ease of use and helpful visualisation of the current data, as well as trends and targets across all of the ResCare centres. The ability to manipulate and drill down on data displays is also considered helpful in understanding the current context. Both senior and local managers agree that only in aggregate do the collection of KPI “tell the story” of what’s going on at an operational level – the interrelatedness of the measures and underlying activities mean that any single measure is almost impossible to interpret outside of this context.

I’m quite a visual person. So if I can see it in graphs like this. It’s red, it’s green. It’s high, it’s low, whatever it might be. I really can gauge it, I think, a lot better than if somebody sits there and says to me, your infection rate was 1.1, this time it’s 6.7. Okay, yes, there is a variance there and yes it is higher but when I actually see it low like that and then up to here – you know what I mean. It just makes, for me, it just brings it home a little bit better, I suppose. (OM South)

4.3.3. Policies and procedures

The third key management control system at ResCare is an extensive library of corporate policies and procedures, which are made available to all staff in both soft and hard copy. This library is largely considered to be the first point of reference with respect to how activities within ResCare are to be carried out, and is used for both individual decision making as well as performance

management practices. Non-compliance with processes is taken extremely seriously and carries significant consequences, up to and including termination of employment.

Development of policies and procedures

The development of policies and procedures at ResCare is a largely collaborative process which takes place primarily within the relevant management forum. The need for a new or revised policy can be identified at any level of the organisation, and is just as often triggered by local operational staff as by senior managers: senior managers tend to identify needs for a new or revised policy when investigating the management of critical incidents, while local operational staff typically identify a need when seeking guidance for a particular task or activity and discovering that none is currently available. Once identified, the need for a new policy is raised as an agenda item in the relevant forum. If the group agrees that there is currently no adequate policy or procedure for the task, activity or situation under consideration, then either an individual or small group (often referred to as a “tiger team”) will usually volunteer to take on the writing of the policy as a special project.

As an example, when a local accommodation manager went to arrange a BBQ event for residents and their families she discovered that no policy or procedure existed for the safe use of the facility barbecues. Having checked informally with other accommodation managers, she brought this up at the next monthly accommodation managers’ forum and took on the role of writing the new procedure. Once the new procedure had been drafted, it was circulated for review at the following accommodation managers’ forum and accepted for entry into the policy library. Any new additions or revisions to existing policies in the library are announced to all staff by the central Document Controller via internal email, and hard copies of the affected documents in centres are required to be updated the following day.³⁹ This part of the policy development process is particularly important, given the expectation that all staff are aware of all policies at all times.

³⁹ It is the responsibility of the local accommodation manager to ensure that these ‘document control’ directives are followed.

Use of policies and procedures

Policies and procedures appeared to serve significantly different purposes for senior and local managers. While both groups shared an overriding concern for organisational compliance with this system, the level and type of their engagement varied considerably.

Senior management level

For senior managers at ResCare, the library of policies and procedures are an important instrument of standardisation across the group. Standardisation of processes and activities within centres is critical to ensuring that ResCare maintains its accreditation as an approved provider within the highly regulated residential aged care services industry; the CEO explicitly warned new staff at a general induction of the risk of harm to both staff and residents when established systems are not followed. Ensuring that correct procedures are followed is most important with respect to the delivery of clinical care, as well as food safety and emergency management; the relative volume of policies and procedures in the policy library reflect this emphasis.

Policies are there to protect you. (CEO)

Compliance with policies and procedures is frequently discussed at senior management meetings, usually in the context of recent critical incidents or emergencies. In reviewing the handling of these cases by the relevant local management team, senior managers first consider which ResCare policies would have applied in the situation, and then compare the action actually taken with that prescribed by the policy or procedure. When the action taken is assessed as compliant with the relevant policy or procedure, senior managers then consider the adequacy of the policy in light of the outcome of the incident. Where the outcome could have been improved, or the incident prevented, senior managers mark the policy and/or procedure for review (or identify the need for a new policy, where the situation was new or otherwise unexpected). However, when the actions taken at a local level are found not to be compliant with the relevant policy and/or procedure – especially, but not only, when the outcome could have been improved – this is usually followed up as a matter of urgency with additional education and training for all staff who may require it, and often serious disciplinary consequences for the specific staff members involved.

Combined management level

Policies and procedures are most often discussed within function-specific forums. Aside from identifying a need for new policies, forum members can raise problematic or ambiguous policies as items for clarification and guidance from the group. In most cases, confusion regarding a policy or procedure is easily resolved when the general manager is able to clarify the meaning of the policy (or its application in a specific circumstance) with the group's agreement. In other cases, however, it becomes apparent that the policy is currently being interpreted in different ways within different centres, and a more involved discussion ensues until the group reaches a consensus. Sometimes the conversation is initiated by the relevant general manager (or forum chair), who has observed variation during visits to centres or has identified problematic interpretation through the review of critical incidents and emergency management practices. Regardless of the point of initiation, a key outcome of forum meetings and policy discussions are increased standardisation of practice across ResCare centres, and improved compliance with policies and procedures.

Local management level

The operation of policies and procedures is most apparent at the local management level. Local managers rely on policies and procedures in lieu of direct supervision of floor staff (e.g. care, catering, cleaning and maintenance staff), with typically only three local managers for up to one hundred employees. A significant component of local management is ensuring compliance with corporate policies and procedures, which is undertaken through staff training, interaction with staff, regular audits, and investigation of complaints or other feedback. Formal policies and procedures also assist local managers with performance management, in that employees who are not meeting the expectations of their role can be directed to the policy for clarification of their duties and associated processes, or provided with additional education around correct procedures. Local managers observe that having formal policies and procedures to refer to is especially helpful where conflict or disagreement arises between managers and employees.

I think from a management perspective when you're implementing or introducing, sorry, in introducing any process and trying to implement that process into practice, it's hard if you don't have a policy, a strong policy, to back up that process or back up the directive that you're supposed to be either introducing or implementing, whatever it may be. (CM North)

How can I performance manage a person if there's no policy? ... Then they say, this is not ResCare. There's never ever a policy on this and that. So staff challenge you. Which is fine because if we don't have a policy, they can. (CM North)

Local managers also rely heavily on policy and procedures to direct their own judgment and decision making. There is prevailing sense among local managers that formal policies provide some level of protection in the case of critical incidents and emergencies, or even the management of more difficult staff- and resident-related situations. This is because local managers generally understand the value placed on compliance with processes by senior management, and as such “doing things by the book” is a relatively safe strategy in terms of personal accountability.

Our policy drive in general is useful whenever you want to know anything, it's the first place. ... I used to use it a lot. I'm more familiar now with a lot of the policies but there's sometimes things crop up that you think, is that right or – especially when it's HR things. You've always got to be double checking that things haven't changed. (OM South)

However, given that local managers (especially local operational managers) are ultimately accountable not only for behavioural compliance within their centres but also for financial and operational performance outcomes, decision making that is driven only by reference to formal policies and procedures is unlikely to be considered adequate in the long-term. For managers who are new to their position, however, they are an invaluable source of guidance and a relatively efficient tool for learning within a decentralised environment.

I find the policies which we have are very helpful especially [for] people like me. ... When I started, policies were very helpful for me. I can just look at the policies which we have and - yeah. ... I have been very fortunate to work with other managers who were very open and very helpful and sharing their experiences which they had before here. (AM South)

4.3.4. Summary of management control system design and use

The discussion and analysis in Section 4.3 shows how ResCare managers of different hierarchical levels and functional roles engage with management control systems in systematically different ways. A summary of the roles of each group of managers in the design and use of each of the three primary management control systems at ResCare is provided in Table 9.

Table 9: Summary of management control system design and use

System	Design/construction	Senior management	Local management
Operating budget	<ul style="list-style-type: none"> • Prepared by senior management • Approved by Board Advisory Committee • Limited input from local management into budget targets 	<ul style="list-style-type: none"> • Try to “counter-weight” financial emphasis • Use budget reports to evaluate strategies and projects • Budget reports trigger high-level discussion of priorities with local management 	<ul style="list-style-type: none"> • Budget reports reviewed by operations manager • Capital budget managed by accommodation manager • Clinical manager involved in management of wages/rostering
Scoreboard	<ul style="list-style-type: none"> • Financial and non-financial KPIs based on strategy map • KPIs updated frequently to reflect changing strategic priorities 	<ul style="list-style-type: none"> • Reviewed weekly • Used to evaluate strategies and projects • Unfavourable trends followed up by local management 	<ul style="list-style-type: none"> • Primarily used by local operations managers • Local managers held accountable for KPIs • Local managers collect KPI data
Policies and procedures	<ul style="list-style-type: none"> • “Source of truth” for processes • Centrally managed library of policies and procedures • Development of new policies and/or procedures can be initiated by any user 	<ul style="list-style-type: none"> • Essential instrument of standardisation of service delivery • Focus on ensuring compliance with policies and procedures 	<ul style="list-style-type: none"> • Local managers accountable for ensuring compliance with policies and procedures • Policies and procedures used for decision making and performance management

In Chapter 6, I relate these different types and levels of engagement to patterns of variation in managers’ cognitive maps (detailed in Chapter 5), in order to determine the relationship between the use of management control systems and the development of managers’ causal mental models.

4.4. Conclusion

In this chapter I have presented a description of ResCare as an organisation, focusing on the design and use of its three primary management control systems. ResCare’s functional matrix management structure incorporates two tiers of management – corporate (‘senior’) management, and business unit (‘local’) management – with additional reporting relationships across functional responsibilities. Three primary management control systems were identified that are actively

monitored and managed by ResCare's senior managers. First, ResCare relies on a consolidated annual operating budget as the main mechanism to ensure financial governance. It is prepared annually by the internal finance team, with input from senior and local management groups. After the annual budget has been finalised and communicated it is used for monthly variance reporting, both within and between levels of management. In addition to the budget reporting process, ResCare also measures and monitors performance using a KPI reporting tool known as 'Scoreboard'. The KPIs include financial, clinical and operational measures which are collated into a monthly variance report that is distributed to the local management of each facility. Finally, ResCare uses an extensive library of corporate policies and procedures which is considered to be the first point of reference with respect to how activities within ResCare are to be carried out. Policies and procedures are used primarily at the local management level for both individual decision making as well as performance management.

Chapter 5: Cognitive Maps

5.1. Introduction

The aim of this chapter is to provide description and preliminary analysis of the empirical data relating to ResCare managers' cognitive maps and the patterns of variation between them. This analysis is informed by the development of the casual mental models construct in Chapter 2, in which I identified three specific dimensions of managers' causal mental models that would be the focus of the analysis in this study. These dimensions are: managers' understanding of organisational priorities, managers' understanding of organisational activities, and the causal beliefs that link these together. In order to analyse the cognitive maps produced during the empirical component of the study, I group study participants into four categories relating to their management level and function. In Section 5.3, I present the cognitive maps of the senior managers as well as my analysis of the characteristics of and variation in the cognitive maps of this group. In Section 5.4, I present and discuss the cognitive maps of the two local operations manager participants. In the same section I present the cognitive maps of the two local clinical managers and local accommodation managers respectively, along with a discussion of their characteristics and composition. Finally, in Section 5.5, I present additional analysis of the sources of between-group variation in participants' cognitive maps. The analysis developed in this chapter provides insight into the features of ResCare managers' causal mental models, as well as providing a preliminary indication of the organisational factors which influence their development.

5.2. Cognitive Maps

Cognitive maps are visual representations of an individual's mental model. Cognitive maps are made up of linked nodes. Nodes can relate to any kind of concept, and can be linked in many different ways. In this study, nodes represent either *organisational priorities* or *organisational activities*, and links between nodes represent managers' beliefs about how these concepts are related; specifically, links represent beliefs about cause-and-effect relationships. In the cognitive maps presented, lines connecting activities and/or priorities indicate a causal attribution relating the two concepts.

Organisational priorities can be identified in the maps as these refer to an outcome, result, or explicit aspect of success at ResCare. Priorities generally cannot be manipulated directly, but rather require some kind of action or intervention to be taken elsewhere in the network of cause-and-effect relationships in order for the desired result to be achieved. As a result, organisational priorities tend to be found at the ends of chains of cause-and-effect beliefs. Nodes at the end of causal chains are referred to as *terminating nodes*. In most cases it is appropriate to interpret nodes closer to the end of causal chains as representing higher organisational priorities. In the cognitive maps presented, organisational priorities are designated using *italic* font.

Organisational activities, on the other hand, can be identified in the maps as any kind of task, process or action that can be undertaken by the manager or other ResCare employee. Activities do not necessarily need to be connected to an organisational priority, and can be connected to one another by causal beliefs to make up more complex causal chains. The overall complexity of the cognitive maps can be assessed in terms of the number of nodes included, the extent to which the nodes are linked together, and the length of the causal chains embedded in the maps. In the cognitive maps presented, organisational activities are designated using **bold** font.

As outlined in the research method, each participant's cognitive map was elicited by asking the question; "What activities are important for the success of ResCare, and why?". Analysis of the cognitive maps is supplemented with detailed coding of causal attributions made during interviews with participants. In the following sections, I present the cognitive maps of each hierarchical management group at ResCare and present preliminary analysis of the organisational priorities, organisational activities, and complexity of causal beliefs for each group.

5.3. Senior Management Mental Models

The senior managers selected as participants for the cognitive mapping component of the study include the Chief Executive Officer (CEO), Chief Financial Officer (CFO), General Operations Manager (GOM), General Clinical Manager (GCM), and General Accommodation Manager (GAM). In this section, I present the cognitive maps of each of these participants along with a discussion of the intra-group variation in terms of the three conceptual dimensions of causal mental models.

Figure 8: CEO cognitive map

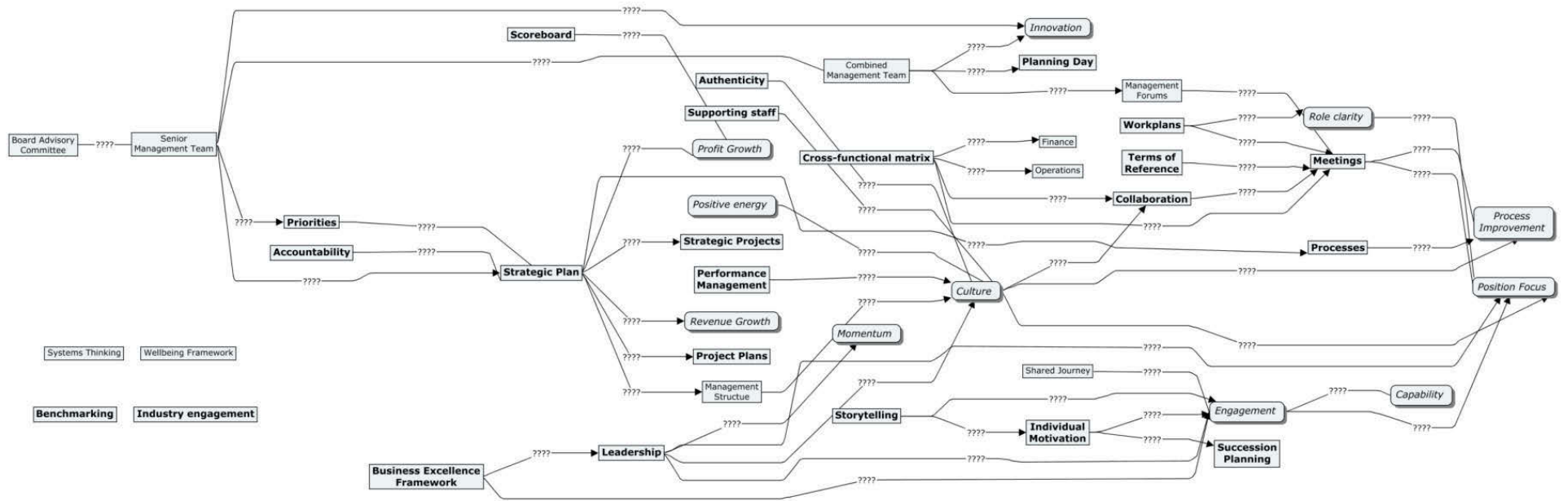


Table 10: CEO cognitive map legend

Concept/Node	Type	Description
Accountability	Activity	Ensuring that clear accountability structures exist for the delivery of strategic and operational objectives.
Authenticity	Activity	Personally demonstrating authenticity in all interactions with staff and stakeholders.
Benchmarking	Activity	Regularly comparing organisational performance to industry counterparts.
Board Advisory Committee	Other	Type of management group.
Business excellence framework	Activity	Development of business processes in line with the Australian Business Excellence Framework.
Capability	Priority	Capability for effective leadership is distributed through the senior management team.
Collaboration	Activity	Working cooperatively with other staff members to achieve specific goals or objectives.
Combined management team	Other	Type of management group.
Cross-functional matrix	Activity	Development of cross-functional matrix structure of management.
Culture	Priority	ResCare maintains a strong and positive organisational culture that reflects its mission and values.
Engagement	Priority	Staff are actively and willingly involved in organisational processes and achievement of objectives.
Finance	Other	Type of management group.
Individual motivation	Activity	Ensuring alignment between individual and organisational goals.
Industry engagement	Activity	Maintaining networks and channels of communication within the aged care industry.
Innovation	Priority	Services and processes are continually updated and improved through innovative approaches.
Leadership	Activity	Providing and modelling effective leadership.
Management forums	Other	Type of management group.
Management structure	Other	Reference to role of cross-functional management structure.
Meetings	Activity	Program of regular formal meetings of various management and staff groups.
Momentum	Priority	Organisational performance continues to improve over time.
Operations	Other	Type of management group.
Performance management	Activity	Coaching oriented toward providing support and maintaining staff accountability for performance.
Planning day	Activity	Annual all-day planning meeting attended by representatives from all management forums and facilities.
Position focus	Priority	Staff achieve appropriate levels of performance with respect to the specific requirements of their role.

Concept/Node	Type	Description
Positive energy	Priority	Organisational staff maintain and demonstrate enthusiasm toward ResCare's mission and objectives.
Priorities	Activity	Determining appropriate organisational priorities at a corporate level.
Process improvement	Priority	Organisational processes are continually refined and updated to reflect industry best practice.
Processes	Activity	Maintenance of compliance with all organisational processes.
Profit growth	Priority	ResCare's profit increases period-by-period.
Project plans	Activity	Use of formal templates for the development and evaluation of strategic projects.
Revenue growth	Priority	ResCare's revenue increases period-by-period.
Role clarity	Priority	All staff have a clear and unambiguous understanding of the requirements of their position.
Scoreboard	Activity	Use of the Scoreboard KPI monitoring and reporting system.
Senior management team	Other	Type of management group.
Shared journey	Other	Observation regarding the implications of organisational activity for individual staff members.
Storytelling	Activity	Use of narrative to explain goals and objectives of organisation and encourage staff engagement.
Strategic plan	Activity	Development and maintenance of a coherent plan for implementation of ResCare's strategy.
Strategic projects	Activity	Development and implementation of specific projects in line with overarching strategic plan.
Succession planning	Activity	Development of management capability to enable key leadership roles to be internally filled if vacated.
Supporting staff	Activity	Providing assistance, guidance, and emotional support to facility staff as required.
Systems thinking	Other	Observation regarding the importance of being able to understand relationships between components of a system.
Terms of reference	Activity	Developing clear objectives and processes for the administration of management groups and meetings.
Wellbeing framework	Other	Category for set of activities associated with improving wellbeing of facility residents.
Workplans	Activity	Development of clear and detailed tasks and objectives for each manager and staff member.

Figure 9: CFO cognitive map

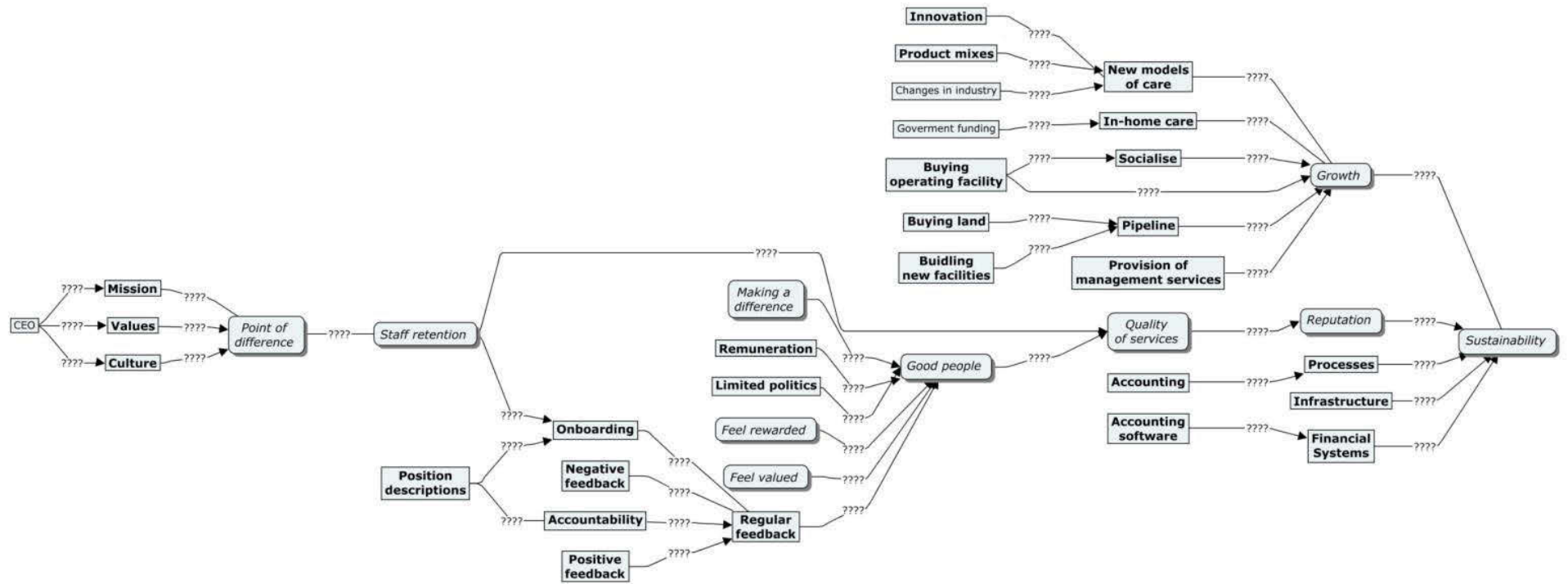


Table 11: CFO cognitive map legend

Concept/Node	Type	Description
Accountability	Activity	Ensuring that clear accountability structures exist for the delivery of strategic and operational objectives.
Accounting	Activity	Internal management of finance and accounting functions.
Accounting software	Activity	Implementation of a scalable accounting platform capable of growing with the organisation.
Building new facilities	Activity	Growth through construction of new residential aged care facilities.
Buying land	Activity	Growth through acquisition of land to support construction of new residential aged care facilities.
Buying operating facility	Activity	Growth through acquisition of existing residential aged care facilities.
CEO	Other	Reference to role of CEO.
Changes in industry	Other	Reference to significant recent changes in aged care service provision industry.
Culture	Activity	Maintenance of a strong and positive organisational culture that reflects ResCare's mission and values.
Feel rewarded	Priority	Staff perceive that they are adequately compensated for their efforts and contribution.
Feel valued	Priority	Staff perceive that they are adequately valued for their efforts and contribution.
Financial systems	Activity	Development of internal finance and accounting processes that are well-integrated with operations.
Good people	Priority	Staff are highly capable and motivated.
Government funding	Other	Observation regarding sources of government funding for aged care.
Growth	Priority	ResCare continues to grow period-by-period.
Infrastructure	Activity	Development of adequate physical and system infrastructure to support continued growth.
In-home care	Activity	Development of in-home care business in parallel to residential aged care provision.
Innovation	Activity	Updating and improvement of services and processes through innovative approaches.
Limited politics	Activity	Minimisation of interpersonal and inter-group conflict and disagreement.
Making a difference	Priority	Staff perceive that their efforts contribute to making a difference to the organisation and/or residents.
Mission	Activity	Communication of a clear and inspiring organisational mission.
Negative feedback	Activity	Staff are provided with constructive feedback regarding their performance.
New models of care	Activity	Adapting business model to account for changes in industry expectations and resource constraints.
Onboarding	Activity	Ensuring that new staff understand the behavioural and performance expectations of the organisation.
Pipeline	Activity	Maintenance of a stream of planned construction and acquisition projects.

Concept/Node	Type	Description
Point of difference	Priority	ResCare's overall ethos makes it an employer of choice.
Position descriptions	Activity	Development of clear and detailed behavioural and performance expectations for each organisational role.
Positive feedback	Activity	Performance and efforts of staff is acknowledged by managers.
Processes	Activity	Development of integrated and effective accounting processes which can accommodate organisational growth.
Product mixes	Activity	Ensuring product mixes in each facility/business is appropriate for the changing industry preferences.
Provision of management services	Activity	Growth through operation of residential aged care facilities owned by a third party.
Quality of services	Priority	Services provided by ResCare are of high quality.
Regular feedback	Activity	Provision of regular positive and negative feedback to staff and managers.
Remuneration	Activity	Ensuring remuneration of staff is sufficiently competitive to attract and retain quality staff.
Reputation	Priority	Perception of quality of facility and care provision of facility stakeholders.
Socialise	Activity	Establishment of ResCare culture and systems within new or newly acquired residential aged care facilities.
Staff retention	Priority	Quality staff are retained by the organisation.
Sustainability	Priority	Ability of ResCare to continue operating in the aged care industry in the long-term.
Values	Activity	Communication and reinforcement of a clear set of organisational values.

Figure 10: GOM cognitive map

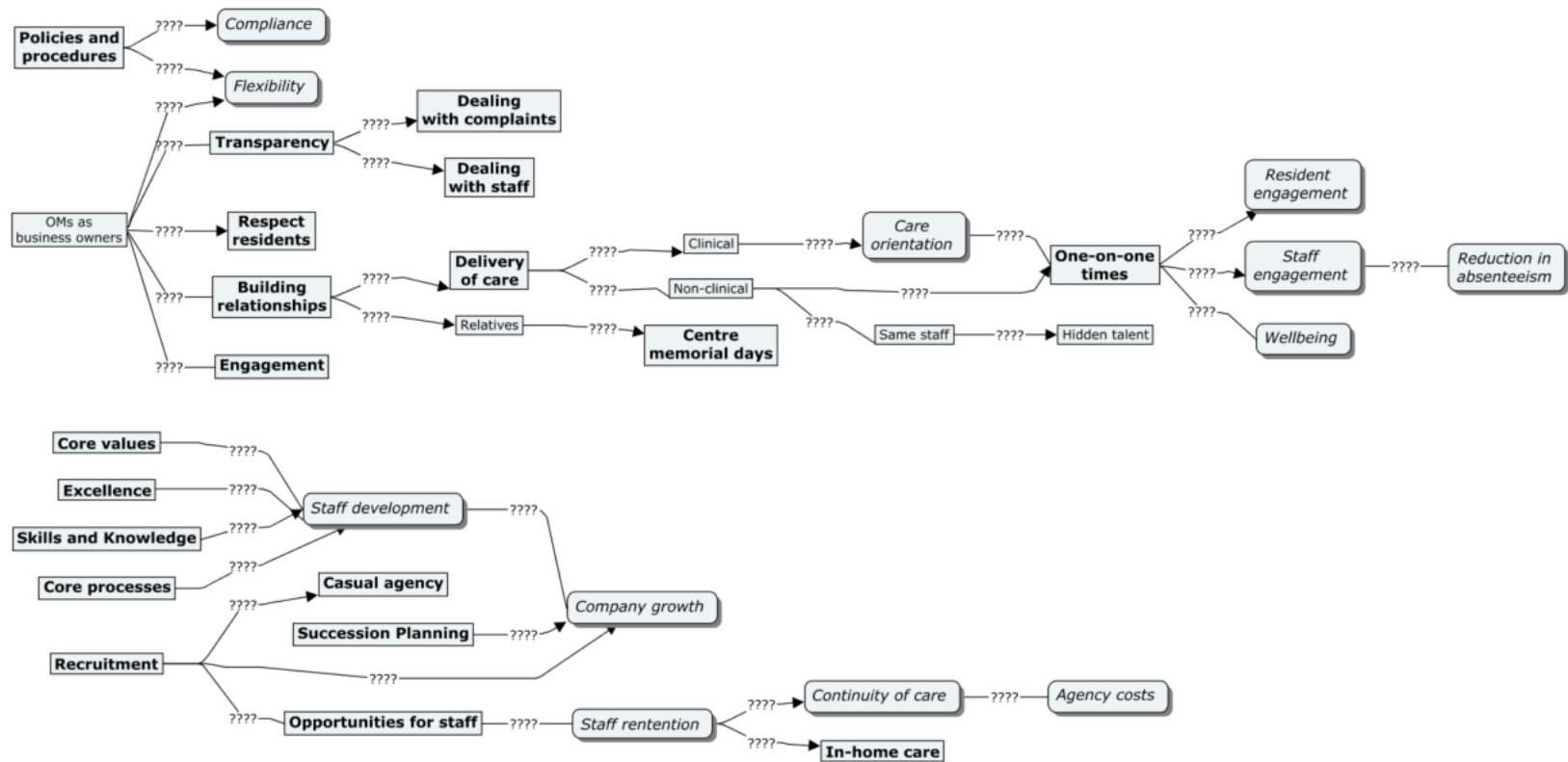


Table 12: GOM cognitive map legend

Concept/Node	Type	Description
Agency costs	Priority	Cost of reliance on external labour agencies to provide contract staff (negative framing).
Building relationships	Activity	Developing strong positive relationships with facility stakeholders.
Care orientation	Priority	Care staff demonstrate a whole-of-person approach to care provision.
Casual agency	Activity	Establishment of an internal casual labour agency for use by all facilities.
Centre memorial days	Activity	Regular facility-level event to acknowledge and remember deceased residents.
Clinical	Other	Type of service provision.
Company growth	Priority	ResCare continues to grow period-by-period.
Compliance	Priority	Maintaining compliance with government accreditation standards for residential aged care.
Continuity of care	Priority	Residents are cared for by a consistent and reliable team of staff.
Core processes	Activity	Ensuring that all staff understand and can reliably implement ResCare's core operational processes.
Core values	Activity	Ensuring that all staff are familiar with and demonstrate ResCare's core values.
Dealing with complaints	Activity	Management of complaints received from facility residents, relatives, or other stakeholders.
Dealing with staff	Activity	Management of facility staff.
Delivery of care	Activity	Meeting the clinical needs of facility residents (e.g. nursing care).
Engagement	Priority	Staff are actively and willingly involved in organisational processes and achievement of objectives.
Excellence	Activity	Staff are encouraged to perform at high levels.
Flexibility	Priority	Tailoring of business model to suit each individual facility.
Hidden talent	Other	Observation regarding use of staff skills and knowledge not normally required for their role.
In-home care	Activity	Development of in-home care business in parallel to residential aged care provision.
Non-clinical	Other	Type of service provision.
OMs as business owners	Other	Observation regarding the need for operations managers to behave as owners of their business unit.
One-on-one times	Activity	Provision of regular one-on-one interaction with facility residents by leisure and lifestyle officers.
Opportunities for staff	Activity	Staff are provided with sufficient opportunities for personal and professional development.
Policies and procedures	Activity	Maintenance of a library of formal policies and procedures specifying how operational activities are to be performed.
Recruitment	Activity	Hiring of new staff to ensure appropriate staff coverage in facility.
Reduction in absenteeism	Priority	Staff absences due to illness are reduced.
Relatives	Other	Type of facility stakeholder.
Resident engagement	Priority	Residents display an active interest in facility routines and activities.

Concept/Node	Type	Description
Respect residents	Activity	Treating all facility residents with an appropriate level of respect.
Same staff	Other	Observation regarding the use of care staff to facilitate leisure and lifestyle activities.
Skills and knowledge	Activity	Ensuring that staff have the appropriate skills and knowledge to perform in their role.
Staff development	Priority	Staff have sufficient opportunities for personal and professional development.
Staff engagement	Priority	Staff are actively and willingly involved in organisational processes and achievement of objectives.
Staff retention	Priority	Quality staff are retained by the organisation.
Succession planning	Activity	Development of management capability to enable key leadership roles to be internally filled if vacated.
Transparency	Activity	Maintaining free and open communication with staff members, managers, and other stakeholders.
Wellbeing	Priority	Facility residents experience high levels of wellbeing given their clinical condition.

Figure 11: GCM cognitive map

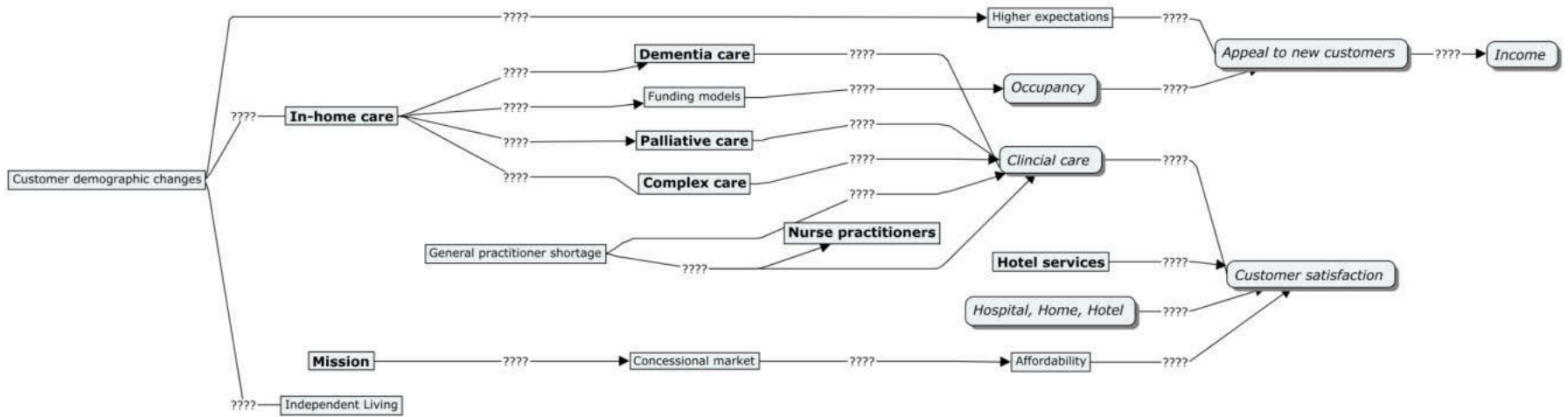


Table 13: GCM cognitive map legend

Concept/Node	Type	Description
Affordability	Other	Observation regarding the need for residential care to remain affordable to those who require it.
Appeal to new customers	Priority	The services provided by ResCare are desirable to new customers/residents.
Clinical care	Priority	Meeting the clinical needs of facility residents (e.g. nursing care).
Complex care	Activity	Provision of specialised care to residents with complex or chronic clinical conditions.
Concessional market	Other	Observation regarding ResCare's mission to cater to low-income population.
Customer demographic changes	Other	Observation regarding implications of changing customer demographics.
Customer satisfaction	Priority	Level of satisfaction of customers with the services provided by ResCare.
Dementia care	Activity	Provision of specialised care to residents with dementia.
Funding models	Other	Observation of changing government funding models for aged care service provision.
General practitioner shortage	Other	Observation of trend regarding aging General Practitioner workforce and imminent shortage.
Higher expectations	Other	Observation regarding the higher expectations of service and care of next generation of residents.
Hospital, home, hotel	Priority	Physical environment reflects appropriate balance of hospital, home, and hotel features.
Hotel services	Activity	Provision of non-care related services similar to those provided by a hotel.
Income	Priority	Total income in a given period.
Independent living	Other	Observation of preference of next generation of residents to remain living independently for longer.
In-home care	Activity	Development of in-home care business in parallel to residential aged care provision.
Mission	Activity	Communication of a clear and inspiring organisational mission.
Nurse practitioners	Activity	Recruitment of Registered Nurses who are qualified to perform additional medical procedures.
Occupancy	Priority	The ratio of facility beds that are occupied by residents to those remaining unoccupied.
Palliative care	Activity	Provision of specialist care to residents with terminal clinical conditions.

Figure 12: GAM cognitive map

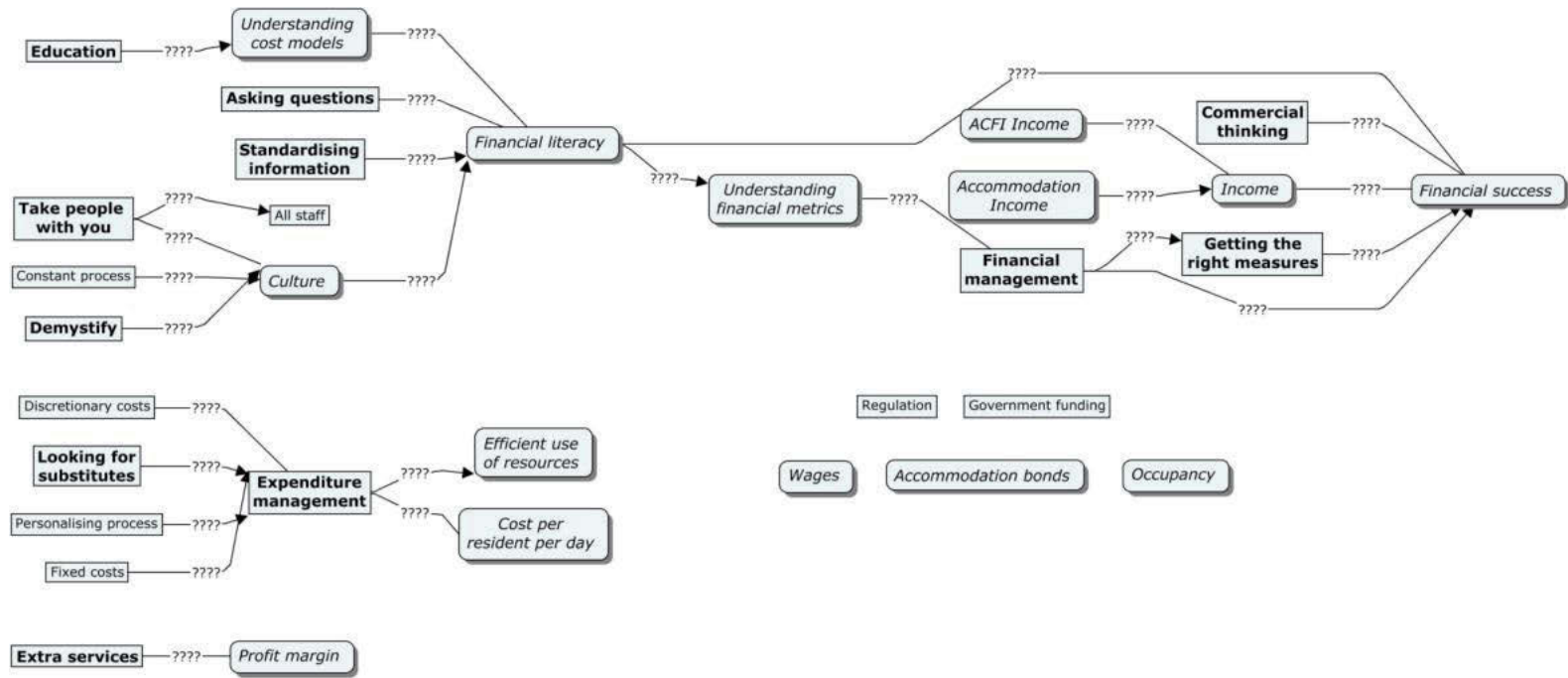


Table 14: GCM cognitive map legend

Concept/Node	Type	Description
Accommodation bonds	Priority	Value of refundable bonds received as deposits against resident accommodation.
Accommodation income	Priority	Income from the provision of accommodation services.
ACFI income	Priority	Aged Care Funding Instrument income.
All staff	Other	Observation relates to all ResCare staff.
Asking questions	Activity	Ensuring that staff ask questions to clarify any concerns or confusions regarding accounting and finance.
Commercial thinking	Activity	Ensuring that all staff consider the commercial implications of organisational decisions.
Constant process	Other	Observation that development of culture is a continual process.
Cost per resident per day	Priority	Facility costs decomposed to cost per resident per day.
Culture	Priority	ResCare maintains a strong and positive organisational culture that reflects its mission and values.
Demystify	Activity	Making transparent the financial state and structure of the organisation.
Discretionary costs	Other	Type of expenditure.
Education	Activity	Providing appropriate financial education to staff.
Efficient use of resources	Priority	Organisational financial resources are used efficiently to produce desired outcomes.
Expenditure management	Activity	Management of facility expenditure to ensure budget limits are not exceeded in any given period.
Extra services	Activity	Provision of services additional to the regulatory minimum standards for a fee.
Financial literacy	Priority	Staff demonstrate appropriate levels of financial literacy.
Financial management	Activity	Measuring and managing financial performance.
Financial success	Priority	ResCare achieves its financial performance goals.
Fixed costs	Other	Type of expenditure.
Getting the right measures	Activity	Developing and implementing an appropriate mix of performance measures.
Government funding	Other	Observation regarding sources of government funding for aged care.
Income	Priority	Total income in a given period.
Looking for substitutes	Activity	Identifying and evaluating alternative products or suppliers.
Occupancy	Priority	The ratio of facility beds that are occupied by residents to those remaining unoccupied.
Personalising process	Other	Observation regarding need to think about organisational resources in a comparable way to personal finances.
Profit margin	Priority	Extent to which income from the provision of a service exceeds the cost of providing the service.
Regulation	Other	Reference to regulatory environment of aged care service provision.

Concept/Node	Type	Description
Standardising information	Activity	Ensuring that financial information is provided in a standard and easily understandable format.
Take people with you	Activity	Ensuring that relevant staff are involved in development and decision making activities.
Understanding cost models	Priority	Ensuring that all relevant staff understand the drivers of organisational costs.
Understanding financial metrics	Priority	Ensuring that all relevant staff understand the metrics used to monitor and report on financial performance.
Wages	Priority	Total cost of facility staff.

5.3.1. Organisational priorities

Senior managers appear to conceptualise organisational priorities at an exclusively corporate level, though the specific priorities incorporated in the cognitive maps vary within the senior management group. Senior managers either refer to organisational priorities in terms of financial outcomes (such as income) or corporate growth (in terms of revenue, head count, or assets), which are represented as terminating or close to terminating nodes in the cognitive maps. These participants also discuss processes and process improvements not only as a means, but also as an end in itself; that is, continuous improvement in processes is considered to be a particularly high priority for its own sake. For the CEO in particular, the emphasis on process improvement as an organisational priority indicates that, to some degree, the means are considered at least as important as the ‘ends’ of financial or other organisational priorities. Other priorities that are mentioned by senior managers include occupancy, corporate sustainability, staff and resident wellbeing, and the reputation of ResCare as a residential aged care service provider.

However, in contrast to the other two senior managers, the cognitive map of the GOM contains numerous references to *operational* outcomes. Of the two clusters that make up the cognitive map, one (larger) cluster appears to relate primarily to centre operations, while the smaller cluster relates to more corporate level outcomes. An explanation for this difference relates to length of organisational tenure – at the time of the study, the GOM had been in the role for less than twelve months and prior to this had worked for ResCare as a local Operations Manager. The implication of this recent elevation into the senior management team on the development of the GOM’s causal mental model is discussed in more detail later in this chapter.

Senior managers’ cognitive maps are also typically oriented toward a relatively long time horizon. This is reflected in the preoccupation with corporate growth and continuous improvement processes. For example, the cognitive map of the CFO adopts a whole-of-business view and focuses explicitly on long-term growth and corporate sustainability. In doing so, the CFO is able to identify a number of major strategic approaches being taken in order to drive growth of the ResCare organisation. Similarly, the cognitive map of the GCM incorporates several macro-economic factors and industry trends that are expected to have an impact on customer satisfaction and attractiveness to ResCare’s target market over the medium to long-term.

As a group, ResCare’s senior managers’ understanding of organisational priorities appears to sit at the *strategic* level. That is, the causal mental models of senior management tend to incorporate priorities that are reflected at the corporate level and relate to the medium to long-term, as opposed to being concerned with the more operational aspects of the business.

5.3.2. Organisational activities

Similarly, the activities incorporated in the cognitive maps of senior managers are relatively abstract in nature, and relate to corporate level systems and processes. Several senior managers – including the CEO, CFO, and GOM – make specific reference to the importance of ResCare’s core processes, but are not specific about the ‘content’ of those processes. All three of these participants also discuss the role of ResCare’s strong values and positive, inclusive culture as significant inputs to the organisation’s success, especially in the sense that these factors are seen to drive staff and resident engagement. Many other management systems and processes are also mentioned by one or more senior managers, including the Scoreboard system, policies and procedures, accountability structures, the strategic plan, the cross-functional matrix structure, succession planning, and feedback management systems. For the CEO in particular, the emphasis placed on inputs such as leadership and collaboration as important organisational activities indicates that for this participant, the “shared journey” may ultimately be more important than the collective destination.

In some cases, the specific activities mentioned by each senior manager is reflective of their functional role in the senior management team. For example, there are almost no specific points of intersection between the activities articulated in the cognitive maps of the GCM and GAM. In the case of the GCM, the activities mentioned are largely related to the core service of clinical care, while the cognitive map of the GAM is oriented more toward financial management and the development of financial literacy within the organisation. While interesting, this is not altogether surprising given the functional specialisation of each role and limited overlap in each manager’s area of responsibility. Nonetheless, what these maps have in common is that the activities that are mentioned relate exclusively to the corporate level of the organisation, rather than the operational level.

Here again, with the partial exception of the GOM, the cognitive maps of ResCare’s senior managers include activities that can be described as *strategic* in nature. These activities relate more

to management of corporate-level systems, processes and capabilities, than specific tasks or activities that might be undertaken at the operational level, and at times are extremely abstract in their conceptualisation.

5.3.3. Causal beliefs

Senior managers' understanding of organisational priorities and activities are connected by complex networks of causal beliefs. These cognitive maps typically consist of a single primary cluster of linked nodes (with some unlinked nodes, and a secondary cluster in two cases), which connects all or most of the activities and priorities mentioned. That a significant number of the nodes are contained within a single cluster within the maps suggests that while a large number of factors are considered, it is clear to the participants precisely how all of these (potentially diverse) activities and priorities relate to one another within a larger context. That is, activities are not viewed in isolation, but each contribute to the achievement of the organisation's objectives in some way.

While the maps vary in size (from 20 to 44 nodes), the complexity of causal beliefs remain high; even smaller maps (as in the case of the GCM and GAM) tend to be very focused, and incorporate moderately long causal chains, linking corporate level activities and drivers to the 'success' of ResCare. The presence of long and complex causal chains indicates that participants are capable of sophisticated causal reasoning that requires understanding of indirect, contingent and equifinal relationships between activities and outcomes at ResCare. Of particular note is the cognitive map of the CEO, who not only mentions a large number of management systems and processes as important organisational activities, but constructs significantly more complex relationships *between* the systems themselves, compared to the other senior managers.

Overall, the complexity of the causal beliefs incorporated in the cognitive maps of senior managers is very high, with relatively large numbers of activities and priorities incorporated while maintaining high levels of connectedness between the nodes in the cognitive maps. This is reflected in the composition of the maps, which typically include a single primary cluster of nodes and relatively long and complex causal chains which connect organisational activities with the achievement of organisational priorities.

5.4. Local management mental models

Each ResCare facility is run by a local management team consisting of a local operations manager, a local clinical manager, and a local accommodation manager. The local management teams of two ResCare facilities, referred to here as North and South, were selected to participate in this study. The resulting six participants are split into three groups for analysis based on their functional role. That is, the cognitive maps of the two local operations managers are analysed as a group; the cognitive maps of the two local clinical managers are analysed as a group; and the cognitive maps of the two local accommodation managers form the final group for the purposes of this analysis. As in the case of the senior management group, the analysis of each of these three sets of managers is undertaken based on the three conceptual dimensions of causal mental models identified in Chapter 2.

5.4.1. Local operations managers

Figure 13 and Figure 14 (below) depict the cognitive maps of the local operations managers of the North and South facilities respectively.

Figure 13: Local OM (North) cognitive map

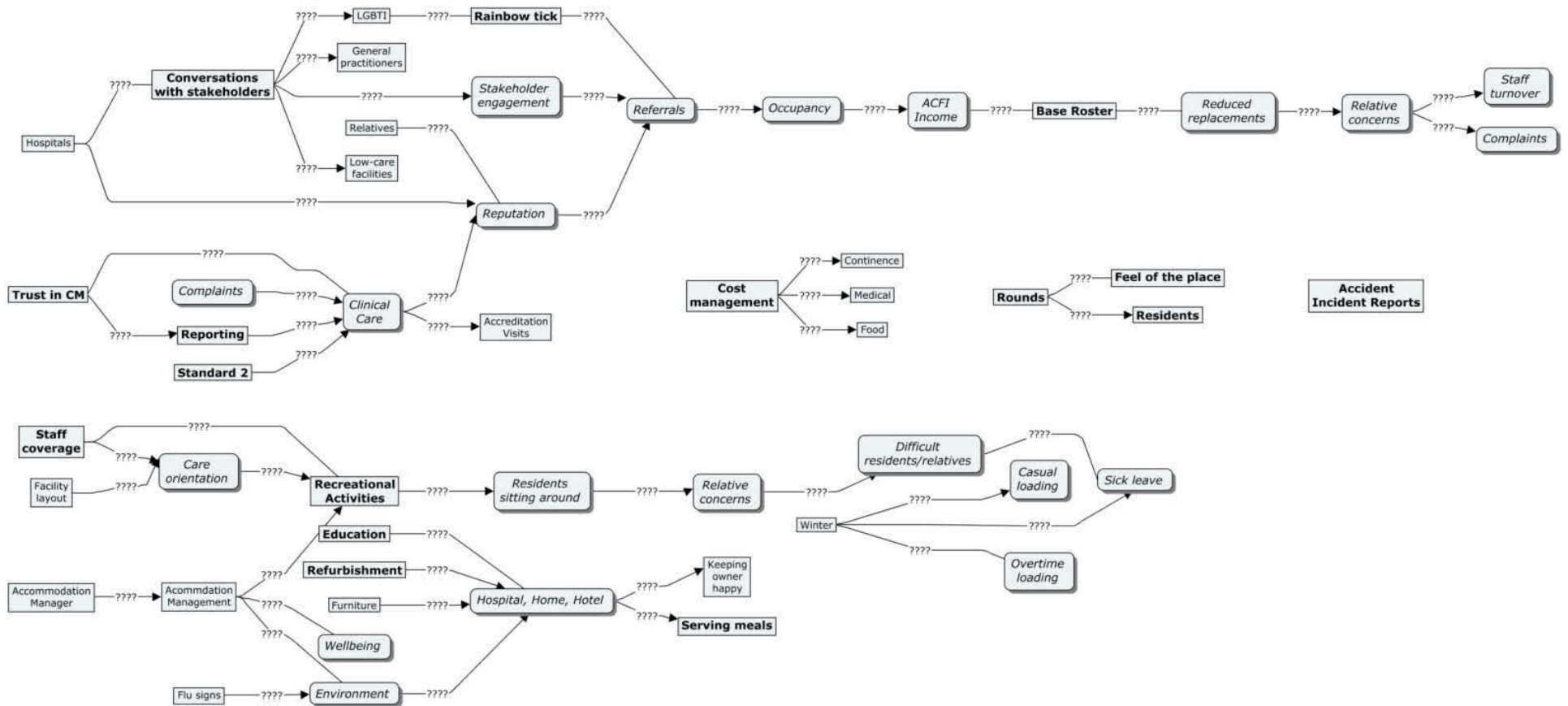


Table 15: Local OM (North) cognitive map legend

Concept/Node	Type	Description
Accident incident reports	Activity	Producing comprehensive reports detailing the circumstances surrounding any accidents or incidents in the facility.
Accommodation management	Other	Category for tasks associated with management of facility accommodation.
Accommodation Manager	Other	Reference to the role of facility Accommodation Manager.
Accreditation visits	Other	Routine facility inspection by government accreditation body.
ACFI income	Priority	Aged Care Funding Instrument income.
Base roster	Activity	Standard staff coverage levels and shift allocations based on facility occupancy level.
Care orientation	Priority	Care staff demonstrate a whole-of-person approach to care provision.
Casual loading	Priority	Total premium paid to staff employed on an hourly casual basis (negative framing).
Clinical care	Priority	Meeting the clinical needs of facility residents (e.g. nursing care).
Complaints	Priority	Complaints received from facility residents, relatives, or other stakeholders.
Continence	Other	Type of facility expenditure.
Conversations with stakeholders	Activity	Maintaining open and frequent contact with facility stakeholders.
Cost management	Activity	Management of facility expenditure to ensure budget limits are not exceeded in any given period.
Difficult residents/relatives	Priority	Residents who are unhappy with care provision or are otherwise demanding of staff and managers.
Education	Activity	Providing ongoing professional education to facility staff.
Environment	Priority	Facility is well presented and meets the appropriate standards of upkeep.
Facility layout	Other	Observation regarding constraints of physical facility layout for staffing and movement.
Feel of the place	Activity	Maintaining awareness of the current state of the facility and its residents.
Flu signs	Other	Observation regarding mandatory seasonal influenza prevention signage.
Food	Other	Type of facility expenditure.
Furniture	Other	Observation regarding style of facility furnishings.
General practitioners	Other	Type of provider of specialist resident care.
Hospital, home, hotel	Priority	Physical environment reflects appropriate balance of hospital, home, and hotel features.
Hospitals	Other	Type of facility stakeholder.
Keeping owner happy	Other	Observation of importance of acknowledging and implementing requests of facility owner.
LGBTI	Other	Type of facility stakeholder.
Low-care facilities	Other	Type of facility stakeholder.

Concept/Node	Type	Description
Medical	Other	Type of facility expenditure.
Occupancy	Priority	The ratio of facility beds that are occupied by residents to those remaining unoccupied.
Overtime loading	Priority	Total premium paid to staff employed in excess of their normal working hours (negative framing).
Rainbow tick	Activity	Achieving and maintaining accreditation as an LGBTI-friendly workplace and residence.
Recreational activities	Activity	Provision of meaningful diversional activities for facility residents.
Reduced replacements	Priority	Number of shifts requiring replacement by another staff member (internal or external) (negative framing).
Referrals	Priority	Residents referred to the facility by facility stakeholders.
Refurbishment	Activity	Program for the undertaking of significant capital works to improve facility infrastructure for residents.
Relative concerns	Priority	Feedback from relatives of residents regarding potential issues (often precipitating a formal complaint).
Relatives	Other	Type of facility stakeholder.
Reporting	Activity	Compiling reports and preliminary analysis relating to clinical data collected at the facility.
Reputation	Priority	Perception of quality of facility and care provision of facility stakeholders.
Residents	Activity	Checking on clinical condition and general wellbeing of residents during rounds.
Residents sitting around	Priority	Residents are not provided with meaningful diversional activities (negative framing)
Rounds	Activity	Regular inspection of the facility and its residents to identify any salient problems or issues.
Serving meals	Activity	Serving meals to residents in a timely, professional and respectful manner.
Sick leave	Priority	Number of shifts requiring replacement by another staff member due to illness (negative framing).
Staff coverage	Activity	Ensuring adequate staff are present in the facility at any given time to ensure appropriate quality of resident care.
Staff turnover	Priority	Rate at which staff leave the organisation (negative framing).
Stakeholder engagement	Priority	Facility stakeholders have a strong and positive engagement with the facility.
Standard 2	Activity	Ensuring that care provided is compliant with government regulations regarding clinical care provision.
Trust in CM	Activity	Trusting the clinical manager to operate relatively autonomously in managing clinical care provision.
Wellbeing	Priority	Facility residents experience high levels of wellbeing given their clinical condition.
Winter	Other	Observation regarding effect of winter season on rates of staff and resident illness.

Figure 14: Local OM (South) cognitive map

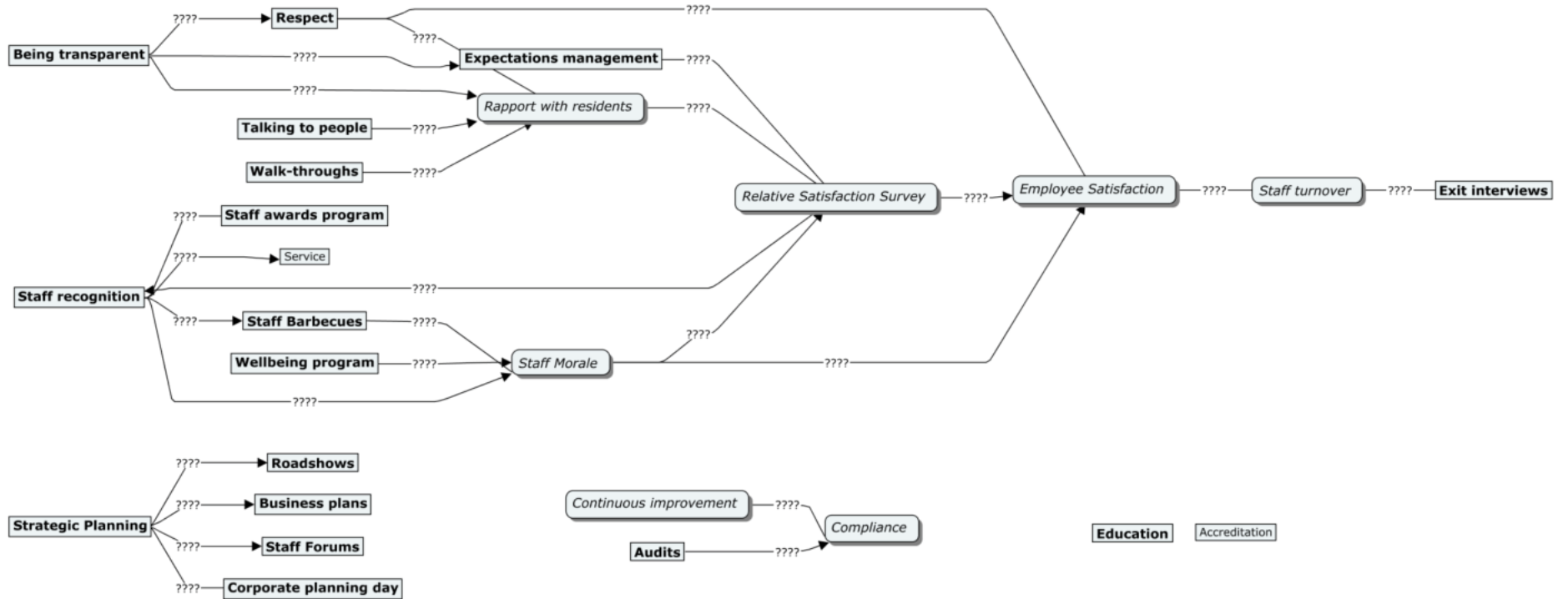


Table 16: Local OM (South) cognitive map legend

Concept/Node	Type	Description
Accreditation	Other	Category for tasks associated with maintaining compliance with government accreditation standards.
Audits	Activity	Routine internal audit of facility operations by senior management-led teams.
Being transparent	Activity	Maintaining free and open communication with staff members, managers, and other stakeholders.
Business plans	Activity	Development and maintenance of a coherent facility-level business plan.
Compliance	Priority	Maintaining compliance with government accreditation standards for residential aged care.
Continuous improvement	Priority	Facility processes are continually refined and updated to reflect industry best practice.
Corporate planning day	Activity	Annual all-day planning meeting attended by representatives from all management forums and facilities.
Education	Activity	Providing ongoing professional education to facility staff.
Employee satisfaction	Priority	Measure of employee satisfaction with work environment at ResCare.
Exit interviews	Activity	Conducting in-depth interviews with outgoing facility staff to provide guidance and elicit feedback.
Expectations management	Activity	Ensuring that stakeholders have appropriate expectations regarding the nature of care provided by the facility.
Rapport with residents	Priority	Staff have a positive and personal relationship with facility residents.
Relative satisfaction survey	Priority	Measure of relative satisfaction with the care provided to residents by the facility.
Respect	Activity	Treating all facility stakeholders with the appropriate level of respect.
Roadshows	Activity	Presentation to facility staff by senior management regarding ResCare's strategy, performance and plans.
Service	Other	Type of staff recognition relating to length of service to organisation.
Staff award program	Activity	Program of identifying, acknowledging and rewarding high-achieving staff members.
Staff barbecues	Activity	Regular facility-level events to acknowledge and reward all staff for ongoing service.
Staff forums	Activity	Program of meetings of representative staff forums.
Staff morale	Priority	Facility staff are generally happy with their roles and work environment.
Staff recognition	Activity	Ensuring that staff efforts and achievements are regularly acknowledged by management.
Staff turnover	Priority	Rate at which staff leave the organisation (negative framing).
Strategic planning	Activity	Development and maintenance of a coherent plan for implementation of ResCare's strategy.
Talking to people	Activity	Initiating conversation with any stakeholders encountered within the facility.
Walk-throughs	Activity	Spending time moving around the facility to facilitate accessibility and awareness of current operations.
Wellbeing program	Activity	Regular events designed to improve the wellbeing of both staff and residents of facility.

Organisational priorities

Local operations managers appear to formulate organisational priorities with reference to a range of centre-level stakeholders, of which outcomes relating to centre staff feature especially prominently. Specifically, staff turnover is a terminal – or near terminal – node in both cognitive maps, indicating that minimising staff turnover is considered to be the ultimate objective in the minds of the operations managers. Other aspects of staff engagement are cited as priorities, including maintaining employee satisfaction and managing sick leave. The cognitive maps of operations managers also include priorities relating to other stakeholder groups, such as residents and relatives; both maps make explicit reference to priorities such as relative satisfaction, relative concerns, and formal complaints. Of particular note is the existence of an apparently complex relationship between these priorities within the maps, with employee and relative satisfaction linked together in a bidirectional causal relationship.

Only the cognitive map of the OM (North) includes specific reference to financial outcomes, though even in this case the financial priorities (such as income) are secondary to maintaining the satisfaction of organisational stakeholders. That is, the OM (North) appears to consider the management of income as both a priority in itself, but also as a means of enabling the achievement of other more salient priorities such as staff and relative satisfaction. Similarly, the cognitive map of the OM (South) appears to incorporate the management of employees and staffing issues both as a means and an end with respect to the achievement of ResCare's organisational priorities.

Organisational activities

There is significant overlap in the organisational activities included in the two local operations managers' cognitive maps, but this is mostly restricted to their discussion of centre level activities and processes. Both local operations managers incorporate the management of three sets of local stakeholders as important organisational activities, including maintaining the engagement and wellbeing of staff; maintaining the engagement and wellbeing of facility residents; and development of rapport and effective communication with residents' relatives. The relationship between these stakeholder groups is also articulated in both maps, with resident wellbeing determining the nature of interaction with relatives, and the nature of interaction with relatives affecting the wellbeing of facility staff. Further, it is apparent from the maps that the engagement and wellbeing of staff is a key input to the wellbeing of residents, forming a complete causal cycle.

Both local operations managers also include specific activities that contribute to staff engagement as an outcome, such as education, recognition and staffing levels, as well as outcomes in terms of staff engagement – notably, minimising staff turnover. Further, the importance of the local operations manager “walking around” the facility and having face to face interaction with residents, relatives, and staff is mentioned specifically by both participants. Finally, both local operations managers mention activities related to maintaining compliance with industry regulations and standards; however, these nodes are typically not linked to specific outcomes.

The cognitive map of the OM (North) also contains a unique set of activities. The first set relates to interaction with the *other* local managers of the facility, and the activities they perform in the management of the facility. An originating node in the largest cluster refers to placing trust in the local clinical manager, and is connected to activities that are part of the clinical manager’s role and responsibilities. In the second large cluster, an originating node refers to the local accommodation manager; this is connected to activities that are part of the accommodation manager’s portfolio. The operations manager’s own set of regular tasks also appears in the map, but only as a short list that is unconnected to specific outcomes or the major clusters.

On the other hand, the cognitive map of the OM (South) appears to focus more on activities relating to the use of management systems and processes than specific operating tasks or procedures, which are not mentioned at all. In this cognitive map, the primary activities in the main cluster relate to communication with and recognition of the three main stakeholder groups outlined above, while systems such as strategic planning and continuous improvement are included outside of the main cluster and are not linked to specific outcomes

Causal beliefs

Both cognitive maps in this group consist of multiple clusters, some of which are relatively large and complex while others are small and made up of simple causal beliefs. While the maps vary significantly in terms of size (with 51 and 26 nodes respectively), both maps contain at least some relatively long causal chains; some sequences include between six and ten sequentially linked causal attributions, with multiple inputs or outputs to key nodes. Both maps also contain some unlinked nodes.

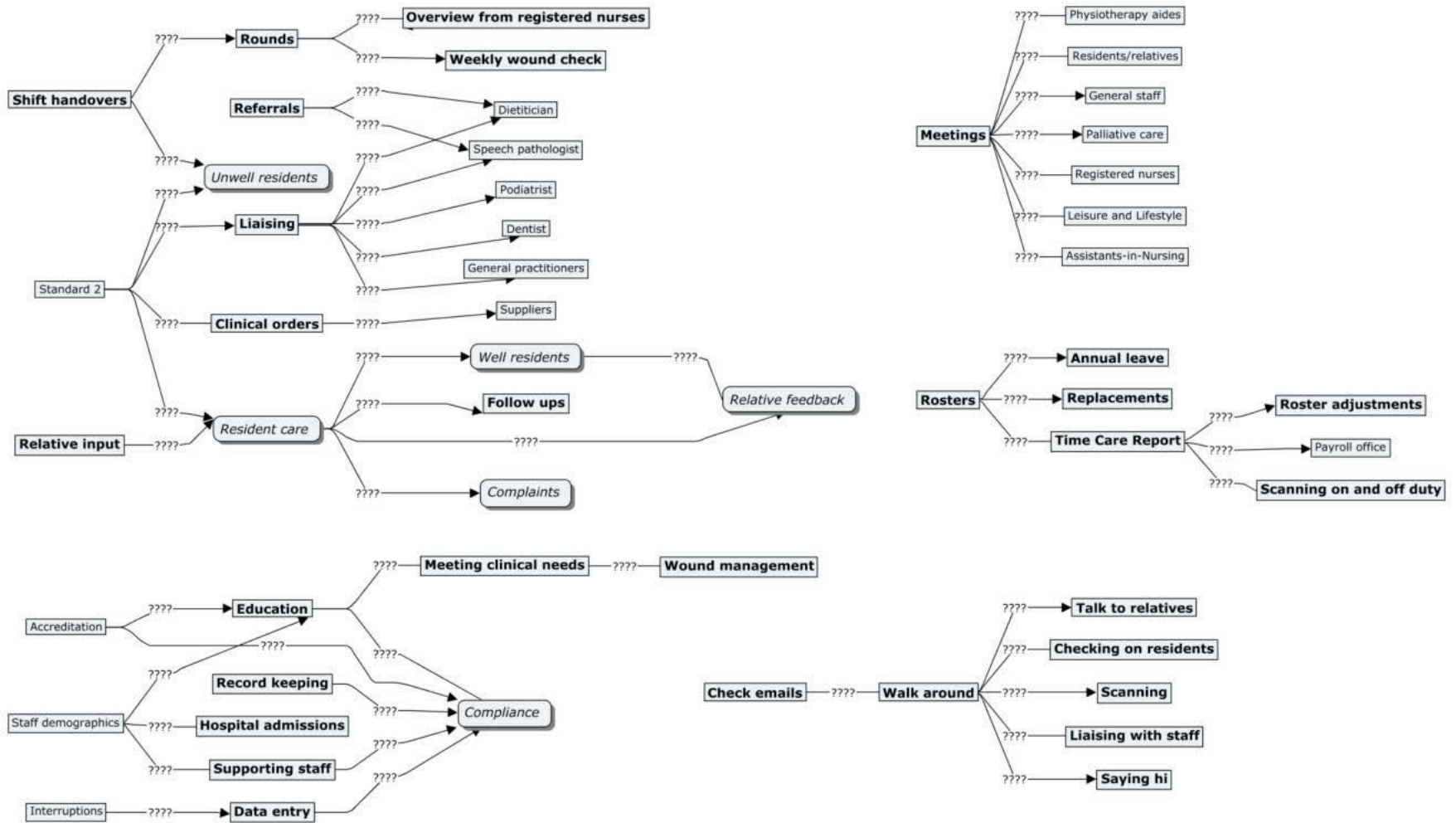
The cognitive map of the OM (North) is very large; with 51 nodes, it is almost double the size of that of the OM (South). The map also contains extremely long and complex causal chains, with up to ten nodes sequentially linked and in at least one case, forming a complete cycle (due to a terminal node being duplicated at the start of the causal chain). Incorporated in these lengthy causal chains are both operational activities and financial priorities, with explicit links drawn between costs and revenues, and between revenues and capacity to maintain core processes. However, the only costs incorporated in the more complex causal chains are those related directly to care provision (i.e. care staff salaries and wages). The need to manage other costs, such as food and medical supplies, are mentioned but not connected to specific outcomes or the major clusters. The cognitive map of the OM (South), on the other hand, is very small with 26 nodes that form a single large cluster, two key nodes and their causes/consequences, and a single unlinked node.

Taken together, these features indicate that operations managers consider a range of different activity sets when considering the inputs to the achievement of organisational priorities, but not all of these activity sets can be explicitly related to one another or to specific outcomes in a coherent manner. Overall, the complexity of the cognitive maps can be described as high, featuring a mix of sophisticated causal reasoning as well as lists of causally independent activities.

5.4.2. Local clinical managers

Figure 15 and Figure 16 (below) depict the cognitive maps of the local clinical managers of the North and South facilities respectively.

Figure 15: Local CM (North) cognitive map



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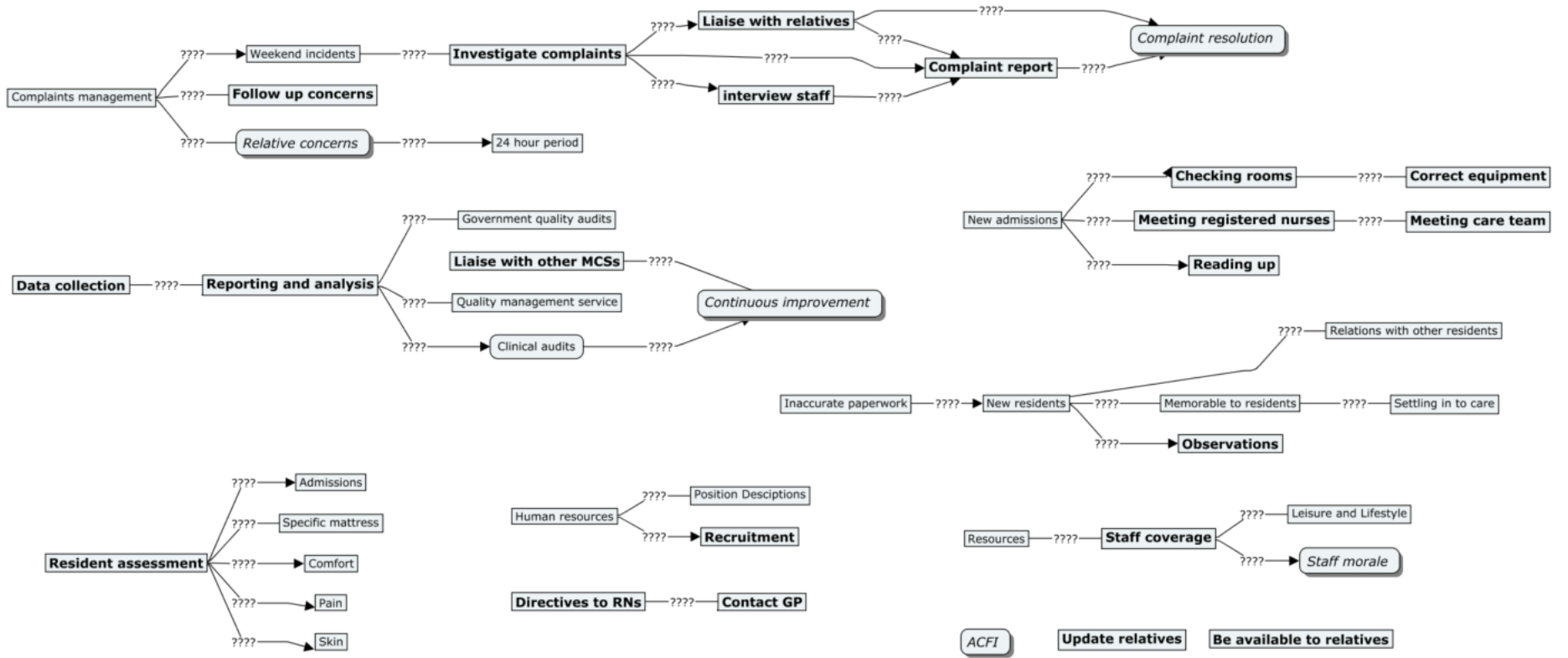


Table 17: Local CM (North) cognitive map legend

Concept/Node	Type	Description
24-hour period	Other	Facility policy that complaints/concerns be followed up within 24 hours of receipt.
Accreditation	Other	Category for tasks associated with maintaining compliance with government accreditation standards.
ACFI	Priority	Aged Care Funding Instrument income.
Admissions	Other	Assessment of residents who are newly admitted to the facility.
Annual leave	Activity	Allocating and approving staff requests for annual leave.
Assistants-in-Nursing	Other	Facility position – supervised by CM.
Be available to relatives	Activity	Ensuring that relatives have access to CM in order to raise concerns or complaints.
Check emails	Activity	Checking and responding to email inquiries.
Checking on residents	Activity	Physically checking the clinical condition of facility residents.
Checking rooms	Activity	Visually inspecting rooms assigned to incoming residents to ensure readiness.
Clinical audits	Activity	Routine audit and reporting on management of complex clinical care cases.
Clinical orders	Activity	Purchasing of supplies for the provision of clinical care to residents.
Comfort	Other	Component of routine resident assessment.
Complaint report	Activity	Producing a formal report relating to a complaint received from a resident or relative.
Complaint resolution	Priority	Complaints resolved to the satisfaction of all parties.
Complaints	Priority	Complaints received from facility residents, relatives, or other stakeholders.
Complaints management	Other	Category for tasks relating to the management of received complaints.
Compliance	Priority	Maintaining compliance with government accreditation standards for residential aged care.
Contact GP	Activity	Seeking advice from resident's General Practitioner regarding appropriate delivery of clinical care.
Continuous improvement	Priority	Facility processes are continually refined and updated to reflect industry best practice.
Correct equipment	Activity	Checking that the correct equipment is available in each resident's room to meet their care needs.
Data collection	Activity	Collection and reporting of clinical and operational data to third-party quality management provider.
Data entry	Activity	Maintenance of residents' electronic case files.
Dentist	Other	Type of provider of specialist resident care.
Dietitian	Other	Type of provider of specialist resident care.
Directives to RNs	Activity	Issuing direct instructions to Registered Nurses (RNs) with regard to care of facility residents.
Education	Activity	Providing ongoing professional education to facility staff.

Concept/Node	Type	Description
Follow up concerns	Activity	Making contact with residents or relatives who have raised a concern or complaint.
Follow ups	Activity	Checking the status of residents currently receiving complex clinical care.
General Practitioners	Other	Type of provider of specialist resident care.
General staff	Other	All facility staff.
Government quality audits	Other	Type of agency that receives quality reports from the facility.
Hospital admissions	Activity	Transferring residents to hospital for management of acute or chronic clinical conditions.
Human resources	Other	Category for tasks associated with management of facility staff.
Inaccurate paperwork	Other	Observation of frequently inaccurate documentation relating to potential incoming residents.
Interruptions	Other	Observation of frequency of interruptions with potential to compromise completeness and integrity of data entry.
Interview staff	Activity	Personally interviewing any facility staff involved in or associated with the subject complaint.
Investigate complaints	Activity	Conducting a comprehensive investigation of the circumstances surrounding the subject of a complaint.
Leisure and lifestyle	Other	Observation of difficulty maintaining sufficient staff coverage in Leisure and Lifestyle function.
Leisure and lifestyle officer	Other	Facility position – supervised by AM.
Liase with other CMs	Activity	Discussion of incidents or operations with clinical managers of other facilities.
Liase with relatives	Activity	Discussion of complaints and complaint management processes with relatives.
Liaising	Activity	Communication and collaboration with providers of specialist care to residents.
Liaising with staff	Activity	Maintaining ongoing communication with facility staff regarding current tasks, issues and priorities.
Meeting care team	Activity	Introducing all relevant care staff to a new resident and their relatives.
Meeting clinical needs	Activity	Meeting the clinical needs of facility residents (e.g. nursing care).
Meeting Registered Nurses	Activity	Introducing all relevant Registered Nurses to a new resident and their relatives.
Meetings	Activity	Chairing and attending meetings of staff groups within the facility.
Memorable to residents	Other	Observation that the clinical manager is relatively quickly and easily recognised by residents.
New admissions	Other	Category for tasks associated with the admission of a new resident to the facility.
New residents	Other	Category for observations related to the experience of new residents admitted to the facility.
Observations	Activity	Making frequent physical observations of new residents to assess clinical condition.

Concept/Node	Type	Description
Overview from Registered Nurses	Activity	Requesting a verbal report from Registered Nurses on shift regarding any current issues and priorities.
Pain	Other	Dimension of routine resident assessment.
Palliative care	Other	Type of meeting held routinely within the facility.
Payroll office	Other	Reference to role of payroll office in facilitating staff compensation.
Physiotherapy aides	Other	Facility position – supervised by CM.
Podiatrist	Other	Type of provider of specialist resident care.
Position descriptions	Other	Reference to role of position descriptions in human resource management.
Quality management service	Other	Type of agency that receives quality reports from the facility.
Reading up	Activity	Reviewing the clinical documentation associated with an incoming resident.
Record keeping	Activity	Maintaining accurate and complete records relating to resident care.
Recruitment	Activity	Hiring of new staff to ensure appropriate staff coverage in facility.
Referrals	Activity	Referring residents to providers of specialist clinical care.
Registered nurses	Other	Facility position – supervised by CM.
Relations with other residents	Other	Observation regarding role of interrelationships between facility residents.
Relative concerns	Priority	Feedback from relatives of residents regarding potential issues (often precipitating a formal complaint).
Relative feedback	Priority	General feedback from relatives relating to their satisfaction with the care provided to a resident.
Relative input	Activity	Seeking pre-emptive input from relatives into their preferences and suggestions for resident care.
Replacements	Activity	Ensuring that any staff members on leave are replaced by another staff member (internal or external).
Reporting and analysis	Activity	Compiling reports and preliminary analysis relating to clinical data collected at the facility.
Resident assessment	Activity	Routine head-to-toe assessment of clinical condition and wellbeing of facility residents.
Resident care	Priority	Residents are provided with care that meets or exceeds the regulatory minimum standards.
Residents/relatives	Other	Facility stakeholder group.
Resources	Other	Observation of need for adequate resources to enable effective facility operations.
Roster adjustments	Activity	Ensuring that final rosters reflect the shifts actually worked by facility staff during the period.
Rosters	Activity	Allocating shifts and producing a roster for clinical staff for a given period.
Rounds	Activity	Routine check of all wings/wards and residents to identify any current problems or issues.
Saying hi	Activity	Making friendly contact with all facility stakeholders encountered during rounds.

Concept/Node	Type	Description
Scanning	Activity	Maintaining awareness of the current state of the facility and its residents.
Scanning on and off duty	Activity	Ensuring that all staff complete the appropriate start-end of shift procedure.
Settling in to care	Other	Observation regarding the process of residents becoming accustomed to the residential care environment.
Shift handovers	Activity	Reporting on any issues, incidents, and bed movements during a shift to the incoming registered nurse.
Skin	Other	Dimension of routine resident assessment.
Specific mattress	Other	Dimension of routine resident assessment.
Speech pathologist	Other	Type of provider of specialist resident care.
Staff coverage	Activity	Ensuring adequate staff are present in the facility at any given time to ensure appropriate quality of resident care.
Staff demographics	Other	Observations about demographic make-up of Registered Nurse cohort.
Staff morale	Priority	Facility staff are generally happy with their roles and work environment.
Standard 2	Other	Category for tasks associated with ensuring compliance with government regulations regarding clinical care provision.
Suppliers	Other	Facility stakeholder group.
Supporting staff	Activity	Providing assistance, guidance, and emotional support to facility staff as required.
Talk to relatives	Activity	Initiating conversation with any relatives encountered during facility rounds.
Time care report	Activity	Producing report detailing shifts worked by staff for the purpose of facilitating accurate payroll.
Unwell residents	Priority	Facility residents who are experiencing a decline in their clinical condition (negative framing)
Update relatives	Activity	Keeping relatives informed regarding the clinical condition of facility residents.
Walk around	Activity	Spending time moving around the facility to facilitate accessibility and awareness of current operations.
Weekend incidents	Other	Incidents which occur during the weekend and outside of the direct supervision of the Clinical Manager.
Weekly wound check	Activity	Routine physical inspection of any residents with wounds requiring ongoing treatment.
Well residents	Priority	Facility residents who are experiencing high levels of wellbeing given their clinical condition.
Wound management	Activity	Ongoing treatment of residents with chronic wounds.

Figure 16: Local CM (South) cognitive map

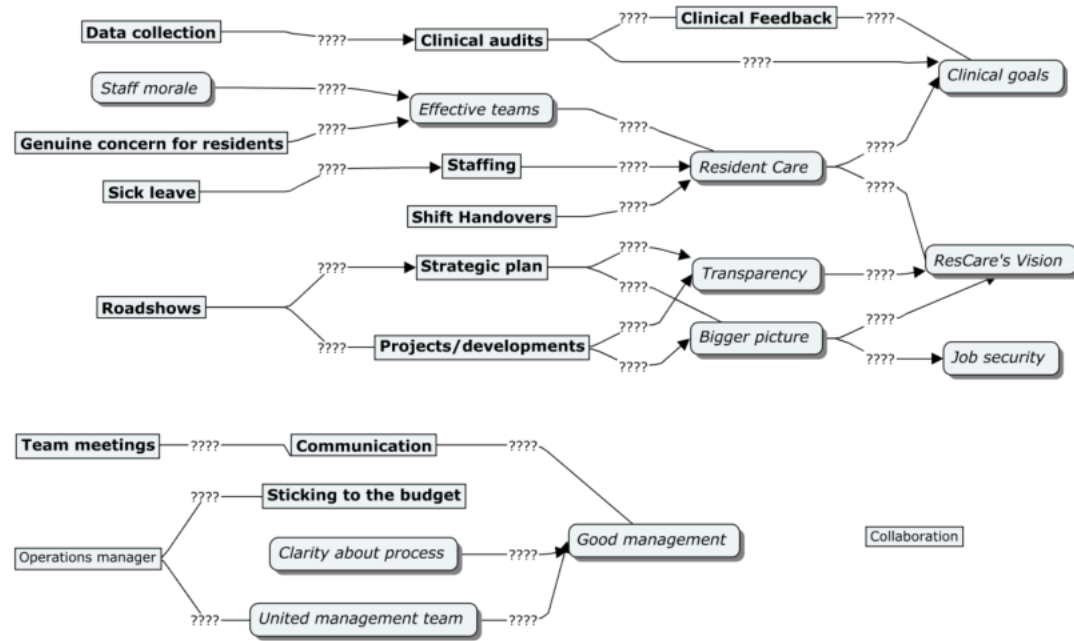


Table 18: Local CM (South) cognitive map legend

Concept/Node	Type	Description
Clarity about process	Priority	Local facility management team clearly understand the expectations of their role and facility processes.
Clinical audits	Activity	Routine audit and reporting on management of complex clinical care cases.
Clinical feedback	Activity	Receiving feedback from senior management with regard to management of complex clinical care cases.
Clinical goals	Priority	Meeting the clinical needs of facility residents (e.g. nursing care).
Collaboration	Other	Reference to ResCare value of working together.
Communication	Activity	Ensuring regular and effective communication between members of the local facility management team.
Data collection	Activity	Collection and reporting of clinical and operational data to third-party quality management provider.
Effective teams	Priority	Teams of facility staff work together effectively and cohesively.
Genuine concern for residents	Activity	Facility staff demonstrate genuine concern for the safety and wellbeing of facility residents.
Good management	Priority	Local facility management team functions effectively.
Job security	Priority	Facility staff feel secure in their employment at ResCare.
Operations Manager	Other	Facility position – supervisor of CM.
Projects/development	Activity	Management of ongoing major projects within ResCare.
ResCare’s vision	Priority	ResCare provides service to “ordinary Australians” requiring residential aged care.
Resident care	Priority	Residents are provided with care that meets or exceeds the regulatory minimum standards.
Roadshows	Activity	Presentation to facility staff by senior management regarding ResCare’s strategy, performance and plans.
Shift handovers	Activity	Reporting on any issues, incidents, and bed movements during a shift to the incoming Registered Nurse.
Sick leave	Activity	Daily replacement of staff absent due to illness.
Staff morale	Priority	Facility staff are generally happy with their roles and work environment.
Staffing	Activity	Management of costs associated with staffing the facility.
Sticking to the budget	Activity	Ensuring that expenditure on supplies is within the limits established by the operational budget.
Strategic plan	Activity	Development and maintenance of a coherent plan for implementation of ResCare’s strategy.
Team meetings	Activity	Conducting regular meetings of the local facility management team.
Transparency	Priority	Facility staff feel that managers communicate freely and transparently with them.
United management team	Priority	Local facility management team works together as a unit.

Organisational priorities

While both local clinical managers characterise organisational priorities in purely operational terms, there is no explicit overlap in the priorities included in the two cognitive maps. In the case of the relatively large cognitive map of the CM (North), only a very small proportion of the nodes represent priorities or outcomes (as opposed to activities or tasks). The priorities that are mentioned relate to operational-level outcomes, such as reduced complaints, compliance, continuous improvement, or staff satisfaction; however, not every cluster of nodes includes a specific priority or outcome, and priorities are not related to one another. On the other hand, the cognitive map of the CM (South) includes explicit reference to a more diverse range of organisational priorities such as resident care, the achievement of clinical goals, “good management”, and the fulfilment of ResCare’s mission of providing care to “ordinary Australians”.

Organisational activities

A similar pattern is apparent in the organisational activities reflected in the cognitive maps of the two local clinical managers. There is some overlap in the organisational activities identified by these managers as being important, with at least six common nodes in their cognitive maps, including: resident care, quality audits, feedback, data collection, staffing, and various meetings. These overlapping activities are exclusively operational in nature and fall entirely within the functional domain of the managers (that is, they relate to the tasks and activities that are the responsibility of the local clinical manager). However, there are significant differences between the two cognitive maps in terms of the types of activities mentioned and relationships between them.

While the cognitive map of the CM (North) incorporates a very large number of activities, many of the clusters of nodes are essentially lists of related tasks in an activity set – such as the specific checklist items in a resident health assessment, or the process for investigating and responding to complaints. Overall, the map more appears to reflect the set of tasks and activities associated with the local clinical manager role, without any explication of the relationships between the activity sets, or to any overarching outcome or goal. In contrast, the much smaller and more focused cognitive map of the OM (South) includes explicit reference to management systems and processes such as strategic planning, projects, the budget, and ResCare’s overarching vision. These systems and processes are linked to each other as well as to more operational components of the clinical

manager's role. This cognitive map also contains reference to more abstract activities or inputs that relate to ResCare's values, including transparency, communication, and teamwork.

Causal beliefs

The most significant point of variation between the cognitive maps of the two local clinical managers is in their overall composition and the nature of the relationships articulated between organisational activities and priorities. The cognitive map of the CM (North) facility is the largest of the local managers', with 106 nodes incorporated into 13 discrete clusters (with some unlinked nodes). However, the majority of these nodes are not causally related to one another, with very few actual causal attributions present in the cognitive map. Instead, connections between nodes seem to represent conceptual or chronological, rather than causal, relationships. The cognitive map of the CM (South) exhibits quite different patterns of causal beliefs. This cognitive map is small but very focused; it is made up of 26 nodes clustered into two main groups (plus one unlinked node), and contains almost exclusively causal (rather than conceptual or chronological) relationships.

Perhaps the only consistent characteristic of the complexity of the two cognitive maps is the lack of long causal chains, with the longest sequence in each map only made up of four or five linked activities and outcomes. However, while the patterns of causal beliefs of the two local clinical managers exhibit quite different features, the overall complexity of the cognitive maps is similar.

Given that each participant's map is *either* very large *or* very connected *and* is made up of small-to-medium length causal chains, it would appear that the overall complexity for this group is moderate.

5.4.3. Local accommodation managers

Figure 17 and Figure 18 (below) depict the cognitive maps of the local accommodation managers of the North and South facilities respectively.

Figure 17: Local AM (North) cognitive map

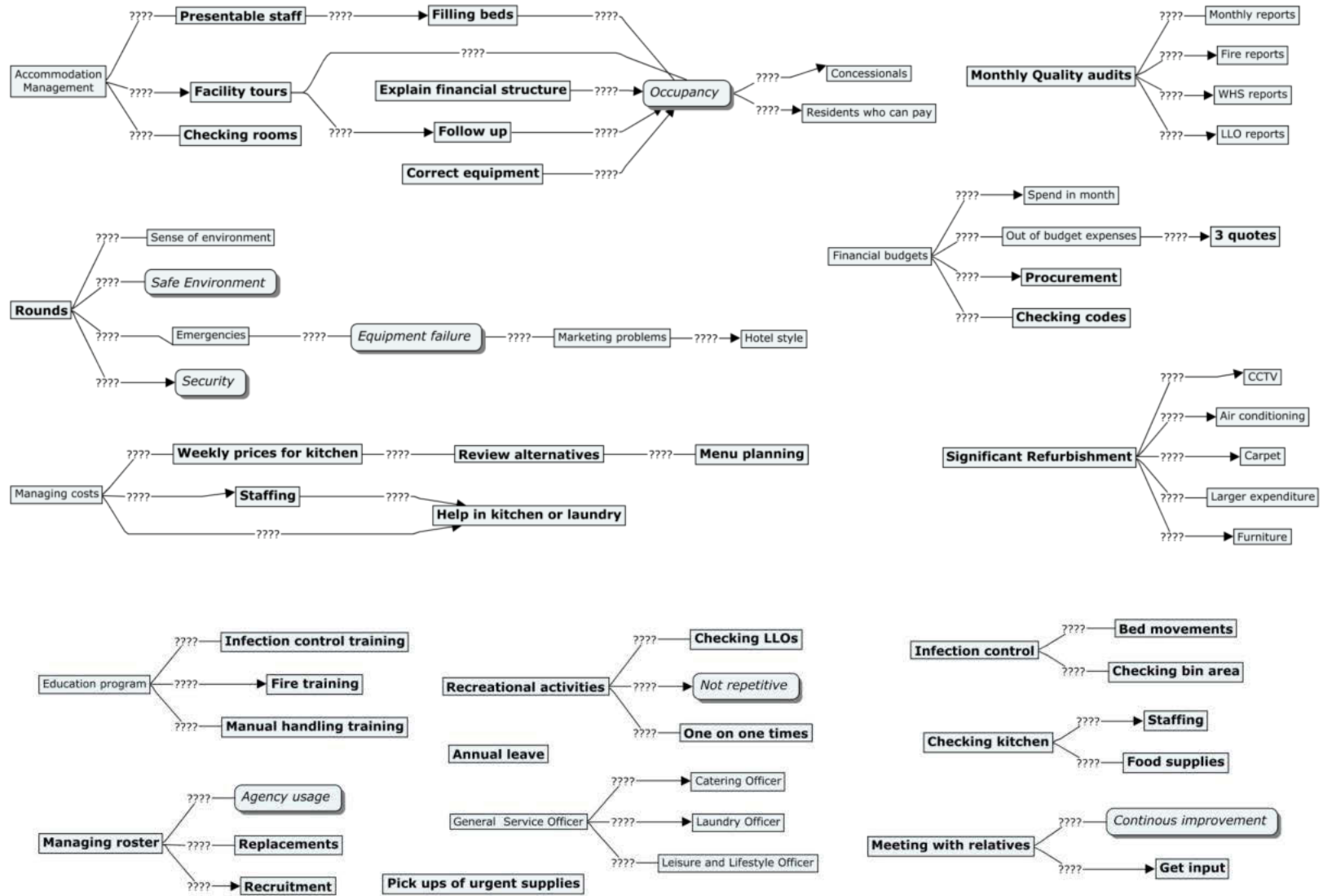


Table 19: Local AM (North) cognitive map legend

Concept/Node	Type	Description
3 quotes	Other	Policy that all out-of-budget expenditure is supported by at least three quotes for the same product/service.
Accommodation management	Other	Category for tasks associated with management of facility accommodation.
Agency usage	Priority	Reliance on external labour agencies to provide contract staff to ensure appropriate coverage in facility (negative framing).
Air conditioning	Other	Type of significant refurbishment expenditure.
Annual leave	Activity	Allocating and approving staff requests for annual leave.
Bed movements	Activity	Maintaining accurate records of movement of residents in and out of the facility.
Carpet	Other	Type of significant refurbishment expenditure.
Catering Officer	Other	Facility position – supervised by AM.
CCTV	Other	Type of significant refurbishment expenditure.
Checking bin area	Activity	Physically inspecting the cleanliness of waste storage area in facility.
Checking codes	Activity	Ensuring that all funds spent by facility are assigned to the correct cost codes.
Checking kitchen	Activity	Physically inspecting the kitchen and catering operations in the facility.
Checking LLOs	Activity	Supervision of facility leisure and lifestyle officers (LLOs).
Checking rooms	Activity	Visually inspecting rooms assigned to incoming residents to ensure readiness.
Concessionals	Other	Facility residents who are fully financially supported by the government.
Continuous improvement	Priority	Facility processes are continually refined and updated to reflect industry best practice.
Correct equipment	Activity	Checking that the correct equipment is available in each resident's room to meet their care needs.
Education program	Other	Category for the implementation of ongoing professional education of all facility staff.
Emergencies	Other	Emergency scenarios (e.g. facility fire, flooding, power outages).
Equipment failure	Priority	Essential plant and equipment fails to function appropriately (negative framing).
Explain financial structure	Activity	Explaining the financial obligations of residential care to prospective residents and/or their relatives.
Facility tours	Activity	Conducting tours of the facility with prospective residents and/or their relatives.
Filling beds	Activity	Sales activities aimed at admitting new residents to the facility.
Financial budgets	Other	Category for activities associated with managing facility financial budgets.
Fire reports	Other	Type of monthly report produced under the quality assurance program.
Fire training	Activity	Training of facility staff in appropriate responses to fire-related emergency scenarios.

Concept/Node	Type	Description
Follow up	Activity	Making contact with prospective residents and/or their relatives following an enquiry.
Food supplies	Activity	Checking that appropriate volume and quality of food is ordered for facility; making special food orders.
Furniture	Other	Type of significant refurbishment expenditure.
General Service Officer	Other	Facility position – supervised by AM.
Get input	Activity	Seeking feedback and other input from residents and relatives about improvement of facility.
Help in kitchen or laundry	Activity	Physically assisting catering and/or laundry staff when the need arises.
Hotel style	Other	Facility displays characteristics and features similar to those of a hotel.
Infection control	Activity	Maintaining compliance with procedures to avoid spread of infection within facility.
Infection control training	Activity	Training of facility staff in appropriate procedures for avoiding spread of infection within facility.
Larger expenditure	Other	Observation of recently increased capital expenditure relating to significant refurbishment program.
Laundry Officer	Other	Facility position – supervised by AM.
Leisure and Lifestyle Officer	Other	Facility position – supervised by AM.
LLO reports	Other	Type of monthly report by leisure and lifestyle officer produced under the quality assurance program.
Managing costs	Other	Category for tasks associated with management of facility costs and expenses.
Managing roster	Activity	Ensuring appropriate staff coverage in facility on a weekly basis.
Manual handling training	Activity	Training of facility staff in appropriate technique for manual handling of facility residents.
Marketing problems	Other	Difficulty placing new residents in unoccupied beds due to poor reputation.
Meeting with relatives	Activity	Face to face discussion between facility managers and relatives of residents.
Menu planning	Activity	Design of nutritionally balanced catering menus for resident meals.
Monthly quality audits	Activity	Quality assurance program involving monthly audits and reporting on core facility processes.
Monthly reports	Other	Type of monthly report produced under the quality assurance program.
Not repetitive	Priority	Recreational activities provided by facility are not repetitive or unappealing to residents.
Occupancy	Priority	The ratio of facility beds that are occupied by residents to those remaining unoccupied.
One-on-one times	Activity	Provision of regular one-on-one interaction with facility residents by leisure and lifestyle officers.
Out of budget expenses	Other	Procedure for making purchases in excess of budget limit for facility.

Concept/Node	Type	Description
Pick up urgent supplies	Activity	Travelling off-site to collect orders of supplies which are needed urgently.
Presentable staff	Activity	Ensuring facility staff maintain appropriate standards of personal presentation (e.g. uniform, grooming).
Procurement	Activity	Purchasing of plant, equipment, and other supplies to meet the facility's needs.
Recreational Activities	Activity	Provision of meaningful diversional activities for facility residents.
Recruitment	Activity	Hiring of new staff to ensure appropriate staff coverage in facility.
Replacements	Activity	Ensuring that any staff members on leave are replaced by another staff member (internal or external).
Residents who can pay	Other	Facility residents who contribute financially to their care and accommodation.
Review alternatives	Activity	Review of price lists from alternative catering suppliers.
Rounds	Activity	Regular inspection of the facility and its residents to identify any salient problems or issues.
Safe environment	Priority	Facility meets the appropriate standards for ensuring resident safety.
Security	Priority	Security features ensure that access in and out of the facility is restricted to authorised personnel.
Sense of environment	Other	Having an awareness of the state of the facility as a whole.
Significant refurbishment	Activity	Government program for the undertaking of significant capital works to improve facility infrastructure for residents.
Spend in month	Other	Policy that budgeted funds be spent in the month to which they are allocated.
Staffing	Activity	Management of costs associated with staffing the facility.
Weekly prices for kitchen	Activity	Review of weekly price lists from major catering suppliers.
WHS reports	Other	Monthly work health and safety report produced under the quality assurance program.

Figure 18: Local AM (South) cognitive map

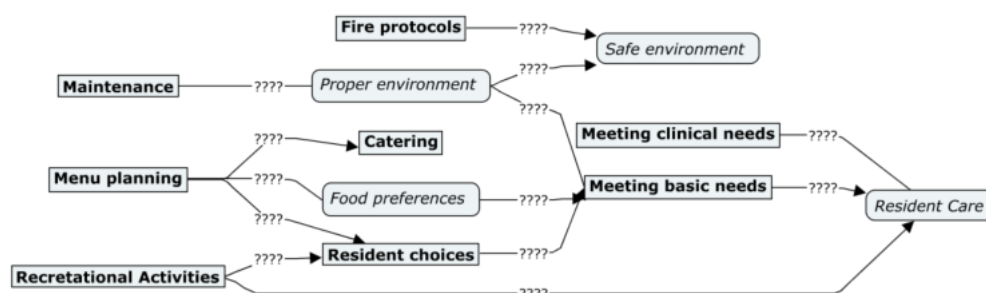


Table 20: Local AM (South) cognitive map legend

Concept/Node	Type	Description
Catering	Activity	Provision of in-house catering services to residents.
Fire protocols	Activity	Maintaining facility readiness to deal with fire-related emergency scenarios.
Food preferences	Priority	Residents are offered catering options which suit their individual preferences.
Maintenance	Activity	Ensuring appropriate upkeep of facility property, plant and equipment.
Meeting basic needs	Activity	Meeting the basic needs of facility residents (e.g. lifestyle and wellbeing).
Meeting clinical needs	Activity	Meeting the clinical needs of facility residents (e.g. nursing care).
Menu planning	Activity	Design of nutritionally balanced catering menus for resident meals.
Proper environment	Priority	Facility is well presented and meets the appropriate standards of upkeep.
Recreational activities	Activity	Provision of meaningful diversional activities for facility residents.
Resident care	Priority	Residents are provided with care that meets or exceeds the regulatory minimum standards.
Resident choices	Activity	Providing a range of options from which residents can select their preferences.
Safe environment	Priority	Facility meets the appropriate standards for ensuring resident safety.

Organisational priorities

As in the case of the two local clinical managers, there is no overlap in the organisational priorities identified by the two local accommodation managers. Like the CM (North), the cognitive map of the AM (North) is a very large map of 68 nodes across 13 clusters (plus several unlinked nodes). However, this map contains few identifiable references to organisational priorities; in fact, only one cluster makes reference to a priority or outcome, being facility occupancy. The AM (South), on the other hand, clearly identifies resident care as the highest organisational priority (as the terminal node) within their cognitive map, and mentions other explicit priorities such as safety and meeting residents' basic needs. In both cases, organisational priorities are framed in purely operational terms.

Organisational activities

The cognitive maps of the two local accommodation managers share five common activities: recreational activities, menu planning/catering, fire risk management, physical environment, and safety. As with the local clinical managers, each of these shared activities is operational in nature and relates to the specific functional tasks and activities that fall under the responsibility of the local accommodation manager role. The AM (North) also identifies a large number of additional activities in the cognitive map, but as with the CM (North), these remaining clusters appear to contain activity and task sets that are related conceptually or chronologically, with no clear relationship between the clusters or to an overarching outcome. As a result, the overall cognitive map better resembles the detail of a position description than a network linking activities to organisational priorities.

Causal beliefs

Like the local clinical managers, the cognitive maps of the two local accommodation managers are *either* very large *or* very connected *and* are made up of small-to-medium length causal chains. As such, while there are significant differences in the composition of the maps, the overall complexity in both cases can be described as moderate. While the cognitive map of the AM (North) is very large map, it contains few clear outcomes and fewer explicit causal attributions linking activities with priorities. Only one cluster appears to link activities to an aspect of success for ResCare, in which the presentation of the facility and its staff, along with the undertaking of facility tours with prospective residents and relatives, is related to facility occupancy. In clear contrast, the cognitive

map of the AM (South) is very small and focused, with only 12 nodes in total – all of which are contained within a single cluster. However, the few nodes that are identified form a relatively comprehensive map with a clear causal structure. This map also contains an implicit reference to the role of the clinical manager, in that clinical needs are related to the ultimate goal of resident care while not being directly linked to any of the activities within the accommodation manager's portfolio.

5.5. Patterns of Variation in Cognitive Maps

The description and analysis of the cognitive maps of each of the management groups in the previous section enables additional analysis of the patterns of variation *between* the management groups. Identifying patterns of variation in this way allows for the generation of a preliminary explanation of the organisational factors which may influence the development of managers' causal mental models. The potential factors considered in this chapter are: the level of management (i.e. senior vs local management); management function (i.e. general operations vs clinical management vs accommodation management); and physical proximity of team members (i.e. corporate vs locally based managers). I also consider two additional, non-organisational sources of variation (educational background, and role experience) in order to consider and exclude these effects from my analysis of the relationship between the use of management control systems and the development of managers' causal mental models in the following chapter.

5.5.1. Levels of management

The detailed comparative analysis of the cognitive maps produced by sub-groups of participants reveals additional patterns of variation between the different levels of management at ResCare. First, the overall complexity of the maps appears to increase with the level of management, with senior managers producing the most complex cognitive maps of the sample. While there is significant variation in terms of the size of the maps, those of senior managers are the most connected and typically contain the large numbers of long, complex causal chains. Second, the activities incorporated in the cognitive maps of senior managers appear more likely to feature references to corporate level management systems and processes, while the cognitive maps of local managers contain more references to facility level operations. Finally, the cognitive maps of senior

managers explicitly incorporate long-term outcomes often framed in financial terms, while local managers more likely to cite local, non-financial priorities, if any.

5.5.2. Functional management

Some variation in the cognitive maps may be attributable to the functional component of managers' roles; that is, whether managers are directly responsible for general operations, the delivery of clinical care, or the provision of accommodation services. While operations managers at the senior and local level do not appear to share a lot of cognitive map features, these managers make more frequent reference to the management of staff and staff-related outcomes than managers of other functions. Operations managers also produced the most complex cognitive maps *within their level of management*, in that the cognitive maps of local operations managers are more complex than those of local functional managers, while the cognitive maps of senior operations managers are the most complex of the entire sample of participants.

The cognitive maps of senior and local clinical managers also share some common features, predominantly relating to the content of the maps. All three maps incorporate a large proportion of nodes that relate to the delivery of ResCare's core service offering, being the provision of clinical care. However, the ability of the manager to relate these activities to outcomes or aspects of success for ResCare remains variable. The general clinical manager relates these core processes to long-term priorities and drivers of success. The clinical manager of the South facility also relates the provision of care to long-term priorities, but with more of a focus on operational drivers than longer-term, macroeconomic factors. Finally, the clinical manager of the North facility provides an extraordinarily comprehensive view of the tasks and activities involved in the provision of care at the operational level, but does not systematically relate these to either short- or long-term outcomes.

With respect to the cognitive maps of ResCare accommodation managers, very little similarity is evident. The cognitive map of the general accommodation manager focuses almost entirely on financial management, financial education, and – ultimately – financial success. In contrast, the cognitive maps of the two local accommodation managers share numerous nodes relating to the tasks and responsibilities embedded in their position descriptions, but have no clearly identifiable

features in common with the senior accommodation manager. Complexity of the maps varies significantly between all three managers.

5.5.3. *Physical proximity of team members*

Considerably greater variation in the cognitive maps appears to be related to the physical proximity of participants, which is largely driven by the team structure within the management hierarchy. There are three clearly identifiable groups of physically proximate managers within the larger sample; the senior management (corporate) team (excluding the CFO, who operates out of a secondary corporate office); the local managers of the North facility; and the local managers of the South facility.

The cognitive maps of the senior management team as a group are relatively complex and contain numerous lengthy causal chains, with some variation in size and number of clusters. However, all of the maps emphasise primarily corporate-level activities and drivers, and contain explicit reference to long-term aspects of success at ResCare.

Some similarity is apparent in the cognitive maps of the three local managers of the North facility. These maps are among the largest of the group, and feature a minimum of four independent clusters, plus unlinked nodes. The three maps share a number of common nodes relating to operational level activities and processes, such as reporting, roster management, education, and engagement with relatives. However, only the operations manager is able to systematically connect these operational activities to specific priorities related to the success of ResCare.

The local managers of the South facility have the most in common in terms of the features of their cognitive maps. All three maps are significantly smaller than the other participants, and consist of only a small number of clusters which contain causal chains of moderate length. There is substantial overlap in the maps of the operations manager and the clinical manager, both of whom mention a number of more system-level activities and outcomes such as strategic planning, transparency/communication, and staff morale. There is less overlap with the accommodation manager, perhaps due to the extremely small number of nodes in this map.

5.5.4. Additional sources of variation

Two additional sources of variation that are not related to ResCare's systems, processes and structures were included in the analysis, based on ex-ante expectations that these factors might also influence the development of managers' causal mental models. These factors are the professional background of the manager and the manager's level of experience in their current role within ResCare.

There are two main educational/professional backgrounds from which ResCare managers are hired: geriatric nursing, and business/commerce. The managers with a nursing qualification include: the CEO, GCM, local OM-North, and both local clinical managers. The managers from a more general business/commerce background include: the GMO, GAM, local OM-South, and the two accommodation managers. Somewhat surprisingly, there does not appear to be any clear common themes in the cognitive maps of either group that is not better explained by other sub-groupings.

A final point of analysis relates to the relative experience and role tenure of each participating manager as a driver of variation in the cognitive maps. For this grouping, the managers are divided into those who had been in their current positions for less than one year, and those who have more than one year's tenure in their roles. Of the eleven managers in the sample, three fell into the former category while the remaining nine fell into the later (note: this is by design, as I selected participants for the study based in part on their relative experience/tenure). The three relatively short-tenured managers are the CFO, GOM, and local AM (North).

In the case of the CFO, very few differences can be identified which may be attributable to limited experience at ResCare. This cognitive map is large and very complex, with all nodes but one forming a single cluster. This cluster includes a number of clear, long-term outcomes which appear to be driven by a range of management systems and processes, as well as strategic, growth-related initiatives. In contrast, the cognitive map of the local AM-North is very large but much less complex, with thirteen independent clusters and few identifiable outcomes or causal attributions. While the lack of complexity in this cognitive map may at first appear related to tenure, the similarity to the cognitive map of the much more experienced local clinical manager of the North facility would suggest a different interpretation.

A more ambiguous case is that of the GOM, who had been in the current role for less than twelve months and previously worked as a local operations manager at ResCare. The cognitive map of the GOM is different to those of the other two senior operations managers in two respects: first, it exhibits somewhat lower complexity with a smaller size and multiple clusters; and second, it makes reference to numerous operational (rather than corporate) activities and outcomes. In these respects, the map bears greater resemblance to those of the two local operations managers in the sample, as well as in the focus on engaging stakeholders, including staff. However, the primary cluster in the cognitive map does relate to corporate level activities and outcomes not dissimilar to the other managers in the senior operations management group. One interpretation is that the GOM is still in the process of transitioning between the role and associated causal mental model of a local manager, and the new role and more complex causal mental model of a general manager.

5.5.5. Summary of patterns of variation in cognitive maps

ResCare managers' cognitive maps of organisational success exhibit identifiable patterns of variation which can be related to their hierarchical management level, functional organisational role, and the physical proximity of team members. The primary patterns of variation relating to management level and function are summarised in Table 21.

Table 21: Summary of patterns of variation in cognitive maps

Sub-Group	Priorities	Activities	Causal beliefs
Senior Managers	<ul style="list-style-type: none"> • Corporate/strategic level priorities, e.g. financial outcomes, corporate growth, process improvement • Long time horizon 	<ul style="list-style-type: none"> • Relatively abstract in nature • Corporate/strategic level activities and processes • Explicit reference to MCS • Partially reflect functional roles 	<ul style="list-style-type: none"> • Highly complex networks of cause-and-effect relations • Typically only 1–2 clusters of nodes • Include indirect, contingent and equifinal relations
Local Operations Managers	<ul style="list-style-type: none"> • Reflective of diverse range of centre-level stakeholders, e.g. staff, residents, relatives • Few references to financial outcomes 	<ul style="list-style-type: none"> • Centre-level activities and processes • References to management and wellbeing of staff, residents and relatives 	<ul style="list-style-type: none"> • Relatively long and complex causal chains • Some unlinked nodes • Not all activity sets related to each other or to priorities
Local Clinical Managers	<ul style="list-style-type: none"> • Little overlap between clinical managers • Variation in level of specificity • Variation in ratio of priorities/activities 	<ul style="list-style-type: none"> • Some overlap in organisational activities • Common nodes relate to functional role 	<ul style="list-style-type: none"> • Significant variation in size and complexity of causal networks • Few long causal chains
Local Accommodation Managers	<ul style="list-style-type: none"> • No overlap between accommodation managers • Low ratios of priorities to nodes • Operational level 	<ul style="list-style-type: none"> • Some overlap in organisational activities • Common nodes relate to functional role 	<ul style="list-style-type: none"> • Either very large or very connected • Small-to-medium length causal chains

In Chapter 6, I relate these patterns of variation to the variation in the extent and nature of engagement with each of the primary management control systems. This is done for each level and function of managers at ResCare in order to determine the relationship between the use of management control systems and the development of managers' causal mental models.

5.6. Conclusion

In this chapter I have presented and analysed the cognitive maps of the eleven ResCare managers that participated in the empirical study, in order to identify and explain the features and patterns of variation in these managers' causal mental models. I analysed the cognitive maps in terms of

the three dimensions of causal mental models identified in Chapter 2, and in four small groups relating to the level and function of management. The cognitive maps of senior managers were found to emphasise *strategic* level priorities and activities, which were connected by highly complex systems of causal beliefs that included long causal chains and high levels of connectedness. The cognitive maps of local operations managers also exhibited high levels of complexity in the causal beliefs that were represented; however, operations managers' knowledge of organisational priorities and activities were more likely to focus on the *operational* level. In the case of both local clinical and local accommodation managers, significant differences were identified in the content and composition of the cognitive maps. However, these participants also included almost exclusively *operational* priorities and activities, which were connected by systems of causal beliefs that exhibited moderate complexity.

My analysis of the cognitive maps also included consideration of additional organisational factors driving patterns of variation in the features of the cognitive maps. The level of management was found to be associated with the overall level of complexity of the maps, while management function was found to be associated with variation in the underlying content. Physical proximity of team members appears to have had some influence on cognitive map similarity. While the relative role tenure and experience of managers did not seem to have a significant influence on the development of cognitive maps, it would appear that a transition between roles relates to a corresponding transition in the features of the cognitive map. On balance, the professional background of managers did not seem to be associated with variation in the cognitive maps. In the following chapter, I use this analysis to develop an explanation of how management control systems relate to the development of managers' causal mental models.

Chapter 6: Theoretical Model

6.1. Introduction

The aim of this chapter is to present the results of my analysis of the relationship between the design and use of management control systems at ResCare (detailed in Chapter 4), and the development of managers' causal mental models (detailed in Chapter 5). My analysis in Chapter 4 revealed distinctly different patterns in the engagement with management control systems by general managers compared with local operational and functional managers; each group of managers pay attention to different types of management control systems and demonstrate differing capacity and inclination to engage with the design as opposed to the content of each. Similarly, my analysis of ResCare's managers' cognitive maps in Chapter 5 revealed distinct patterns of variation in the content and composition of the causal mental models by each of the management groups. In this chapter I relate the variation in engagement with management control systems to the variation in the content and composition of each management group's causal mental models; this is used to generate a theoretical explanation of the general relationship between management control systems and managers' causal mental models.

In Section 6.2 I analyse the relation between *general* managers' use of and engagement with management control systems, and the content and composition of these managers' causal mental models. First, I explain the patterns of engagement with management control systems of senior managers at ResCare, before systematically relating these patterns to patterns of variation in senior managers' causal mental models. I consider how the use of information generated by management control systems contributes to the refinement and change of senior managers' causal mental models. I also consider how senior managers embed their strategic knowledge and causal beliefs into the design of the components of management control systems. Based on this analysis, I then develop theoretical expectations of the effect of management control systems on general managers' causal mental models, and the effect of senior managers' causal mental models on management control systems.

In Section 6.3, I adopt the same analytic techniques to analyse the relation between *local* managers' causal mental models and their patterns of engagement with management control systems. In this

analysis, I differentiate between local operational and local functional managers' roles at the operational level, as well as consider the patterns evident within the different business units studied empirically. Specifically, I consider how the different patterns of engagement with management control systems in the two facilities studied contribute to variation in the causal mental models of local operational and functional managers. Finally, in Section 6.4, I synthesise my findings and present a general theoretical model of the relationship between management control and the development of managers' causal mental models. I then reflect on the implications of the theoretical model for the strategic performance measurement and wider accounting judgement and decision making literature.

6.2. Senior Managers' Engagement with Management Control Systems

In the discussion and analysis presented in Chapter 4, I showed how ResCare's senior managers engage with each of the three primary management control systems: the operating budget, the Scoreboard, and policies and procedures. Of these three primary management control systems, senior managers devoted most of their attention to the operating budget and to the Scoreboard system. Not only did senior managers regularly review the quantitative performance information generated by these systems, they also frequently reviewed the overarching design with respect to the specific measures incorporated in the system.

The operating budget is prepared by the senior management team⁴⁰ who determine both the line items to be included as well as the appropriate level of budget targets for each period. Once the budget was operational, however, senior managers tried to de-emphasise the implicitly financial nature of the budget targets and instead used budget reports to evaluate current strategies and projects; this then triggered high-level discussions with local management regarding changing strategic priorities. Senior managers were careful to "never do financials first" (GOM) in their interactions with local managers, in order to balance emphasis on financial outcomes and encourage closer engagement with the (primarily non-financial) drivers of performance.

⁴⁰ The senior management team is supported by the finance team in the preparation of the operating budget, which is ultimately subject to approval by the Board Advisory Committee.

Senior managers were also responsible for the design of the Scoreboard system, which incorporated both financial and non-financial KPIs based on the underlying strategy map (see Figure 7). These measures were updated frequently to reflect the changing strategic priorities of the senior management team, and were intended to focus the attention of both senior and local management groups on these “leverage points”. An example of this process was the incorporation of additional measures related to the use of casual employment agencies to fill shifts left vacant due to staff leave. In this case, excessive use of employment agencies was identified by senior managers as a primary cause of unfavourable labour cost variances. As a result, a more frequent measure of agency costs (reported fortnightly instead of monthly) was added to the Scoreboard system; operational managers were strongly encouraged to focus on improving this particular measure in the short to medium-term. This imperative also led to the development of several roster management and employment initiatives run by the GOM in order to reduce reliance on external employment agencies across the group.

In contrast, senior managers did not appear to engage with the development or use of policies and procedures to the same extent as the operating budget and Scoreboard. For senior managers, the existence of a comprehensive library of policies and procedures was sufficient to ensure the standardisation of service delivery across the nine facilities; they demonstrated considerable ambivalence regarding the specific components or content of this system, and in most cases were happy to delegate the development and refinement of policies and procedures to local managers. Once policies and procedures became incorporated into the central library, however, senior managers became highly concerned with ensuring that these were communicated and implemented consistently across the organisation.

6.2.1. Implications for the content and composition of senior managers’ causal mental models

The pattern of engagement with management control systems by senior managers at ResCare is mirrored by the content and composition of their causal mental models. These causal mental models are highly complex, with high levels of connectedness between activities and outcomes. The content of the causal mental models primarily consists of activities at the strategic/corporate level, which are systematically related to long-term financial and non-financial outcomes. In some cases, the activities incorporated in senior managers’ causal mental models refer directly to

management control systems and processes. What is not present in the casual models, however, is any reference to significant operational tasks or outcomes.⁴¹

The content and composition of senior managers' causal mental models can be related to their engagement with management control systems in three ways. First, given the decentralised nature of ResCare, the use of management control systems represents a lever through which senior managers are able to enact change at the operating level and influence organisational success. As such, it is not surprising that senior managers' causal mental models incorporate explicit relationships between the use of management control systems and the achievement of long-term objectives, while omitting any specific reference to operational-level tasks and activities. This is because causal mental models represent an individuals' knowledge of how to *intervene* in a causal system in order to produce a desired goal or outcome (Klein & Hoffman 2008; Sloman 2005; Woodward 2003).

Second, the content of senior managers' causal mental models reflects the set of activities and outcomes that are measured and managed using the budget and Scoreboard systems. Together, these two systems comprise a relatively comprehensive set of measures of both the *drivers* of performance and the financial and non-financial performance *outcomes* to which they are linked via the underlying strategy map (see Figure 7). Senior managers at ResCare are concerned with both the overarching design of and performance information contained within the budget and Scoreboard, and devote considerable time and attention to the maintenance of these systems. This is in contrast to their ambivalence regarding the specific content of other systems such as the library of policies and procedures, in which case compliance and consistency is valued over the operational detail. These different patterns of engagement are reflected in the predominantly strategic-level activities and outcomes incorporated in senior managers' causal mental models, and extremely limited reference to operational-level activities and outcomes.

Third, senior managers' cognitive maps include a significantly greater proportion of performance drivers relative to performance outcomes. This pattern relates to senior managers' insistence on "counterweighting" the potential to overemphasise financial measures and outcomes over the (often non-financial) *drivers* of performance. This imperative is reflected both in the design of the

⁴¹ An exception to this pattern is the GOM. This was discussed in greater detail in Chapter 5.

Scoreboard system, which contains predominantly non-financial metrics, and the pattern of use of the budget and Scoreboard system, in which the budget is used not to interrogate financial outcomes but to trigger discussion of priorities and to evaluate the effectiveness of current strategies and projects. Across the senior management team, the priorities represented in the managers' causal mental models reflect a mix of financial and non-financial aspects of performance. However, some managers do not refer to financial outcomes at all (including, surprisingly, the GOM and CFO), while other managers incorporate multiple financial objectives in their causal mental models (specifically the GCM and GAM). This pattern appears to be related to the scope of each managers' functional role, with a more narrow focus leading to more specific causal attributions regarding the effect of strategic activities on financial outcomes.

Senior managers' engagement with management control systems also has implications for the process of *updating* and *refining* causal mental models.⁴² During the period of study, changes in senior managers' mental models were driven by engagement with the Scoreboard system. The Scoreboard system generates monthly performance data both for individual facilities and for the consolidated/corporate level, which is then reviewed by the senior management team upon its release. Senior managers prosecute significant favourable and unfavourable variances in order to understand why performance was different to their ex-ante expectations. A difference between expectations and reality is a trigger for the development or refinement of mental models (Endsley 1995), as this implies that the mental model used to generate those expectations is no longer aligned with the underlying system or phenomenon. In this way, new information provided by the Scoreboard system can prompt changes in senior managers' causal mental models.

In the case of the addition of new measures of external labour agency use (described in Section 6.2), discussion was initially triggered by analysis of unfavourable labour cost variances reported across multiple ResCare facilities over an extended period of time. The scale of the variance prompted senior managers to investigate the causes of the variance (using both Scoreboard and budget data, as well as discussions with local operations managers), of which agency labour usage was a significant factor. This process resulted in a significant increase in the attention paid by senior managers to the use of external labour agencies by facilities in all

⁴² Changes in mental models have been inferred based on analysis of longitudinal data collected as part of the study, as the cognitive mapping exercise was undertaken using a cross-sectional approach.

subsequent reviews of Scoreboard and budget data, as well as an increase in the emphasis placed on the outcome of agency costs in combined management level meetings and interactions. An expected result of this process is the incorporation of management of external labour agency use (an activity) and agency costs (a priority) into the causal mental models of senior and/or local managers.⁴³

6.2.2. Implications of senior managers' causal mental models for the design of management control systems

At ResCare, senior managers' causal mental models directly influenced the design of management control systems when senior managers' understanding of organisational priorities become reflected in the *components* of management control systems. Specifically, senior managers updated the components of the operating budget and Scoreboard in order to better align them with current strategic priorities. Often, these changes were themselves initiated by changes in managers' causal mental models; as senior managers' understanding of strategic priorities change, so too did the line items and measures incorporated in the operating budget and Scoreboard. In some cases, this involved the addition of measures, while in others it required their removal.

An example of this process was senior managers' decision to remove laundry costs as a specific KPI in the Scoreboard system. As discussed in Chapter 4, twelve months prior to the study a detailed cost analysis exercise prepared by the finance team revealed that laundry costs varied significantly between centres. Improving the efficiency of laundry processes became a strategic priority for ResCare senior managers; a measure of the cost of laundering bedlinens and residents' personal items was added to the Scoreboard in order to enable its oversight and focus local management attention on the issue. Once Scoreboard performance data demonstrated that laundry costs were being managed effectively and consistently across the nine centres, and that there was no longer a difference between expectations and performance, the measure was removed as it was no longer considered a strategic priority. In this manner, ResCare senior managers ensured that the *design* of the Scoreboard system remained aligned with their collective understanding of the

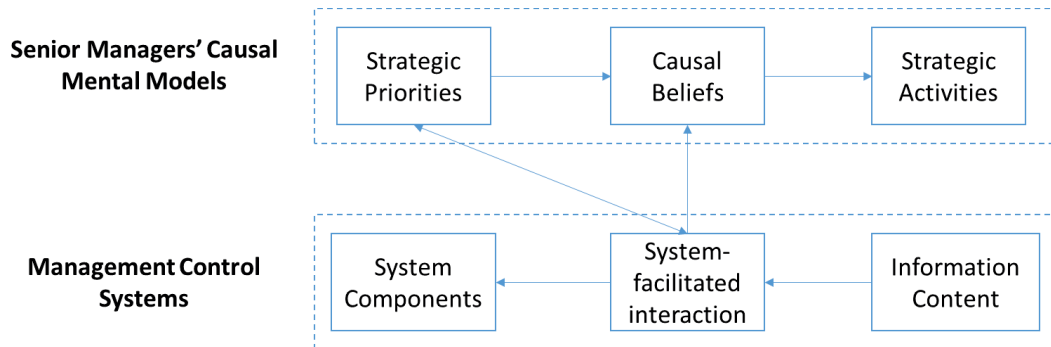
⁴³ Of note, however, is that agency usage only appears explicitly in the cognitive map of the GOM. However, it does appear in the cognitive maps of multiple local managers.

current strategic priorities of the organisation. However, laundry costs remained accounted for as a distinct line item in the less-emphasised operating budget.

6.2.3. Explaining the relationship between management control systems and senior managers' causal mental models

The discussion and analysis presented in this section can be used to develop a more general understanding of the relationship between management control systems and senior managers' causal mental models. This relationship appears to be bi-directional, with the systems generating performance information which triggers the refinement and updating of senior managers' causal mental models, and senior managers' causal mental models informing the development of the systems themselves. Figure 19 outlines the main mechanisms through which this bidirectional relationship manifests.

Figure 19: The relationship between management control systems and senior managers' causal mental models



Effect of management control systems on senior managers' causal mental models

Management control systems influence the development of senior managers' causal mental models when managers are prompted to revise their beliefs about causal relationships. Managers are prompted to revised their beliefs by reviewing the information content of a management control system; for example, when the information content of current performance data, or recent budget reports, is significantly different to the manager's expectations. A difference between the manager's expectations and system information content can be explained in one of two ways: first, the causal reasoning that informed the manager's expectations is inaccurate and requires revision; or second, the system information content is inaccurate and requires repair. In the first case, the effect of the management control system information content will generally be mediated by

interaction within the senior management team, in which surprising variances from expectations or targets – particularly unfavourable variances – are raised for discussion. Where the senior management team is confident in the validity and reliability of the information content, this discussion is likely to result in discussion and modification of team members' causal attributions about the drivers of particular outcomes or results. On the other hand, when the senior management team lacks confidence in the integrity of the underlying information, this is unlikely to result in changes to managers' causal reasoning – instead this may prompt revision of the design of the management control system itself.

Frequent opportunities to articulate and share causal beliefs within a group may also encourage senior managers to add new causal attributions to their overarching mental model, or to refine existing causal attributions by incorporating new ideas about enabling or constraining conditions. As such, managers' causal reasoning can be expected to become more complex over time as a result. In addition, to the extent that managers' incorporate components of each other's causal beliefs into their own mental models as a result of this process of reflection, articulation, and refinement, then frequent opportunities to discuss system information content can be expected to lead to greater alignment in managers' causal reasoning.

Effect of senior managers' causal mental models on management control systems

Senior managers' mental models influence the development of management control systems when their existing knowledge and beliefs about appropriate strategic priorities is embedded in the form of system components. At a minimum, this process is undertaken during the initial design phase of a management control system, such as the establishment of a new performance measurement system; however, this process also underlies any incremental change or development, such as the addition or removal of specific KPIs.

Where initial or incremental development of a system involves more than one member of the senior management team, the embedding of strategic priorities within the management control system will be mediated by system-facilitated interaction. That is, the process of determining new or revised system components will require managers involved to articulate their understanding of the relevant strategic priorities, reach a consensus among the group, and translate these into a format appropriate for embedding in the management control system. As a result, a potential outcome of

this process is a modification of senior managers' beliefs about appropriate strategic priorities resulting from the discussion and debate with other team members.

In the case of a revision of the management control system design, the frequency of review of system information content is likely to drive secondary effects with respect to both senior managers' mental models and the design of the management control system itself. The more often senior managers review the information content of a management control system, the more opportunity there will be for system-facilitated interaction and subsequent revision of beliefs about cause-and-effect relationships. Where there are frequent opportunities for review and discussion of the information content of a management control system, senior managers have greater opportunity to reflect on, share, and refine their otherwise implicit causal attributions. As such, frequent engagement by senior managers in incremental revision and development of a management control system will lead to its components becoming more closely aligned with the average or consensus beliefs about appropriate strategic priorities among senior managers. The inverse relationship can also be expected to hold: the less frequently senior managers' engage in the development of a management control system, the less aligned its components will be with senior managers' beliefs about strategic priorities. This effect will be especially pronounced in volatile or dynamic environments in which strategic priorities might be expected to change within relatively short timeframes.

6.3. Local Managers' Engagement with Management Control Systems

Local managers' engagement with management control systems at ResCare appears to be qualitatively different for local operational managers and local functional (clinical and accommodation) managers. For local functional managers, the nature and extent of engagement with management control systems varies significantly from facility to facility, and appears to be determined by the attitude and leadership style of the local operations manager. For this reason, I consider each of these groups separately in my analysis.

6.3.1. Local operations managers

Local operations managers' pattern of engagement with management control systems reflects that of senior management; they are most concerned with the operating budget and Scoreboard system,

and not overly involved in the development and day-to-day use of policies and procedures. Budget and KPI reports are compiled and distributed to managers on a monthly basis, and are reviewed by local operations managers promptly on their receipt. Local managers are also able to review current performance information by accessing the Scoreboard system through the web-based platform at any time, though in most cases the performance information is only updated monthly when reports are compiled. Local managers don't typically distinguish between budget targets and Scoreboard KPIs, considering them all to be components of a single monthly performance report. The predominantly financial measures reported in the budget report are not given any greater weight relative to the predominantly non-financial operational measures contained in the KPI report; if anything, financial 'ends' are given less consideration than non-financial 'means'.

While local operations managers are ultimately accountable for performance against the facility's budget and KPI targets, they are also responsible for ensuring compliance with centrally-approved policies and procedures, as well as relevant regulatory requirements. As such, local operations managers are conscious of their accountability for performance against budget and KPI targets, but do not concern themselves unduly with poor financial results (in the short-term, at least). They argue that the interrelatedness of multiple drivers and outcomes of performance mean that poor performance cannot be realistically attributed to any single aspect of facility management, and that as long as the facility is maintaining its core processes then financial performance will eventually be restored. For this reason, ensuring that operational activities are compliant with established policies and procedures is a form of insurance against poor financial outcomes for local operations managers.

Both the design and current performance information content of these systems are frequently raised for discussion in combined management meetings; senior and local managers debate topics such as underlying budget assumptions, changes to KPIs, or the appropriateness of targets and strategies for their achievement. In most cases, this discussion involves the responsible senior manager explaining the proposed changes and rationale to the local management group, and responding to their concerns about the possible operational impacts or appropriateness of the changes. In other cases, senior managers actively seek input from local managers either in the development of new measures, or to identify the causes of problematic performance trends and develop strategies for

performance improvement. In all cases, senior managers are careful to frame discussions as inclusive and supportive, rather than as coercive or potentially alienating to local management.

6.3.2. Local functional managers

Local functional (clinical and accommodation) managers' exposure to management control systems is effectively determined by the local operations manager – their involvement varies from facility to facility. The decentralised nature of management at ResCare means that local managers have the discretion to employ their own management style, which extends to their use of ResCare's management systems and processes within their facility. While it is not considered acceptable for managers to create their own systems or processes, the extent to which operations managers involve functional managers in their use of the budget and Scoreboard, as well as other facility management functions such as rostering and performance management, is not standard across the organisation.

North facility local management

Clinical and accommodation managers at ResCare's North facility have limited exposure to and involvement in the use of formal management control systems. While the review of the monthly performance report (consisting of both budget and KPI targets) as a local management team is mandated by senior management, and included as a standing agenda item for local management meetings, in practice this review is cursory at best and almost irreverent in tone. This tone is set by the local operations manager, who expressed a lack of confidence in their own ability to engage with "the financial stuff" on multiple occasions, preferring instead to focus on the quality of care provided with the view that the "rest" would look after itself.⁴⁴ Local functional managers do not routinely log on to the Scoreboard system, despite having operational measures that they are technically responsible for within the formal performance measure accountability framework.

North facility functional managers have somewhat greater operational responsibilities relative to functional managers at other facilities. Notably, the local clinical manager performs a number of functions that would normally be associated with the operations manager (and in some cases, the accommodation manager). For example, at the North facility the clinical manager takes

⁴⁴ There is some evidence that this approach is relatively effective, with the North facility commended for its high levels of both relative/resident and staff satisfaction reported by ResCare's third party quality assurance partner during the period of study.

responsibility for all of the rostering of care staff, allocation of annual and long-service leave, and filling shifts with replacement staff due to staff illness. This portfolio of tasks would normally be part of the operations manager role; in fact, the clinical manager recalled her surprise when discovering that other clinical managers were not also expected to perform these tasks. Similarly, the accommodation manager effectively operated autonomously and at the time of the study was responsible for several major infrastructure upgrade projects on top of the normal duties associated with the role.

South facility local management

Clinical and accommodation managers at the South facility have substantially greater exposure to and involvement in the use of formal management control systems relative to their North facility counterparts. Within the South facility, the local operations manager extends responsibility for the use of the operating budget and Scoreboard system to the entire local management team, including both local functional managers. While review of the monthly facility performance report is a mandatory standing agenda item for all local management team meetings, the South facility local management team engage with the report in detail and take seriously any variances in both non-financial and financial metrics. Both functional managers were aware of the targets and KPIs that fall within their area of responsibility and how those targets contribute to the overall performance of the facility.

The willingness of the entire local management team to engage with budget targets and Scoreboard KPIs can be attributed to the attitude of the local operations manager, who expresses appreciation for the Scoreboard system as a management tool (compared with frustration or resentment observed in other facilities). The operations manager of the South facility regularly reviews current performance data by accessing the web-based Scoreboard platform, and provides extensive commentary on any variances beyond the minimum explanation required by senior management. Where a ready explanation for variances is not available, the operations manager follows up with the responsible functional manager; they are tasked with investigating the cause of the deviation and reporting back to the operations manager once the investigation is concluded. For example, an unexpected increase in the cost of oxygen supply was followed up by the clinical manager, who provided the basis of the explanatory commentary that was entered into the Scoreboard system.

6.3.3. Implications for the content and composition of local managers' causal mental models

Local operations managers

Like senior managers, local operations managers' pattern of engagement with management control systems is reflected in the characteristics of their causal mental models. Local operations managers' causal mental models are also highly complex, with multiple clusters of activities and some medium-to-long causal chains. The content of the causal mental models aligns broadly with the distribution of local managers' attention to the budget, KPI Scoreboard, and compliance (as opposed to the content) with policies and procedures; these causal mental models are comprised of a mix of operational activities, specific financial and non-financial outcomes, and strategic activities such as management of stakeholders and the use of management systems and processes. For example, both operations managers' causal mental models contain a high proportion of references to the management of staff and rostering, which can be related to the high proportion of each facility's expense budget that relates to the cost of labour. The incorporation of predominantly operational activities in local operations managers' causal mental models can be related to their greater concern with operational processes and compliance, relative to that of senior managers.

The inclusion of significantly more non-financial than financial outcomes in local operations managers' causal mental models echoes senior management's insistence on nurturing the operational drivers of performance, rather than trying to manage financial outcomes in isolation. Local operations managers themselves identify their priority as ensuring the quality and sustainability of core processes with limited regard for the financial consequences; they argue that if quality of care is compromised, then financial performance will inevitably suffer in the long-term. This philosophy is reflected in the emphasis on non-financial activities and priorities in the causal mental models. Further, many of the non-financial outcomes explicitly identified as outcomes or aspects of performance in local operations managers' causal mental models are associated with those KPIs embedded in the Scoreboard system; this includes representations of occupancy rates, per-resident funding levels, relative satisfaction, employee satisfaction, and staff turnover.

The influence of formal management control systems on local operations managers' causal mental models is not limited to the content of these systems, but extends to the interaction facilitated by the use of systems such as the budget and Scoreboard. Discussions between senior and local management provide an opportunity to consolidate and refine the causal knowledge and reasoning of both parties, which becomes embedded in managers' causal mental models. While the Scoreboard system in particular can communicate aspects of performance that are considered significant by senior management, only in discussions about what should be included/excluded in the KPIs is the relationship between the measures and ResCare's overall objectives made explicit. Discussions continue until all concerns have been addressed and a consensus is reached, resulting in increased convergence of the causal mental models of the managers' present. The significant overlap in the activities, processes and outcomes contained within the cognitive maps of the two local operations managers in the study may be interpreted as evidence of this convergence. However, it is worth noting that this convergence is the result of not only senior managers sharing their causal reasoning, but also from the input by local managers who are able to affirm or challenge the specific causal attributions that are explicated. In this way, management control system-facilitated interaction allows both senior and local managers to directly influence one another's causal mental models in the collaborative generation of shared causal reasoning.

Local functional managers

Variation in exposure to and involvement in the use of management control systems can be related to variation in the complexity and composition of local functional managers' causal mental models. In this study, local functional managers of the North facility were found to produce qualitatively different cognitive maps to their counterparts in the South facility. This difference could not be comprehensively accounted for in analysis of other potential sources of variation, including physical proximity of team members, professional background, role tenure/experience, or the specific functional role of the managers. In contrast, the level of involvement and style of use of management control systems – determined by the local operations manager – may provide a more complete explanation of the development of local functional managers' causal mental models.

The causal mental models of the local functional managers at the North facility are very large and effectively comprise a comprehensive list of the operational tasks and activities associated with

each role. Despite their size, however, these models exhibit only a low level of connectedness; the activities are clustered into a large number of independent clusters, with few genuine causal attributions. Contributing to the low level of connectedness is the relatively few outcomes identified as being related to the success of ResCare; however, both local functional managers of the North facility point to continuous improvement as being an important aspect and driver of success. Overall, these cognitive maps more closely resemble the position descriptions of each functional role than a causal network linking activities to outcomes in a systematic manner. However, this may not be surprising given the exclusively operational focus of these roles and the lack of involvement in more strategically oriented systems, such as the operating budget and Scoreboard system.

It does not appear that the causal mental models of functional managers at the North facility are affected by the use of the budget or Scoreboard system; rather, it is the absence of such an effect that is worth noting. However, it is possible that a more complex relationship exists between the causal mental models of these managers and a different type of management control system: the library of ResCare policies and procedures. Policies and procedures are considered to be the ultimate guide for the delivery of core processes at ResCare, and are a valuable tool for learning and development especially for new employees. Both functional managers of the North facility refer to policies and procedures as being especially helpful to them when initially establishing themselves in their roles; however, they rely on these less as they become more experienced. A possible explanation for the decreasing reliance on formal policies and procedures is that as managers become more experienced, the information within this system becomes incorporated as procedural knowledge in managers' mental models. Once the knowledge is internalised in this way, it is no longer necessary to consult the policies and procedures in order to be able to perform the functional role. Both functional managers appear to have internalised a significant proportion of the relevant policies and procedures for their functional role into their causal mental models, resulting in a comprehensive map of the tasks and activities that they are personally responsible for.

The causal mental models of the functional managers of the South facility are qualitatively different from those of their North facility counterparts, and the differences can be related to the contrasting use of management control systems. The causal mental models of these managers are

very small but highly connected, consisting of only one or two clusters made up of medium length causal chains. Despite their small size, the maps are broad in focus and somewhat abstracted from the detail of operational activities. Both maps identify resident care as being the ultimate short-term objective for their facility, and the functional managers are able to identify how ResCare's core processes contribute to this aim. Of particular note is the way that each functional manager acknowledges the role of other facility managers within their mental model; the accommodation manager includes meeting clinical needs as a driver of resident care, while the clinical manager identifies the importance of the operations manager in building an effective, united management team.

Involvement in more strategically oriented systems such as the budget and KPI Scoreboard appears to have contributed to the development of more holistic, complex, and integrated causal mental models for the functional managers of the South facility. While specific KPIs and budget targets are not explicitly incorporated in the causal mental models (though the clinical manager does acknowledge budget targets in aggregate), exposure to these systems may allow managers to better cluster sets of activities and abstract out of detailed procedural knowledge to more complex causal reasoning about how those activities and procedures contribute to the overarching objectives of their facility.

While the causal mental models of functional managers of the South facility do not incorporate significant operational detail, it is reasonable to assume that these managers nonetheless possess equivalent procedural knowledge to other managers in equivalent roles. However, when prompted to make causal attributions about how activities at ResCare contribute to its success, they are able to identify specific outcomes and generate a causal network linking activities and processes to their achievement. On the other hand, when given the same prompt, functional managers who have not developed these more complex causal mental models appear to substitute the question for a simpler one (Kahneman 2003), and provide instead a description of the tasks and activities that they are personally responsible for.

6.3.4. Implications of local managers' causal mental models for the design of management control systems

Local operations managers

Local operations managers at ResCare were not observed to directly influence the design of any of the three primary management control systems during the period of study. However, to the extent that local operations managers' causal mental models are explicated and shared with other managers – such as senior or local functional managers – their knowledge of activities, priorities and causal beliefs can become embedded in the components of these management control systems through the indirect mechanism of system-facilitated interaction. This process is discussed in greater detail in Chapter 7.

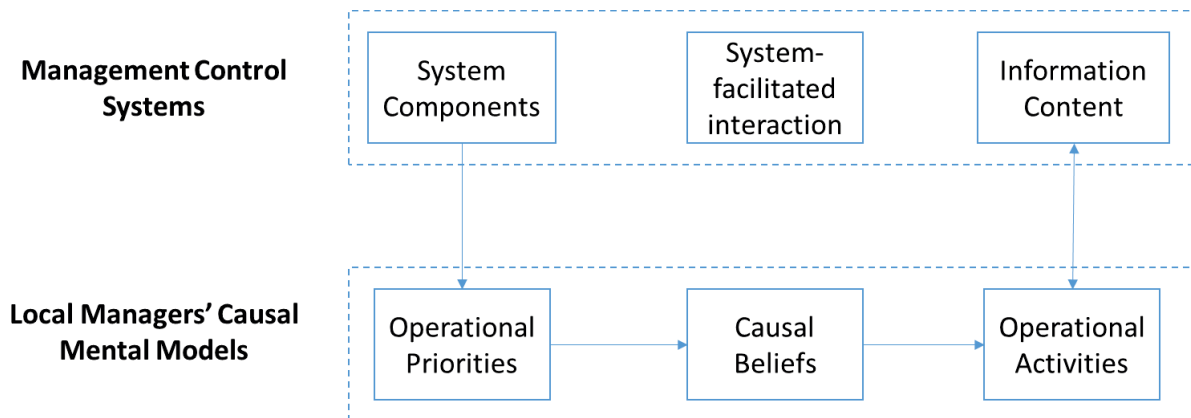
Local functional managers

The causal mental models of experienced functional managers, on the other hand, were observed to directly influence the *content* of ResCare's policies and procedures. Once functional managers have internalised the relevant set of policies and procedures, they become more likely to notice a gap in the behavioural expectations of their role and the procedures that are formally documented. When such a gap is noticed, the manager has the opportunity to raise this in the forum of their peers (i.e. the clinical managers' forum, or the accommodation managers' forum), and will often volunteer to develop a new policy or procedure to address the gap. An example of this process was the identification by the North facility accommodation manager of a lack of formal policy or procedure for the safe use of outdoor barbecues (described in detail in Chapter 4). When functional managers develop a new policy or procedure, it is their experientially-developed, procedural knowledge that forms the basis of the document. In this way, the mental models of functional managers actually influence the development of this particular management control system.

6.3.5. Explaining the relationship between management control systems and local managers' causal mental models

The relationship between local managers' causal mental models and the use of management control systems is similarly bi-directional in nature, but has several different features. Figure 20 outlines the key features of the relationship.

Figure 20: The relationship between local managers' use of management control systems and the development of causal mental models



Effect of management control systems on local managers' causal mental models

Management control systems influence the development of local managers' causal mental models when accountability for performance causes managers to embed either system components or system content into their mental models as operational priorities or activities. The specific relationship depends on the nature and orientation of the control system.

Results-control oriented management control systems (such as performance measurement systems or operating budgets) communicate senior managers' expectations in terms of the outcomes that operational managers are required to deliver. Accountability for specific outcomes encourages managers to internalise these components as operational priorities in their causal mental models, which may or may not be linked to operational activities through existing causal beliefs about the drivers of performance. Where managers are exposed to management control systems such as performance measurement systems and operating budgets, but these systems are not used for the purposes of results control and performance evaluation, then operational managers are less likely to pay attention to the system and subsequently internalise the components into their causal mental models. The use of results-control oriented management control systems to establish a framework of accountability encourages intensive use of the system by local managers, which increases the likelihood of incorporation of system components into local managers' causal mental models.

Behaviour-control oriented management control systems can also influence the causal mental models of local managers, but are more likely to affect local managers' knowledge of operational activities. Behaviour-control oriented management control systems communicate senior

managers' expectations by providing local managers (and employees) with specific guidelines for the performance of activities and processes. When local managers are held accountable for compliance with these guidelines, they are likely to embed the information content of these systems, in the form of instructions, into their causal mental models as knowledge of appropriate operational activities. These activities may be linked to operational priorities through existing causal beliefs about the drivers of performance, but may also stand alone in operational managers' causal mental models. The content of behaviour-control oriented management control systems is only likely to become internalised in local managers' causal mental models when these managers have reason to frequently consult and comply with the instructions. Accountability for compliance is one reason for intensive use of behaviour-control oriented management control systems by local managers; other reasons may include the relative inexperience of the manager, or the need to performance manage other more junior staff.

Effect of local managers' causal mental models on management control systems

Local managers' causal mental models can influence the development of management control systems when they are offered the opportunity to embed their specialised, local knowledge of operational activities into the content of behaviour-control oriented management control systems. While local managers may initially develop knowledge of appropriate operational activities through the information content of behaviour-control oriented management control systems, they may also learn about these activities through verbal instruction, behavioural role modelling, and their own practical experience of trial-and-error. As a result, experienced local managers are likely to develop knowledge of operational activities that may be more complete and complex than that which is embedded in the information content of behaviour-control oriented management control systems. In these cases, the alignment between the information content of management control systems and the causal mental models of experienced local managers may be improved by inviting local managers to articulate this often implicit local knowledge, and embed it as revised information content within the management control system. Once embedded in the system, this information becomes available for incorporation into the causal mental models of all local managers as more complete or complex knowledge of operational activities.

6.3.6. Summary

In this section, I have demonstrated how the relationship between management control systems and the development of managers' causal mental models at ResCare is determined by the extent and nature of their involvement with various systems. Senior managers' attention is primarily focused on the operating budget and Scoreboard system, reviewing both the performance information content and overarching design of these systems on a regular basis. Senior managers embed their strategic priorities into the design of these systems, and use regular performance feedback to update their beliefs about how drivers and outcomes of performance are related – modifying the content of the system accordingly. However, senior managers also use the budget and Scoreboard systems to communicate their strategic priorities to the local managers who are ultimately responsible for the implementation of ResCare's strategy. By holding local managers accountable for facility-level measures within the budget and KPI Scoreboard, senior managers are able to convey those aspects of performance that they consider to be important for the achievement of ResCare's objectives.

Local managers pay attention to the facility-level budget and Scoreboard performance reports that they are accountable for, and incorporate these measures into their causal mental models of the drivers and outcomes of performance. However, local managers develop their understanding of the specific causal relationships between drivers and outcomes through interaction facilitated by the use of the budget and Scoreboard system. In most cases, this interaction occurs in combined management meetings, during which senior and local managers review current performance information, discuss potential strategies for performance improvement, and occasionally consider changes to the design of the systems themselves. This management control system-facilitated interaction provides a platform for both senior and local managers to make their causal reasoning explicit, and in doing so are able to reveal previously implicit assumptions about the drivers of performance and identify differences in interpretation of ResCare's goals and objectives. A result of this interaction is increased convergence of senior and local managers' causal mental models.

The extent to which local functional managers' causal mental models are affected by management control systems is determined by the level of engagement required by the local operations manager. Where the local operations manager does not require local functional managers to engage with formal systems and share accountability for performance, local functional managers' causal mental

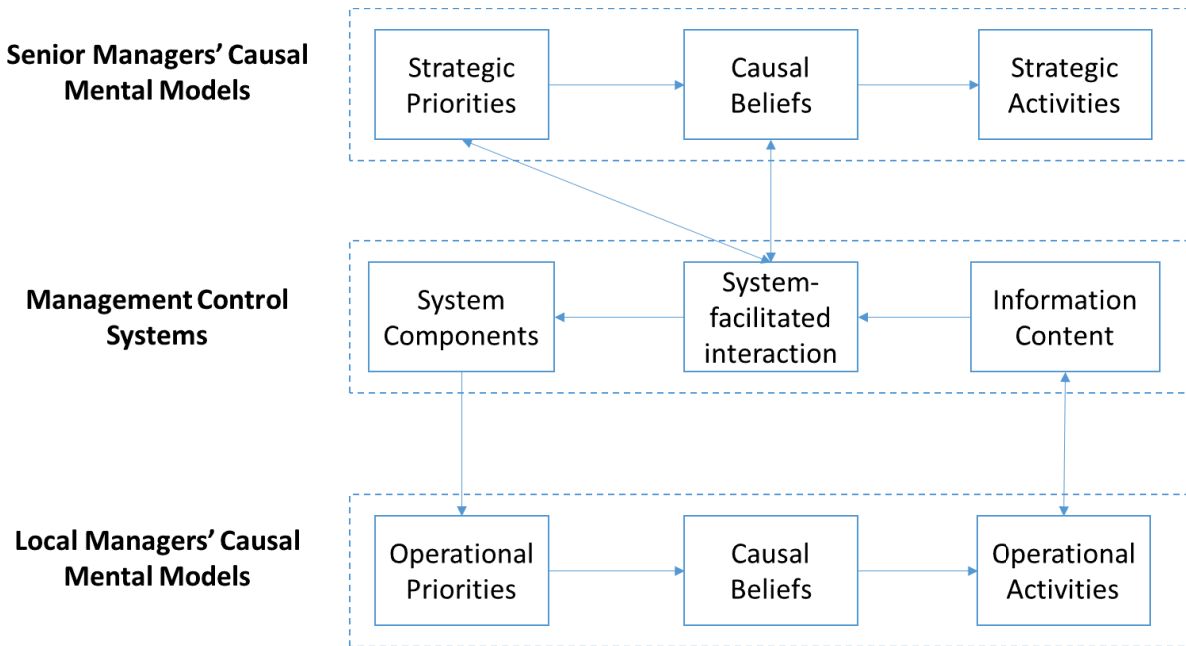
models do not incorporate specific performance outcomes or explicit causal attributions, and instead rely on procedural knowledge as a substitute for more complex causal knowledge. On the other hand, local functional managers who are required – and encouraged – by the local operations manager to engage with formal management control systems exhibit significantly greater complexity in their causal mental models, which include specific aspects of performance as outcomes and a high level of connectedness between the activities that drive performance. These causal mental models also acknowledge the roles of other local managers in the achievement of success at the facility level.

6.4. A General Theoretical Model

The primary research question that I seek to address in this thesis is: *How do management control systems influence the development of managers' causal mental models; and how do managers' causal mental models influence the development of management control systems?* Addressing this research question has significant implications for both the literature on the cognitive effects of strategic performance measurement, as well as the wider accounting judgement and decision making literature. While it is generally acknowledged that individual behaviour and decision making depends largely on an individual's mental representation of their environment (Luft & Shields 2009), research in management accounting has not previously attempted to identify and explain the specific relations between management accounting and control systems, mental representations (such as causal mental models), and individual decision making. As such, it remains unclear precisely *how* management accounting and control systems influence the development of managers' causal mental models, nor how managers' causal mental models might influence the development of management accounting and control systems in the first instance.

The theoretical explanations I have developed in the previous section can be consolidated to produce a more complete theoretical model of the relationship between management control systems and the development of managers' causal mental models. This model is presented in Figure 21.

Figure 21: The relationship between management control systems and managers' causal mental models



6.4.1. Cognitive effects of strategic performance measurement

The general theoretical model and theoretical arguments presented in this chapter can be applied to the specific case of strategic performance measurement; this extends the arguments in the literature relating to the design and use of these systems and their effect on managerial cognition. While theoretical and methodological constraints have previously limited the development of the concept of causal mental models for a management accounting context, the theoretical model allows for the development of theory at the level of the *content and composition* of managers' causal mental models by decomposing the causal mental models construct into three constitutive dimensions: understanding of organisational priorities; knowledge of organisational activities; and beliefs about the cause-and-effect relationships linking drivers and outcomes of performance. This represents an extension on prior studies which consider the potential mediating role of mental representations, but were unable to elicit their content and composition directly. Rather, these studies either inferred the existence and operation of mental models based on judgement and decision outputs (e.g. Banker, Chang & Pizzini 2011; Brewster 2011; Cheng & Humphreys 2012; Choy & King 2005; Humphreys & Trotman 2011; Knechel, Salterio & Kochetovea-Kozloski 2010; Vera-Muñoz, Shackell & Buehner 2007), or relied upon self-reported data relating to the frequency of confirmation or change of existing mental models (Hall 2011).

Analysis of the *content* and *composition* of causal mental models facilitates the accommodation of much greater diversity and complexity of mental models; this is more reflective of the cognitive representations of decision makers in naturalistic environments, relative to studies which take place under laboratory conditions. In this thesis, the study of the causal mental models of multiple managers in a single organisational setting revealed significant variation in the knowledge and beliefs of managers in different hierarchical and functional roles. For example, senior managers tend to conceptualise organisational priorities and activities at a strategic (or corporate) level, while local managers tend to translate organisational priorities and activities into operational equivalents. Similarly, qualitative differences were observed in content and composition of the causal mental models of managers occupying similar organisational roles, despite exposure to the same underlying strategic performance measurement system.

These findings have three specific implications for research investigating the effects of strategic performance measurement systems on mental models and managerial cognition. First, the significant qualitative variation in the content and composition of managers' causal mental models suggests that the effect of these systems on managers' causal mental models is not uniform, and data relating to the causal mental model of a single manager is not necessarily a good proxy for its effects on other managers in the same organisation. Second, this qualitative variation would also suggest that the simple existence or design of a strategic performance measurement system is not sufficient to explain its effects on a managers' causal mental model; rather, the patterns of engagement by individual or groups of managers must also be considered in order to produce a complete explanation of the cognitive effects of the system. Third, care needs to be taken to distinguish between hierarchical levels of management when operationalising the causal mental models construct in strategic performance measurement research, as the causal mental models of senior and local managers were found to operate at different levels of abstraction and may not necessarily be similar or theoretically substitutable.

The decomposition of the causal mental models construct also enables the development of more detailed theoretical explanations relating to the determinants and consequences of each dimension with respect to the relationship with the use of management accounting and control systems. That is, I find that the components, content and use of a management control system affect managers' causal mental models in significantly different ways. For example, senior managers' beliefs about

cause-and-effect relations are influenced primarily by reviewing the *content* of a management control system, specifically when this information differs from their existing understanding or expectations, and identifying alternative causal attributions during discussion and debate. In contrast, senior managers' knowledge and beliefs can themselves influence the *components* of a management control system when their priorities are articulated and challenged during discussions within the senior management team and ultimately embedded into the design of the system. For local managers, it is the components of a results-control management control system that influence causal mental models when these components are translated into managers' understanding of the organisational priorities.

While engagement with strategic performance measurement systems may influence managers' understanding of organisational goals and priorities, simple exposure to these systems would not appear to be sufficient to affect managers' beliefs about the cause-and-effect relationships linking the drivers and outcomes of performance. Rather, managers' beliefs about cause-and-effect relationships were only found to be affected during discussion of the components and content of the system with other managers.⁴⁵ This finding would appear to be inconsistent with primarily experiment-based literature which finds that strategic performance measurement systems can be used to convey causal information directly to individual managers (e.g. Banker, Chang & Pizzini 2011; Banker, Chang & Pizzini 2004; Cheng & Humphreys 2012; Farrell, Luft & Shields 2007; Farrell, Kadous & Towry 2012; Humphreys & Trotman 2011; Kelly 2010; Vera-Muñoz, Shackell & Buehner 2007; Webb 2004). This indicates that it may be necessary to incorporate additional social dynamics into research which seeks to understand the full range of cognitive effects of strategic performance measurement.⁴⁶

Together, the theoretical model and associated theoretical explanations that I develop in this chapter provide a previously missing link in the argument for a mediating relationship between management control systems and judgement and decision making activities at a general level. While it has been well established in the literature that cognitive representations act as a critical input to judgement and decision making, the role of management control systems in influencing cognitive representations had not been explicitly addressed or adequately explained. The

⁴⁵ This finding is explained in detail in Chapter 7.

⁴⁶ Examples of recent studies which incorporate social dynamics and cognition into the study of strategic performance measurement include Vaivio (2004) and Tuomela (2005).

theoretical model illustrates a new causal pathway between the use of management accounting and control systems and the development of a decision maker's mental representations, and allows for the temporal and spatial separation of the inputs to decision making and the decision making activity itself. As such, the theoretical model opens up avenues for research in strategic performance measurement systems, as well as the wider accounting judgement and decision making literature, to identify additional new relationships between the use of management accounting and judgement and decision making practice within organisations.

6.5. Conclusion

In this chapter I analysed the relationship between the use of management control systems at ResCare and the development of managers' causal mental models, and used this analysis to develop a general theoretical explanation and model of this set of relationships. I used empirical data and analysis from Chapters 4 and 5 to explain how senior managers and local managers at ResCare embed their strategic knowledge and causal beliefs into the design of the components of management control systems, and how the use of information generated by management control systems contributes to the refinement and change of senior managers' causal mental models. This analysis revealed qualitative differences in the relationship between engagement with management controls systems and the development of causal mental models at different hierarchical levels of management.

I consolidated the results of my analysis into a general theoretical model that systematically relates the components of both senior and operational managers' causal mental models to three dimensions of management control system design and use. Using the model, I showed that in the case of senior managers, a bidirectional relationship exists in which senior managers' knowledge of strategic priorities is embedded into the components of a management control system, which in turn can prompt the revision of senior managers' causal beliefs when information generated by the system is unexpected. In the case of operational managers, I demonstrated that different relationships exist depending on the type of management control system: accountability for outcomes prompts the incorporation of management control system components into operational managers' knowledge of operational priorities, while accountability for behaviour instead prompts the incorporation of components as knowledge of operational activities.

By building theory at the level of the *components* of managers' causal mental models, the theoretical model extends our understanding of how management control systems, such as strategic performance measurement systems, can influence judgement and decision making through the mediating variable of managers' cognitive representations. Furthermore, it provides a detailed explanation of how management control systems can be used to systematically influence the cognitive inputs of managers' cognitive representations. Further implications of the model for group-level mental model and social dynamics are considered in Chapter 7, and the implications of this theoretical extension for the literature on strategic performance measurement systems are considered in further detail in Chapter 8.

Chapter 7: Further Implications

7.1. Introduction

The aim of this chapter is to reflect on the further socio-cognitive implications of the relationship between management control systems and managers' causal mental models at the *group* level. Specifically, I present additional analysis of the role of interaction and participatory processes in the development of individual managers' causal mental models, as well as the extent to which the causal mental models of a management group are similar, congruent or divergent. The extent to which managers' causal mental models are similar, congruent, or divergent has implications for group-level outcomes such as communication, learning and performance, and these implications can be used to explain the socio-cognitive effects of interactive control and budget participation.

In Section 7.2 I present my analysis of the effect of the interactive use of management control systems on managers' causal mental models, and explain why interactive control facilitates managerial learning. I use the case of ResCare to illustrate the incremental effects of management control system-facilitated interaction on the development of both senior and local managers' causal mental models. I then use this analysis to extend the theoretical model developed in Chapter 6 to include the role of management control system-facilitated interaction in the development of both senior and local managers' causal mental models. By applying the extended theoretical model to the concept of interactive control, I develop an explanation of the socio-cognitive dynamics underlying Simons' mechanisms of signalling and learning, and generate theoretical arguments explaining the effects of interactive control on managerial cognition, learning, and, ultimately, performance. I then use this theoretical explanation as the basis for evaluating the competing conceptualisations of the interactive control construct that are present in the literature.

In Section 7.3, I draw on additional theory relating to group-level mental model dynamics to explore the socio-cognitive effects of budget participation. First, I consider the extent to which participatory processes contributed to the similarity, congruence or divergence of ResCare managers' causal mental models, in order to assess the extent to which individual managers' mental models are shared and/or understood by other group members (cross-understanding). I then apply the extended theoretical model and arguments relating to mental model cross-understanding

to expand the notion of participation, and explain how the causal mental models construct and theory can facilitate a deeper understanding of the information transferred during participative processes and of their potential effects on managerial cognition.

7.2. Interaction, Interactive Control and Learning

System-facilitated interaction refers to discussion (either face-to-face or otherwise) that is focused on either the components or content of a management control system, and can take place either within or between levels of management. This dimension of management control systems was developed in Chapter 2 based on the notion of interaction as it is conceptualised within Simons' levers of control framework, as well as the concept of participation within the budgeting literature. Simons' argues that the interactive use of control – characterised by face-to-face discussion between senior and operational managers – provides a platform for evaluation of the causes and implications of current system information, and this dialogue stimulates the organisational learning that will lead to the development of emergent strategies (Simons 1987, 1990, 1995a). Similarly, longitudinal field studies of the use of strategic performance measurement systems demonstrate that interaction around the development and use of performance measures can lead to the articulation of previously tacit local knowledge, specifically about the cause-and-effect relations that link activities and measures (Tuomela 2005; Vaivio 2004). In this section I consider the role of management control system-facilitated interaction in the development of managers' causal mental models, and the implications of this relationship for explaining the cognitive effects of interactive control.

7.2.1. System-facilitated interaction and managers' causal mental models

At ResCare, management control systems facilitated frequent interaction between managers of different hierarchical levels. Three specific types of types of system-facilitated interaction were observed during the period of study. The first type involved one-on-one interaction between a member of the senior management team and a member of a local management team, either reflecting the direct reporting relationship (such as an OM reporting to the GOM) or an indirect reporting relationship (such as a CM interacting with the GCM) within ResCare's cross-functional management structure (see Figure 6). These interactions were considered to be *system-facilitated* when they involved discussion of either the components or content of a management control

system. These interactions represented opportunities for senior and local managers to share knowledge and information about current issues and performance, but also to communicate and affirm values, beliefs and priorities. The relative *lack* of emphasis placed on financial outcomes in these discussions by senior managers is especially noteworthy.

Well, in terms of managing them, it is around simply managing their KPIs, so yeah, we check in on their KPIs. But for me, there's also the piece because their performance review is as much around their reflection of [ResCare's] values as it is around their being able to manage to a [profit and loss]. I can have a brilliant financial manager, who's a shit manager. Well, I don't want them. I want the whole package. I want someone who actually puts the people first. (GOM)

I like the conversation when I go into meet with them, and try to meet with them monthly in their own centres, when they talk to me about people. What I don't want to hear is, I've just saved you \$2 per resident per day on food. Well, I don't care at that point. What did that mean to the people? So give me the people piece first. (GOM)

The second type of system-facilitated interaction observed at ResCare was discussion of the components or content of management control systems during formal combined management meetings. Over the period of study, both the operating budget and Scoreboard systems were discussed in detail during these meetings; senior and local managers discussed topics such as underlying budget assumptions, changes to KPIs, or the appropriateness of targets and strategies in terms of their achievement. In most cases, this discussion involved the responsible senior manager who explained the proposed changes and rationale to the local management group, and responded to their concerns about the possible operational impacts or appropriateness of the changes. In other cases, senior managers actively sought input from local managers in the development of new measures, the diagnosis of the causes of problematic performance trends, and the development of strategies for performance improvement.

In both informal and formal types of interaction between senior and local managers, senior managers were careful to frame discussions as inclusive and supportive, rather than as coercive or potentially alienating to local management.

The frustration [of attending meetings] is time, and I think sometimes because we are leadership – we need to be there. But I sometimes question, well do I? Do I need to be there? But I can see that the conversation piece afterwards is another reason I did need to be there, particularly because I

go out and about so I visit people in centres. That, of course again, means that when I walk into a centre, it doesn't matter where I go – I can't remember people's names, I recognise faces – but you know, hi, hey. They know me and they connect me to something positive. (GOM)

So there's an authenticity around support. It's not just support by words, it's genuine commitment to see people succeed and to go about it in a way that might even be quite confrontational sometimes but you've got to deal with the fact that you're either in or you're out. You're not half in. (CEO)

The third type of system-facilitated interaction observed at ResCare took place between local operations managers and local functional managers. However, the extent and nature of this interaction varied considerably between the two facilities studied. Interaction within the local management team of the North facility was frequent, but rarely involved all three local managers simultaneously. In most cases, interaction between managers was reactionary, in that one manager will seek out another to ask for instructions in managing a specific incident or situation (in the case of functional managers), or to request that specific action be taken (in the case of the operations manager). The operations manager explained that while the team was expected (by senior management) to meet formally on a weekly or fortnightly basis, this was not always realistic when the centre is busy. As a result, there were limited opportunities to review or discuss the content of monthly performance reports as a group.

In the South facility, however, the three local managers were observed to interact frequently and on both a formal and informal basis. Both functional managers frequently approached the operations manager independently to discuss ideas, projects, or emergent issues; however, functional managers were often observed checking in with one another regarding the implications of any decisions or actions they might be considering. In contrast to their North facility counterparts, the local management team of the South facility met formally on a regular basis to review and discuss current performance and issues, and engaged with the monthly performance report in detail. As a result, both functional managers were aware of the targets and KPIs that fall within their area of responsibility, and how those targets contributed to the overall performance of the facility.

Implications for the content and composition of managers' causal mental models

Interaction between management groups provided an opportunity to consolidate and refine the causal beliefs of all parties, which became embedded in managers' causal mental models. In the

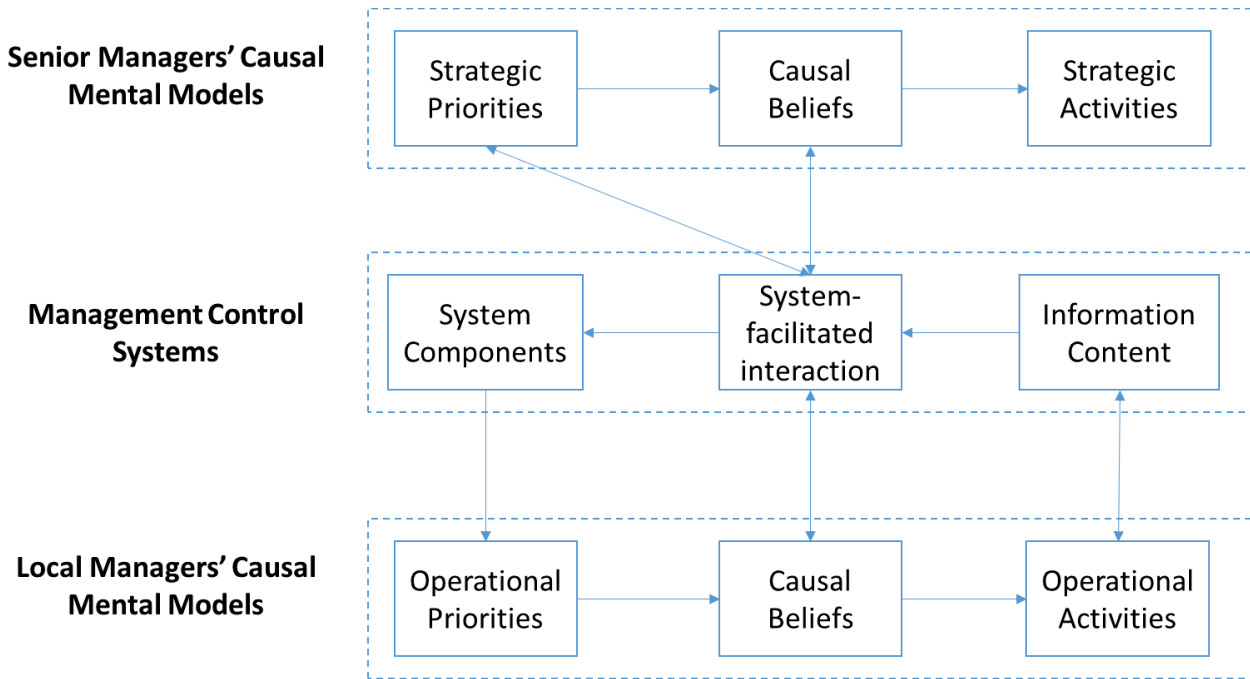
case of interaction between senior managers and local managers, discussion of either the components or the content of a management control system was sufficient to encourage the articulation and sharing of beliefs about the underlying causal relationships between organisational activities and outcomes. For example, while exposure to the Scoreboard system was sufficient to communicate senior managers' current strategic priorities (as explained in Chapter 6), only through interaction and discussions about the inclusion or exclusion of KPIs were the relationships between the measures and ResCare's overall objectives made explicit. These discussions continued until all concerns had been addressed and a consensus was reached, resulting in increased convergence of the causal mental models of the managers' present. The significant overlap in the activities, processes and outcomes contained within the cognitive maps of the two local operations managers in the study may be interpreted as evidence of this convergence.

However, it is worth noting that this convergence is the result of not only senior managers sharing their own causal reasoning and beliefs, but also from the input from local managers who are able to affirm or challenge the specific causal attributions that are explicated. In this way, management control system-facilitated interaction allowed both senior and local managers to directly influence one another's causal mental models in the collaborative generation of shared causal reasoning.

Explaining the relationship between system-facilitated interaction and managers' causal mental models

The additional analysis of the role of system-facilitated interaction at ResCare illustrates how the interactive use of management control systems influences the development of both senior and operational managers' causal mental models by facilitating the sharing, transfer, and collaborative generation of casual beliefs during interactions between levels of management. Figure 22 indicates these additional pathways on the general theoretical model developed in Chapter 6.

Figure 22: Effect of system-facilitated interaction on the relationship between management control systems and managers' causal mental models



System-facilitated interaction can be initiated either through review of the information content of a results-control oriented management control system, or review of its components. When initiated by review of information content, system-facilitated interaction may involve senior managers requiring operational managers to provide commentary or explanation regarding unexpected performance outcomes. As in the case of senior managers, operational managers may be prompted to revise their beliefs about causal relationships when the information content of a management control system (such as current performance data or recent budget reports) is significantly different to the manager's expectations. By requiring operational managers to provide commentary or explanation of variances, interactive review of the information content of results-control oriented management control systems (such as performance measurement systems or operating budgets) can encourage the articulation of operational managers' causal beliefs about the drivers of performance by explaining current performance information and proposed strategies for improvement. However, this process of articulation is only likely to lead to changes in managers' causal mental models within the context of a mutually supportive environment and management style. Under these conditions, operational managers are more likely to feel inclined to genuinely reflect on their causal beliefs and to share these in a public forum, while senior managers are more

likely to engage with operational managers' beliefs and attempt to reconcile these with their own causal mental models. When operational managers share their causal beliefs in a public forum for other managers to either affirm or challenge, all parties gain additional insight into the causal beliefs of their colleagues as well as potential alternative ways of reasoning about cause-and-effect relationships.

System-facilitated interaction can also be initiated by the need for review of the components of a results-control oriented management control system. Review of system components represents an opportunity for system-facilitated interaction when senior managers consult with other levels of management about proposed design changes, rather than simply informing other managers of changes after the fact. Discussion of proposed design changes within a wider management forum enables senior managers to explicate and share the reasoning behind the changes, such as the strategic significance of a new KPI, and defend their reasoning should other managers challenge their rationale. By communicating not only changes in system components, but also the reasoning behind the changes, senior managers have the opportunity to influence operational managers' understanding of both operational priorities (as discussed previously) as well as the causal reasoning that links drivers to outcomes of performance. Similarly, this kind of system-facilitated interaction also affords operational managers an opportunity to challenge senior managers' causal reasoning – especially with respect to the relationship between operational activities and outcomes – and assert their own beliefs, which may then become incorporated in the causal mental models of the senior managers themselves.

Frequent system-facilitated interaction ensures that managers have regular opportunities to articulate and share their causal beliefs; this may encourage managers' to incorporate new causal attributions to their overarching mental model, or to refine existing causal attributions by incorporating new ideas about enabling or constraining conditions. This is especially likely to be the case when causal mental models reflect different aspects of the overall organisation; senior managers' causal mental models will tend to have a strategic focus, while operational managers' causal mental models are somewhat more localised. Awareness – if not explicit incorporation – of both strategic and local elements in managers' causal mental models ensures that causal reasoning can be expected to become more complex over time.

7.2.2. Effect of interactive control on managers' causal mental models

The extended theoretical model developed in this chapter can be applied to Simons' concept of interactive control; this extends our understanding of *why* interactive control facilitates learning and improved managerial performance. The levers of control framework is positioned as less about the direct use of systems by top management and more about the pattern of otherwise autonomous decisions and actions of lower-level managers and employees. Simons (1990) proposes that the interactive use of control systems is necessary where decisions and actions increasingly originate from any level of the organisation, and typically cannot be identified or programmed in advance. These systems are argued to play a role in controlling the uncontrollable – in providing an overarching framework within which autonomous organisational participants can interpret information, make decisions, and solve organisational problems. Simons' theoretical framework suggests that by investing their scarce attention into a particular system, top management can *signal organisational priorities* and provide incentives to subordinate managers to engage with the information contained within the system. The interactive control system then provides a platform for face-to-face discussion of the causes and implications of this information, and this dialogue *stimulates learning processes* that will lead to the development of emergent strategies. However, the mechanisms through which this learning occurs, or how learning is translated into autonomous behaviour and decision making, are not explicated within the levers of control framework.

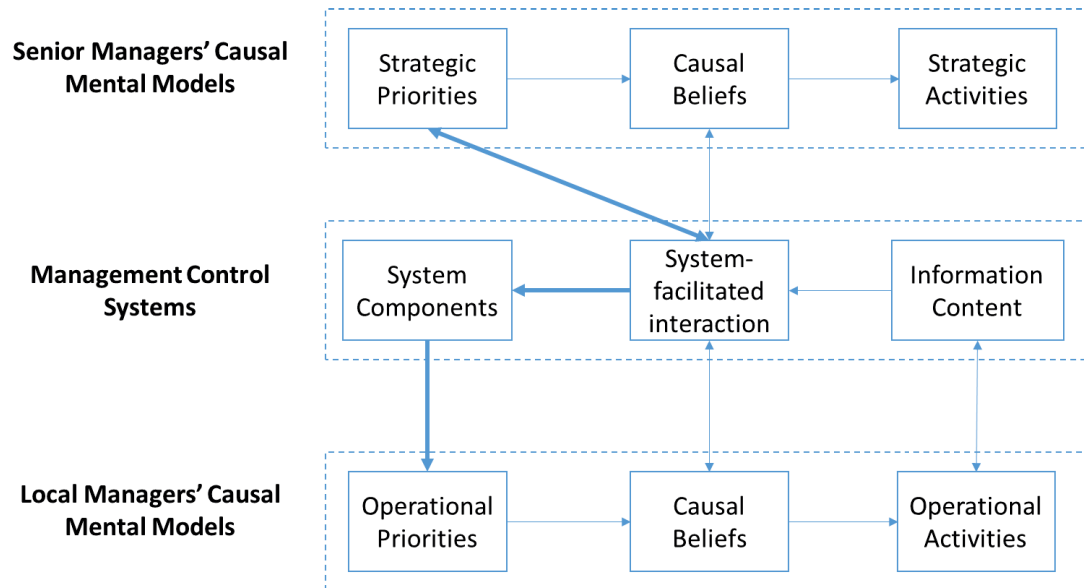
Signalling

Signalling is the use of information to reveal values and preferences (Simons 1990). In the case of interactive control, managers use information within the interactive control system to communicate the set of activities that they consider to be the most critical; the strategic uncertainties which must be attended to in order to ensure that the goals of the organisation will be achieved. Signalling plays a particularly important role when the size and complexity of the organisation and its operating environment renders it impossible for top management to monitor these strategic uncertainties personally given their inherently limited attention.

When considered within the framework of managers' causal mental models, signalling can be understood as the process by which senior managers' arrive at a consensus regarding appropriate strategic priorities. The strategic priorities are then embedded as components within results-control oriented management control systems and translated into operational priorities by operational

managers within the context of their own business unit. This signalling process is illustrated in Figure 23. Analysis of the extended theoretical model and associated arguments reveals a number of significant characteristics of the signalling mechanism that are not explicit in Simons' model.

Figure 23: Signalling



First, senior managers and local managers do not necessarily need to share beliefs about priorities directly for signalling to be effective; in fact, given that the focus of senior managers and operational managers causal mental models can be expected to be quite different, complementarity is likely to be more important than similarity in this respect. Complementarity, in this case, is the result of management control systems mediating the translation of senior managers' priorities, developed in and for a strategic context, into the causal mental models of operational managers. Operational managers then interpret these priorities in the context of their knowledge of their local operating environment.

Second, analysis of the implications of interactive control for managers' causal mental models reveals that signalling alone is insufficient for increasing the complexity of managers' causal mental models. While the use of management control systems facilitates the translation of senior managers' strategic priorities into the operational priorities of local managers, face-to-face interaction is required in order for both sets of managers to develop their understanding of both the drivers and implications of the achievement of these priorities. Setting priorities without also establishing the network of possible causes and effects risks operational managers focusing

exclusively on specific operational outcomes, while inadvertently undermining the underlying strategic priorities.

In this way, the application of the theoretical model demonstrates why signalling alone is not sufficient to influence the complexity of senior and operational level managers' causal mental models. On its own, signalling can be achieved through the use of results-control oriented management control systems, such as performance measurement systems and formal accountability structures, without the need for accompanying discussion and debate in a face-to-face setting. However, using these systems to signal senior managers' strategic priorities is insufficient to communicate the causal reasoning underlying senior managers' expectations.

Learning

Within the context of the theoretical model, learning can be conceptualised as a change in any of the components of managers' causal mental models that occurs in response to new information about, or experience with, the underlying causal system. Managers learn when their knowledge of strategic and/or operational priorities is updated; when they acquire knowledge of relevant strategic and/or operational activities; and when their beliefs about the cause-and-effect relations linking activities and priorities are revised or otherwise changed. However, only changes in a manager's causal beliefs are likely to result in changes in that managers' patterns of judgement and decision making, behaviour, and, ultimately, performance. This is because it is only knowledge of causal mechanisms and relations that determine an individual's ability to intervene in a system in order to achieve a specific goal or purpose (Pearl 2000; Sloman 2005; Woodward 2003).

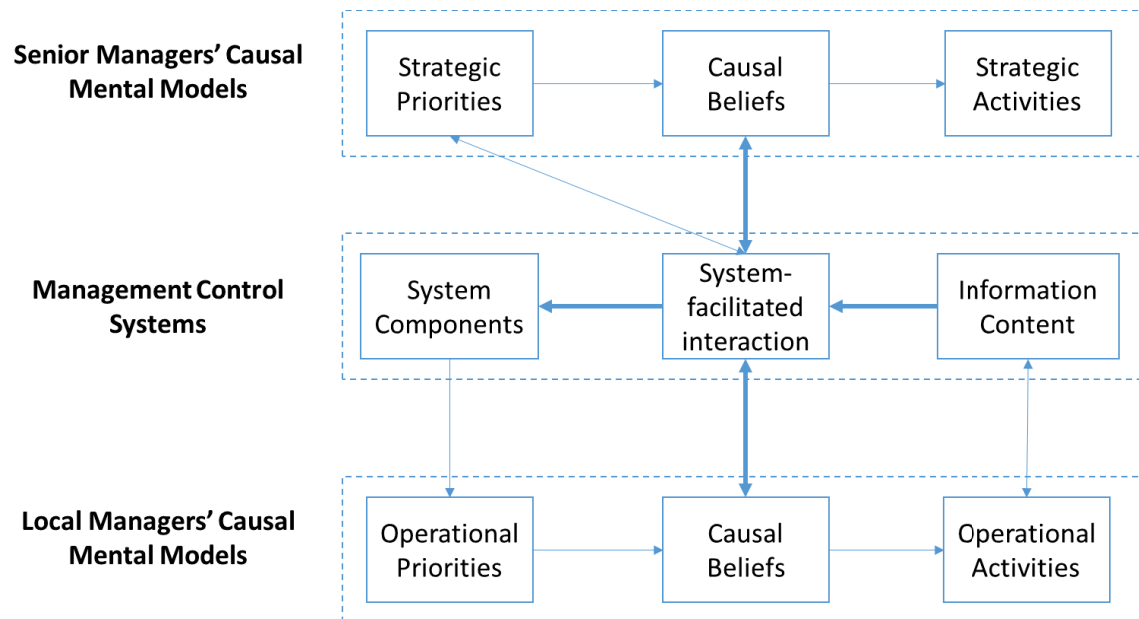
Interactive control appears to play an important role in enabling the development of managers' causal mental models *beyond* their understanding of desired outcomes and priorities. Simons argues that it is debate and dialogue which translates the preferences signalled by the interactive control system into the learning which then drives emergent strategy formation. In smaller organisations, this debate and dialogue is likely to happen organically as key personnel are able to interact and share information informally (Simons 1995b). Within small, physically proximate local management teams it is the motivations and attitudes of operational managers that will determine the extent to which other local managers are exposed to the systems that senior

management use interactively, and the extent to which the operational manager articulates and shares their own beliefs about operational priorities and their drivers.

Large organisations, however, require formal mechanisms to ensure that this interaction occurs and that information, opinion and insight is shared through system-facilitated debate (Simons 1995b). Interactive control systems can help to “build information bridges among hierarchical levels, functional departments and profit centres”. (Simons 1991, p. 61). These systems provide a platform for debate and dialogue by encouraging participants at all levels of the organisation to engage with the information in the system and be prepared to contribute their own views in the interrogation of the causes and implications of the data discussed. However, Simons does not attempt to specify the nature of this learning beyond its focus on strategic uncertainties; it is not clear who in the organisation is learning, precisely what is learnt, or how this learning occurs. This missing link in Simons’ theorisation is what makes it difficult to identify how interactive control and this underspecified learning would result in congruent autonomous behaviour at the operating level.

The application of the theoretical model demonstrates *why* interactive control enables a type of learning that facilitates operational managers’ autonomy while maintaining congruence with senior managers’ strategic priorities and vision. Figure 24 shows the pathways within the theoretical model that facilitate the articulation, development and generation of managers’ beliefs about the cause-and-effect relationships in their operating environment. These beliefs, in turn, inform operational managers’ decisions and actions with respect to operating activities within the business unit for which they are responsible. For operational managers’ autonomous behaviour to be congruent with senior management’s vision for the organisation, there needs to be alignment between the causal mental models of both sets of managers. For operational managers, this means that the development of their causal mental models requires both their own local knowledge of the operating environment, as well as input from senior managers’ with respect to the organisations’ overarching strategic priorities.

Figure 24: Learning



Role of interaction in facilitating learning

Key to the effectiveness of interactive control in facilitating learning is – perhaps unsurprisingly – interaction. Analysis of the theoretical model reveals two key insights into the role of interaction in encouraging learning about cause-and-effect relationships at both the senior and operational levels of management. First, interaction is crucial for the development of managers’ beliefs about underlying causal relationships, and the facilitation of congruent autonomous behaviour at the operational level. Interaction can be initiated either with regard to proposed changes to system components, or through routine review of the information content of the system. For interaction to be effective in this regard, it only needs to enable the articulation, challenge and generation of specific causal attributions relating drivers and outcomes of performance. Furthermore, for interaction to result in changes to managers’ mental models it must take place within the context of what managers perceive to be a mutually supportive environment. When managers perceive themselves to have genuine input into the design of the system, or alternatively, perceive the purpose of the discussion of performance information as supportive rather than antagonistic, they are more likely to volunteer their own beliefs and internalise the beliefs of others into their own causal mental models.

Second, routinely interactive use of management control systems can also be expected to lead to increased complexity of both senior and operational managers’ causal mental models. This

increased complexity may explain the findings of improved organisational performance in organisations which make use of interactive control.

7.2.3. Implications for conceptualisation of interactive control

Together, the insights generated by the application of the extended theoretical model to Simons' notion of interactive control may provide some additional clarity regarding the nature and expected behaviour of the interactive control construct. That is, the incorporation of causal mental models into the existing theoretical arguments relating to learning may help to evaluate the different approaches to conceptualising interactive control in the literature, as well as reconcile some of the inconsistent findings relating the interactive use of control systems to outcomes such as learning and performance.

In his original conceptualisation, Simons argues that “management control systems *become interactive* when business managers use planning and control procedures to actively monitor and intervene in ongoing decision activities of subordinates” (Simons 1990, p. 136, emphasis added). In subsequent work, Simons expands his definition to identify four core characteristics of an interactive control system. The following characteristics are argued to be present in every example of interactive control use: (1) information generated by the system is an important and recurring agenda addressed by the highest levels of management; (2) the interactive control system demands frequent and regular attention from operating managers at all levels of the organisation; (3) data generated by the system are interpreted and discussed in face-to-face meetings of superiors, subordinates and peers; and (4) the system is a catalyst for the continual challenge and debate of underlying data, assumptions and action plans (Simons 1991, p. 97).

However, Simons makes reference to additional characteristics of interactive control in later studies; the additional characteristics are the subject of a content analysis by Bisbe, Batista-Foguet and Chenhall (2007), who identify five distinct dimensions across Simons' entire body of work. These are: (1) an intensive use by top management; (2) an intensive use by operating managers; (3) a pervasiveness of face-to-face challenges and debates; (4) a focus on strategic uncertainties; and (5) a non-invasive, facilitating and inspirational involvement. They argue that interactive control should be treated as a multidimensional, emergent construct, as opposed to a latent or unidimensional construct. Modelling the interactive control system construct in this way implies

that each component has a distinct nature, and each is required for the abstracted construct to have meaning. However, most empirical studies that seek to operationalise the interactive control construct include only some of the five dimensions identified by Bisbe, Batista-Foguet and Chenhall (2007) (e.g. Bisbe & Malagueño 2009; Henri 2006; Widener 2007). This approach is also advocated by Tessier and Otley (2012), who suggest that the first three criteria retain the ‘interactive’ label, while the other two contribute to other constructs relating to performance measurement.

If interactive control is most suitably modelled as a multidimensional emergent construct consisting of five dimensions, then the exclusion of constituent components would likely obscure or distort any relationships between interactive control and hypothesised causes or effects, leading to inconsistent findings in the literature. Alternatively, it is possible that some of the dimensions in the Bisbe, Batista-Foguet and Chenhall (2007) analysis are superfluous to the theoretical arguments, and themselves generate distortion or mask empirical effects of the interactive control construct. As I argue earlier in this chapter, only the logic of a clear underlying rationale that constitutes the “why” of a theory (Whetten 1989) can provide a basis for the evaluation of competing models. In this chapter I have proposed that the concept of causal mental models and the associated theoretical framework relating to individual capacity for learning, communication, judgement and decision making, can provide insight into the “why” of interactive control and provide a basis for evaluating competing models in the literature.

The analysis in this thesis ultimately supports the position that all five of the dimensions of interactive control proposed by Bisbe, Batista-Foguet and Chenhall (2007) are required for control use to be considered interactive, and for the theorised effects on learning and performance to hold empirically. For the use of management control systems to result in congruent autonomous strategic behaviour, operational managers’ causal mental models must be aligned or compatible with those of senior management. Alignment of causal mental models is the result of learning, which is framed here as the process by which managers come to update or refine their beliefs about operating or strategic priorities, activities, and the causal relationships between them, based on reflection, discussion, and debate. The necessary dimensions of interactive control, then, are those that together facilitate the articulation, challenge and generation of causal attributions that are

critical to increasing alignment within the causal mental models of senior and operational managers.

The application of the refined theoretical model demonstrates that active and frequent engagement with the control system by both senior and operational management is sufficient for the translation of senior managers' strategic priorities into the operational priorities incorporated in operational managers' causal mental models. However, the articulation, challenge and generation of causal attributions – and the updating of managers' causal beliefs – was only made possible by face-to-face interaction directly related to the proposed changes to system components or the routine review of the information content within the system. To this point, both the Bisbe, Batista-Foguet and Chenhall (2007) and Tessier and Otley (2012) conceptualisations of interactive control remain plausible. To separate the two positions, I consider the implications of the remaining two dimensions in the context of the causal mental models framework: a focus on strategic uncertainties, and a non-invasive, facilitating and inspirational involvement.

The fifth criteria – a non-invasive, facilitating and inspirational involvement – has some parallel within the arguments associated with the theoretical model. That is, for interaction to result in changes to managers' mental models it must take place within the context of what managers' perceive to be a *mutually supportive environment*. This requirement speaks to the tone of interaction, which largely determines how likely operational managers are to volunteer their own beliefs and internalise the beliefs of others into their own causal mental models. While the study of ResCare did not provide an opportunity to observe the opposite condition – an antagonistic environment and invasive management style – the underlying theoretical framework of causal mental models would suggest that such conditions would not be conducive to encouraging operations managers to articulate their beliefs, or to challenge those of senior managers. Given the critical importance of this mutual sharing of causal attributions for the development of managers' causal mental models, it seems reasonable to argue that conditions which facilitate open and transparent discussion without an overt control agenda are required for learning to take place.

The final criteria – a focus on strategic uncertainties – would also appear to be necessary for this type of learning to occur. There are at least two reasons for this requirement that can be elicited from the refined theoretical model and analysis of the ResCare case. First, a focus on strategic uncertainties is a necessary condition to provoke change in managers' causal mental models. A

key characteristic of mental models is that these cognitive representations are relatively enduring but dynamic (Klein & Hoffman 2008); they are enduring in the sense that they denote cognitive structures that are stored as a complete unit in a potentially permanent state in long-term memory (Doyle & Ford 1998), yet are dynamic in the sense that the detail of the model can change over time – even during the flow of a conversation (Forrester 1971). Changes to parts of mental models occur when new information is received and beliefs about the component concepts and relationships are updated. For this reason, a focus on *uncertainties, ambiguities or conflict* (strategic or otherwise) increases the likelihood that managers will be exposed to new information or beliefs as a result of management control system-related interaction. Conversely, discussion of more certain or less contested causal relationships is unlikely to result in any managers (with the possible exception of the very inexperienced) having cause to update or refine their existing causal mental models, and as such no learning will occur.

Second, a focus on strategic – as opposed to operational – uncertainties is significant as this represents the most likely common ground for both senior and operational managers to be able to share knowledge and beliefs. As outlined in the refined theoretical model, the focus of senior managers' causal mental models can be expected to be primarily strategic in nature, while operations managers' focus is more operational. These different levels of focus mean that there is unlikely to be considerable direct overlap in the causal mental models of senior and operational managers; instead, alignment occurs when managers' mental models are complementary. As previously discussed, complementarity is the result of management control systems mediating the translation of senior managers' priorities, developed in and for a strategic context, into the causal mental models of operational managers, who interpret these priorities in the context of their knowledge of their local operating environment. This translation is only likely to occur when discussion is initiated at a strategic level; if discussion is initially focused on operational matters, no translation is required and no significant changes to either senior or operational managers' causal mental models is likely to result.

7.2.4. Summary

The extended theoretical model developed in this chapter can be used to explore the underlying socio-cognitive dynamics of Simons' concept of interactive control; this enables us to explain *why* interactive control facilitates learning, as well as to evaluate the competing conceptualisations that

currently exist within the literature. The concepts and theory associated with causal mental models can be used to extend Simons' mechanisms of signalling and learning; in particular, this allows us to develop a set of specific theoretical expectations about how interactive use of control systems can be expected to influence causal mental models on a systematic basis, and in so doing facilitate congruent behaviour and decision making by autonomous operational managers. Further, the incorporation of underlying socio-cognitive mechanisms into the levers of control framework reveals that the treatment of interactive control as a multidimensional emergent construct with five distinct dimensions (per Bisbe, Batista-Foguet & Chenhall 2007) is a more appropriate approach to conceptualisation than alternative models present in the literature, as all five dimensions are required for interactive control to have the proposed effects on managerial learning and, ultimately, performance.

7.3. Socio-cognitive Effects of Budget Participation

A considerable stream of research on the effects of budget participation finds that involvement of subordinate managers in the budgeting process can lead to a potentially multi-directional transfer of information across hierarchical levels by means of interaction between superior-subordinate manager dyads (Campbell & Gingrich 1986; Chong & Chong 2002; Chong, Eggleton & Leong 2006; Kren 1992; Latham & Saari 1979; Magner, Welker & Campbell 1996; Parker & Kyj 2006; Shields & Young 1993). However, little is currently known about the information that is potentially transferred during participative budgeting. As a result, prior literature has been constrained in its ability to produce *cognitive explanations* of the effects of budget participation on managerial cognition, and capacity for judgement and decision making. In this section, I draw on additional theory relating to *group-level* mental model dynamics to understand the extent to which participative processes result in managers' mental models that are more or less similar, congruent, or divergent, and consider the implications of these group-level dynamics for managerial cognition and capacity for judgement and decision making.

7.3.1. Group-level mental model dynamics

The influence of management control systems on the development of managers' causal mental models has further implications with respect to group-level mental model dynamics and the effective operation of teams within ResCare. While causal mental models are significant inputs to

an individual's capacity for judgement and decision making, group level mental model dynamics have the potential to influence the effectiveness of communication, learning, and task-related activity of the group. Two specific forms of mental model dynamics have been identified in the literature: shared mental models (Cannon-Bowers, Salas & Converse 1993; Klein & Zsombok 1997; Klimoski & Mohammed 1994; Mohammed, Ferzandi & Hamilton 2010; Orasanu & Salas 1993; Rouse, Cannon-Bowers & Salas 1992; Stout 1995), and cross-understanding (Guiette & Vandembemt 2013; Huber & Lewis 2010, 2011). Shared mental models and cross-understanding are related but distinct concepts, with different implications for both the development and use of causal mental models in team environments.

Shared mental models

Shared mental models refer to the components of individual group members' mental models that are shared by the entire group. These components can relate to details of the overall task, team goals, team member roles, individual tasks, team members themselves, and the information that team members need to complete a task (Stout, Cannon-Bowers & Salas 1996). Within teams at ResCare there is some evidence of the presence of a significant overlap in the content of team members' mental models; similarities in complexity – but not specific overlap in content – exist at the senior management level, while greater commonality is present in the mental models of the respective North and South facility local management teams. In the case of the local management team of the North facility, the cognitive maps of the three local managers share references to specific operational tasks, including reporting, roster management, education, and engagement with relatives. In the case of the South facility, there is substantial overlap in the maps of the operations manager and the clinical manager, both of whom mention a number of more system-level activities and outcomes such as strategic planning, transparency/ communication, and staff morale, but considerably less overlap with the accommodation manager (possibly due to the small size of the cognitive map).

Shared mental models are argued to enable adaptive behaviours and coordination under stress (Cannon-Bowers, Salas & Converse 1993; Klein & Zsombok 1997; Klimoski & Mohammed 1994; Mohammed, Ferzandi & Hamilton 2010; Orasanu & Salas 1993; Rouse, Cannon-Bowers & Salas 1992; Stout 1995; Stout, Cannon-Bowers & Salas 1996); however, empirical findings in this literature are mixed. While this study did not set out to identify or test the effects of shared mental

models specifically, three possible insights can be identified in the empirical data and analysis. First, shared mental models do not appear to be a prerequisite for effective communication and team performance in the case of ResCare: the senior management team in particular share very little of the content of their mental models, yet consistently demonstrate effective collaboration, coordination and adaptive behaviours. Second, the type of content that is shared between team members may moderate the effect of shared mental models on team behaviour and performance. The North facility managers share a significant number of nodes relating to specific operational tasks, but do not demonstrate particularly effective intra-team communication or collaborative behaviours; managers spend more time reacting to emergent crises than proactively managing risks. In contrast, the South facility managers share nodes relating to system-level processes, and do demonstrate effective communication, collaboration, and risk management as a team. Finally, the complete lack of overlap in content of the mental models of senior and local managers indicates a lack of shared mental model at the combined management level. However, this group also exhibits relatively effective communication and group-level output.

Cross-understanding

Cross-understanding, on the other hand, refers to the extent to which group members have an accurate understanding of one another's mental models (Huber & Lewis 2010), and may have greater explanatory power for the effects of group-level mental model dynamics at ResCare. Cross-understanding is argued to affect group processes and outcomes through at least three mechanisms: by enabling effective communication through establishing common ground; by initiating changes in mental models where interaction allows for inquiry about others' knowledge and beliefs; and by facilitating more effective coordination and collaborative behaviours (Huber & Lewis 2010). High levels of cross-understanding are expected to contribute to higher-quality group outcomes and increases in group members' learning; however, their effects will be dependent on the motivations of group members.

The causal mental models of ResCare senior managers in particular appear to be more diverse than similar; yet this team exhibits high levels of coordination and the ability to anticipate one another's beliefs and preferences. In this case, cross-understanding may explain this absence of a consistent "shared mental model effect" on team behaviours and performance (Huber & Lewis 2010). Huber and Lewis (2010) argue that insight into one another's mental models facilitates collaborative

behaviour and coordination in the same way that mental model similarity might, and can explain instances where diversity of mental models could be expected to impede group communication and performance, but doesn't. Once again, this study was not designed to identify or test the effects of cross-understanding directly; however, the operation of this construct can be at least partially inferred from the data generated by observation of group dynamics and semi-structured interviews with study participants.

Cross-understanding within the senior management team

Within the senior management team, there is some evidence of high levels of cross-understanding between the CEO and each of the other senior managers. That is, ResCare's CEO appears to cultivate detailed insight into the knowledge, beliefs, sensitivities and preferences of senior management team members, and draws on this understanding when interacting with other members of the team in both one-on-one and team meetings. The CEO explained that this behaviour reflected a conscious, effortful strategy, aimed at maintaining effective communication and fostering cognitive connections between team members. Specifically, the CEO framed this type of cognitive work as one of the most significant aspects of her approach to leadership, going so far as to express a level of agnosticism as to specific strategic priorities and instead positioning her role as being more concerned with building consensus and alignment among the broader leadership team.

I don't genuinely mind what ends up in the plan. All I want to make sure is that we're engaging what people agree are the priorities and that we're getting consensus; because once we've got to that point, then people want to see that what we've agreed actually happens. So if that's the process, then my job is to make sure that we don't lose those connections. (CEO)

My role is to bring in alternate views, alternate thinking, and get the sense that people go, yes. When they're nodding their head and they're going, yes, we must do this, then it's about crafting the work plan so that it happens. (CEO)

Experience says if they're involved in the setting of the priorities and they agree with those priorities, you will be astounded as to what people can actually do if they're engaged and know how to collaborate and they bring people on the journey. (CEO)

ResCare's CEO mentions three deliberate strategies for consensus and alignment building among team members. The first is the provision of "anchors", in this case relating to the values and

mission of the organisation, which team members are encouraged to use as reference points in their own judgement and decision making. By constantly reinforcing these “simple” anchors through behavioural modelling, as well as verbal references during interactions with the senior management team, the CEO anticipates that senior managers will internalise anchors into their own cognitive representations and reinforce them in a similar fashion with their own local, functional teams.

I'm always anchoring whatever I do and they're very simple. They're easy to remember and you'll notice if I'm chairing meetings, I'll always come back to the same tenet. So part of that leadership, you're then helping everybody because the power of storytelling and the power of shared journey, conversations and on-boarding, means that then you'll start to hear them actually having their own conversations. So I don't have to say it's all about core process. The team will talk about core process. (CEO)

The second strategy is the use of metaphors to keep conversations on common ground, and ensure that team members are able to understand the significance of the point being expressed within the broader context of ResCare's management and operations. Over the course of the study, ResCare's CEO was observed making frequent and varied use of metaphors when explaining a proposed course of action or recommending changes to another team members' management approach, particularly when the demeanour of meeting participants became defensive, demoralised, or fatigued.

So when you get that head nodding, that's when I know the connection is going on. So if I'm leading a meeting and you throw in a weird metaphor like that, then people will go, oh yeah, I get that, and you know you're onto something. Because they're connecting that scenario with something inside their head. (CEO)

Finally, ResCare's CEO aims to increase cognitive alignment *within* the team, encouraging effective communication and collaboration between team members with different levels of experience, functional backgrounds, and perceptions of performance and performance expectations. Part of this strategy is deliberately backing off and giving the team the space and structure to work within and identify points of divergence in their respective cognitive representations. Another part is actually personally mediating relationships between team members, by bridging gaps in perception around expectations and performance.

There's also got to be an element of just getting people together and recognising that they're not going to come together as a team if you don't actually get people sort of viewing their dirty laundry. To say, actually guys, you're not getting this right. So my brief ... was to flesh out the unspoken issues so that you get alignment. It has worked. (CEO)

[Previously,] no-one's helped them to connect the dots between their perception of performance and actually what everybody else is expecting from them, and therein lies the gap. (CEO)

The high levels of cross-understanding that are evident between the CEO and other members of the senior management team would indicate that there is a *maximally skewed* distribution of cross-understanding within the team, in which the CEO is *cognitively central* (Huber & Lewis 2010). Huber and Lewis (2010) theorise that a cognitively central team member can influence communication, encourage the elaboration of task-relevant knowledge, and facilitate collaborative behaviours, by drawing on what he or she understands about others' mental models to tailor communication and influence what is discussed by the group. In this way, the cognitively central member can also influence the development of managers' mental models by encouraging the elicitation of task-relevant knowledge and alternative perspectives, and moderating the quality and content of information that is articulated and subsequently internalised into other managers' mental representations.

Cross-understanding within local management teams

Less direct evidence is available to support the drawing of conclusions about levels of cross-understanding within local management teams at ResCare, though some possible relationships can be elicited from observation of team behaviour. Like the senior management team, local management teams are comprised of members in different functional roles, and from different professional backgrounds and levels of experience. This group diversity can lead to performance-degrading conflict (Jehn, Northcraft & Neale 1999) where group members make arguments or proposals that are not acceptable to other members of the team. However, Huber and Lewis (2010) suggest that high levels of cross-understanding can counteract the potential for conflict, as group members are aware of each others' beliefs and preferences, and as such are better able to adapt proposals accordingly and identify potential for compromise or agreeable trade-offs.

In the case of the North facility, the diversity of the local management team appears to be driving frequent episodes of conflict and frustration within the group. Further to this, there does not appear

to be particularly effective communication or significant collaborative behaviours within this team that might have been evidence of the operation of high levels of cross-understanding. Instead, local managers operate almost exclusively within their own domains, with little insight into the knowledge, beliefs and expectations held by other managers at the facility. This lack of insight was apparent in the disconnect between the views expressed by the OM, CM and AM about the division of responsibilities and effectiveness of the local management team.

I have to trust [the CM] that she's on top of the clinical care – because that's her portfolio, is care. So I have to trust her, that what she reports to me is actual. I have the added benefit that I'm a nurse, so when I go around, if I see stuff I can say, hey what's what, what's happening with this. (OM North)

I'm looking at my position description, because [the OM] told me I had to do it today. If I were to be honest with you, I do do what's in my position description but I probably do 50 percent more that's not included in my position description, like tours, primarily done by [the AM]. ... But I think what about all the other stuff that we do, the administrative side. I have a lot of case conferences with families as well. I do all the position descriptions for the staff, so that's time consuming. Even though [the OM] is supposed to, but I do that. I think, gosh, I do all these other things, what about that, none of that's in here. Then that makes me think what every other [CM] is telling me is true. It's just me, I'm stupid for agreeing to do all this extra stuff. (CM North)

Finally, as discussed in Chapter 6, this team does not interact as a group or engage with formal management control systems; the interactions that do take place are typically focused on an emergent issue or crisis. Under these circumstances, it seems unlikely that there has been sufficient opportunity for high levels of cross-understanding to develop between team members – this could explain the relatively low rate of learning about complex causal relationships within the group.

In the South facility, the similarly diverse local management does not appear to experience the same levels of conflict or frustration; on the contrary, at various points during the study each team member expressed their sense of being “on the same page” as each other and felt that the team presented a united front to the other staff in the facility. Communication and collaboration within this group is explicitly prioritised and appears to be significantly more effective, resulting in interaction between members that is frequent and productive, and involves all members of the group.

The biggest thing is communication and I think if you've got the communication flowing through and everyone is on the same page, things will tend to run smoother, not always without bumps but I think smoother than people not knowing what's going on. If you leave people in the dark, they lose interest too. They think, oh well, I don't know what's going on, I don't care. (OM South)

I disturb [the OM] on a half an hourly basis, every half an hour I knock on the door and I speak to her about things here, things here, things here. She is experienced ...and so I take her advice. We have to discuss on many issues, specifically which residents we are taking in because it will impact everybody. (AM South)

I have to work very closely with [the CM] ... If she thinks somebody has to be moved in terms of – a room has to be changed for a resident because of care needs – she will come ask me in terms of financial aspect how was I, so if there was a different price attached to it. So she will come and ask me as [the AM] and usually we will speak to [the OM] as a team, that we think this can be done because there's not impact to us financially ... so we work very closely. (AM South)

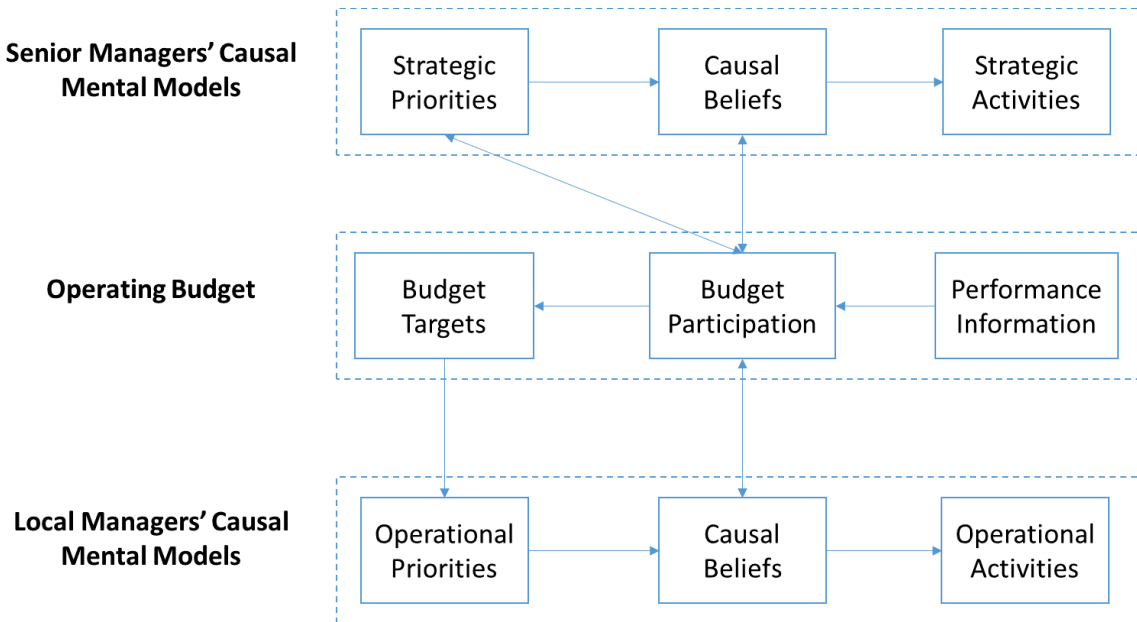
The relative complexity and convergence of causal models in the group may be interpreted as being the result of high rates of learning about relevant causal relationships in the environment. Given that there is evidence of opportunity and motivation for the development of high levels of cross-understanding in this group, as well as evidence of the theoretical effects of high levels of cross-understanding, cross-understanding may well provide part of the explanation of how management control systems influence the development of managers' causal mental models in the case of ResCare's South facility.

7.3.2. Effect of budget participation on managers' causal mental models

Within the extended theoretical model, accountability for budget targets can be expected to influence managers' understanding of operational priorities regardless of their level of participation; this may indirectly represent a transfer of senior managers' understanding of strategic priorities when they are embedded as budget targets and translated by subordinate managers into operational priorities. However, budget participation may enhance this effect to the extent that participation increases the intensity and frequency of managers' use of the budget. This is due to more intensive independent use of a results-control oriented management control system (in this case, the budget) resulting in subordinate managers being more likely to internalise system

components (budget targets) into their causal mental models. These relationships are represented in Figure 25.

Figure 25: Relationship between the use of an operating budget and the development of managers' causal mental models



Conceptualising budget participation

Prior research on budget participation has been limited in its ability to produce *cognitive explanations* of the effects of participatory processes due to the historically narrow interpretation of participation (Shields & Shields 1998). Studies within this literature have tended to interpret participation exclusively in terms of a subordinate's involvement in budget goal setting; that is, the extent to which the subordinate is involved in and has influence on the final budget targets. While Shields & Shields (1998) recommend the incorporation of a wider scope and broader range of dimensions, this has yet to be taken up in earnest by subsequent studies.

When applied to budget participation, the theoretical model and associated set of theoretical arguments suggest that the participation of operational managers in budget processes can extend beyond the setting of targets (a component of the budget) and into budget-related interaction relating to the *performance information* contained within the budget once the budgeted period has commenced. This type of budget-related interaction can occur with or without equivalent input into the *design* of the budget (in the form of budget targets), yet can have equivalent significant

implications for information transfer between levels of management. This is because neither the setting of targets nor review of performance information by themselves is sufficient to stimulate information transfer; rather it is the *interaction* between managers that is facilitated by jointly conducting these tasks that affects managerial cognition and performance.

A further dimension that appears to be significant in determining the effect of budget participation on managerial cognition is the extent to which operational managers perceive their participation to be of their own volition and received within a mutually supportive environment and management style. The extended theoretical model illustrates how participatory processes can enable senior and subordinate managers to contribute to the development of each other's causal mental models through budget-related interaction. However, the necessary process of articulating, challenging and collaboratively generating causal attributions will only occur within a mutually supportive environment and management style. This additional condition may in fact conflict with underlying assumptions within the budget participation literature regarding the nature of budget participation interactions, which typically assume that the purpose of the budget is for control or performance evaluation, rather than ex-ante planning and goal setting (Shields & Shields 1998; Sivabalan et al. 2009). In this way, the application of the theoretical model provides some insight into why the purpose of budget participation may moderate the cognitive effects of participation, and in particular the likelihood that participation will result in development of either senior or subordinate managers' causal mental models.

Job-relevant information

The budget participation literature has produced considerable evidence that participatory budgeting practices lead to information transfer between superior and subordinate managers. Within this literature, budget participation has been argued to act as a platform for superior managers to transfer *job-relevant information* to subordinate managers (Campbell & Gingrich 1986; Chong & Chong 2002; Kren 1992; Latham & Saari 1979; Magner, Welker & Campbell 1996; Parker & Kyj 2006), to more clearly communicate senior managers' *performance expectations* (Chenhall 1986; Chong & Chong 2002; Chong, Eggleton & Leong 2006; Parker & Kyj 2006), and for subordinate managers' to articulate and share their own *local knowledge* (Brown, Evans III & Moser 2009; Covalleski et al. 2003; Shields & Young 1993). However, little is currently known about the actual information that is transferred during participative budgeting.

This may also be attributable to the historically narrow definition of participation, which has contributed to a similarly narrow framing of the type and nature of information that may be transferred during participative budgeting processes.

Together, the theoretical model and expanded conceptualisation of budget participation provide insight into the information that may be transferred between senior and subordinate managers during participative budgeting processes. Specifically, participation can result in the transfer of information relating to strategic and/or operational priorities; strategic and/or operational activities; and beliefs about the cause-and-effect relationships that connect the drivers to outcomes of performance. The model also provides an indication of the circumstances under which different types of information might be transferred. For example, the participation of subordinate managers' in budget target setting (per the historical framing of participation) may be sufficient to enable the translation of superior managers' strategic priorities into the operational priorities embedded within operational managers' causal mental models. However, when participation is framed as a broader, ongoing dialogue between senior and subordinate managers within a mutually supportive environment, it is possible that this process will result in the generation and transfer of information pertaining instead to the underlying causal structures that link activities and priorities, and contribute to managers' capacity to make informed judgements and decisions.

Implications of budget participation for managerial cognition

Analysis of the extended theoretical model and socio-cognitive dynamics reveals further implications of budget participation for managerial cognition. First, the more frequently senior and operational managers engage in system-facilitated interaction, the greater the level of alignment and/or cross-understanding of causal beliefs between the groups. In the case of budget use, higher levels of budget participation can be expected to lead to both senior and subordinate managers' having improved insight into the knowledge and beliefs of the other at a minimum, and may lead to greater alignment in beliefs over time. As discussed earlier in this chapter, increased levels of cross-understanding is argued to affect group processes and outcomes through at least three mechanisms: by enabling effective communication through establishing common ground; by initiating changes in mental models where interaction allows for inquiry about others' knowledge and beliefs; and by facilitating more effective coordination and collaborative behaviours (Huber & Lewis 2010). High levels of cross-understanding are also expected to contribute to higher-

quality group products and increases in group members' learning, depending on the motivations of group members. In this way, the positive effect of budget participation on the level of cross-understanding between senior and subordinate managers may explain why performance may improve as a result, but also why performance may not improve despite the implementation of participative processes.

Second, the more frequently senior and operational managers engage in system-facilitated interaction, the greater the complexity of (both) managers' causal mental models. This increased complexity of managers' causal mental models is driven by the process of articulation, challenge and collaborative generation of causal attributions within senior-subordinate manager dyads (or larger groups). Within an enabling context (a mutually supportive environment and managerial style), this can lead to subordinate managers incorporating aspects of senior managers' causal beliefs (most likely relating to strategic rationales) into their mental models, as well as senior managers incorporating aspects of subordinate managers' causal beliefs (based on local knowledge) into their own causal mental models. As a result of the new or refined causal attributions, the average complexity of both managers' causal beliefs is likely to increase. The positive effect of budget participation on the complexity of managers' causal mental models may explain positive effects on managerial performance, to the extent that the complexity of managers' causal mental models is a significant input into the effectiveness of the judgement and decision making activity of managers in decentralised environments. This effect may also help to explain the inconsistent findings with respect to performance effects of participation within the literature, as complex causal mental models may only be incrementally effective when the operating environment is similarly complex and/or volatile. This would appear to be consistent with the findings and arguments about complexity mediating the relationship between budget participation and performance in the literature (Campbell & Gingrich 1986; Kren 1992; Murray 1990).

7.3.3. Summary

The theoretical model developed in this chapter can be applied to the specific case of budget participation in order to advance theoretical arguments regarding the *cognitive effects* of participatory budgeting processes, and suggests potential ways to reconcile previously inconsistent findings within this literature. By expanding the conceptualisation of budget participation to include any budget-related interaction, as opposed to focusing exclusively on the task of budget

target setting, it is possible to develop a more nuanced understanding of what information is transferred through participative processes and under what conditions. While participation in target setting is sufficient to enable the transfer of information relating to strategic and/or operational priorities, budget-related interaction can enable the articulation, challenge and collaborative generation of causal attributions within the senior-subordinate dyad. The model also suggests an additional factor that contributes to the successful transfer of information through budget participation: the presence of a mutually supportive environment and managerial style. Finally, the concepts and theory of causal mental models provide an explanation of the effects of budget participation on both individual and group cognition, including increased effectiveness of communication, the facilitation of managerial learning, and improved capacity for judgement and decision making. The incorporation of these concepts and conditions into future budget participation research may help to resolve inconsistencies that have previously frustrated the advancement of theoretical arguments in this area.

7.4. Conclusion

In this chapter, I explored the implications of management control system-facilitated interaction and *group-level* mental model dynamics on the relationship between management control systems and managers' causal mental models. First, I considered the role of management control system-facilitated interaction in the development of managers' causal mental models, and the implications of this relationship for explaining the cognitive effects of interactive control. Analysis of the role of interaction in the ResCare case showed that it is only when management control systems facilitate interaction between levels of management that causal beliefs are shared and transferred between senior and operational managers, and that the sharing and updating of causal beliefs is only likely to occur in the context of a mutually supportive environment and management style. Using these insights, I developed an explanation of why the interactive use of control systems facilitates managerial learning. This incorporation of underlying socio-cognitive mechanisms into the levers of control framework revealed that the treatment of interactive control as a multidimensional emergent construct with five distinct dimensions (per Bisbe, Batista-Foguet & Chenhall 2007) is a more appropriate approach to conceptualisation than alternative models present in the literature, as all five dimensions are required for interactive control to have the proposed effects on managerial learning and, ultimately, performance.

Second, I drew on additional theory relating to *group-level* mental model dynamics to understand the extent to which participative processes result in managers' mental models that are more or less similar, congruent, or divergent, and considered the implications of these group-level dynamics for managerial cognition and capacity for judgement and decision making. Specifically, I reflected on the existence and development of shared mental models and cross-understanding within management teams in the ResCare case, and find that management control system-facilitated interaction can enable the development and maintenance of high levels of cross-understanding within management teams, which subsequently demonstrate more effective communication, extensive collaborative behaviours, and high levels of complexity – if not similarity – in managers' causal mental models. Application of these group-level dynamics to the phenomenon of budget participation demonstrated that while participation in target setting is sufficient to enable the transfer of information relating to strategic and/or operational priorities, any form of budget-related interaction can enable the articulation, challenge and collaborative generation of causal attributions within the senior-subordinate dyad. Furthermore, analysis of group-level dynamics indicated that the effects of budget participation can include increased effectiveness of communication, the facilitation of managerial learning, and improved capacity for judgement and decision making.

Chapter 8: Conclusion

8.1. Introduction

My aim in this thesis was to explore and then explain the relationship between the use of management control systems and the development of managers' causal mental models. In this final chapter I provide a summary of the case study and analysis undertaken for the thesis, and articulate how the thesis has addressed the research objective, research question, and specific research motivations. In each of the following three sections I identify the specific contributions that this thesis makes to the management accounting literature, before explaining the limitations of the study and implications for future research opportunities. I conclude with some final observations regarding the findings of the study.

8.2. Summary of Research

In this thesis I sought to address the research question: *how do management control systems influence the development of managers' causal mental models; and how do managers' causal mental models influence the development of management control systems?* Accounting judgement and decision research has historically focused on how decision makers use accounting information to inform their judgement and decision making activity, yet findings in the management and work behaviour literature consistently demonstrate that the direct provision of information plays only a relatively small role in influencing judgement and decision making in practice (e.g. Bruns & McKinnon 1993; Mintzberg 2009; Tengblad & Edvin Vie 2012). The research question in this thesis was instead premised on the notion that management accounting and control systems influence the broader *cognitive inputs* to managerial judgement and decision making. One of the key cognitive inputs to judgement and decision making is the development of *causal mental models*, a type of cognitive representation of networks of cause-and-effect relations (Klein & Hoffman 2008)

In Chapter 1, I proposed that the construct of causal mental models and underlying theory relating to their development and use may represent a socio-cognitive “missing link” within four distinct management accounting literatures. First, the literature investigating the cognitive effects of *strategic performance measurement systems* consistently finds that the provision of causal

information to decision makers facilitates a range of judgements and decision outcomes. However, no study has been able to examine the hypothesised mediating variable of causal mental models directly, and it remains unclear how the use of management accounting and control systems can be expected to influence causal mental models in practice. Second, the literature surrounding the *interactive use of control systems* seeks to explain its effects using the information-oriented cognitive mechanisms of signalling and learning, but currently lacks an underlying theoretical explanation of *why* interactive control would facilitate learning. Finally, I argued that the literature that considers the *cognitive effects of budget participation* has been constrained by a historically narrow definition of participation, which has restricted the ability of the literature to examine the implications of different types or levels of participation on information transfer and managerial cognition. As a result, little is currently known about the information that is potentially transferred during participative budgeting and its effects on managerial cognition and capacity for judgement and decision making.

In Chapter 2 I reviewed literature from various disciplines relating to the development and use of causal mental models, and developed a preliminary conceptual framework which informed my empirical approach which I outlined in Chapter 3. In Chapters 4 and 5 I described and analysed the empirical data from my study of residential aged care service provider ResCare, separately identifying the key features of the design and use of management control systems at the organisation, then the key features and patterns of variation in the causal mental models among study participants. In Chapter 6 I demonstrated how variation in engagement with management control systems by managers at ResCare explained systematic variation in the content and composition of these managers' causal mental models. I then used these findings to develop a theoretical model of the relations between the use of management control systems and the development of managers' causal mental models, and outlined the implications of the model for understanding the cognitive effects of strategic performance measurement systems. Finally, in Chapter 7, I extended the theoretical model to include consideration of the socio-cognitive implications of the relationship between management control systems and the development of both individual and group-level causal mental models, and reflected on the implications of this explanation for the interactive control and budget participation literatures. In the following sections I address these implications and articulate the contributions made by this study to each literature, along with suggested opportunities for future research in these areas.

8.3. Thesis Contributions

8.3.1. Cognitive effects of strategic performance measurement

This thesis makes two contributions to the literature that investigates the cognitive effects of strategic performance measurement systems. The first contribution is the generation of direct insight into the *content and composition* of managers' causal mental models by developing the causal mental models construct for application and operationalisation in a management accounting context. This conceptual development allows for theorisation at the level of the *content* of managers' mental representations, which represents an extension to prior studies which considered the potential mediating role of mental representations but were unable to elicit their content and composition directly. Rather, these studies either inferred the existence and operation of mental models based on judgement and decision outputs (e.g. Banker, Chang & Pizzini 2011; Brewster 2011; Cheng & Humphreys 2012; Choy & King 2005; Humphreys & Trotman 2011; Knechel, Salterio & Kochetovea-Kozloski 2010; Vera-Muñoz, Shackell & Buehner 2007), or relied upon self-reported data relating to the frequency of confirmation of or change to existing mental models (Hall 2011). Identifying specific dimensions relating to the *content* of a causal mental model enables the development of significantly more detailed theoretical arguments relating to the determinants and consequences of each dimension in relation to the use of management accounting and control systems. Identifying specific dimensions of causal mental models also facilitates the accommodation of much greater diversity and complexity of mental models; this is more reflective of the cognitive representations of decision makers in naturalistic environments, but not previously possible given the conceptual and methodological limitations of previous studies.

In order to develop the causal mental model construct for application in a management accounting context, in Chapter 2 I decomposed the construct into three constitutive dimensions: understanding of organisational priorities; knowledge of organisational activities; and beliefs about the cause-and-effect relationships linking drivers and outcomes of performance. I then drew on this conceptual development to inform the research design outlined in Chapter 3. The absence of prior studies that attempt to observe cognitive representations directly necessitated the development of a novel approach to eliciting participants' causal mental models within their naturalistic work context. The approach outlined in Chapter 3 is modelled on the Cognitive Task Analysis (CTA) technique of cognitive mapping, a data elicitation and visualisation technique commonly used in

naturalistic decision making and organisational behaviour research but not previously adopted within management accounting. Together, the conceptual and methodological development relating to the causal mental models construct undertaken in this thesis allows for the direct observation of the content of causal mental models. This allows the development and testing of more nuanced hypotheses relating the use of management accounting and control systems to judgement and decision making outcomes, and, ultimately, managerial and organisational performance.

The second contribution of this thesis to the strategic performance measurement literature is my explanation of how management accounting and control systems influence the development of managers' causal mental models, and how managers' causal mental models influence the development of management accounting and control systems. To develop a clearer understanding of this relationship, I outlined a preliminary conceptual framework which provided initial sensitising concepts relating to both the use of management control systems and the features and patterns of variation within participants' causal mental models. The conceptual framework was used to inform the research method developed and outlined in Chapter 3; this provided a structure within which to analyse the empirical data relating to both the use of management control systems (system components, system-generated information, and system-facilitated interaction), and the features and patterns of variation within participants' causal mental models (understanding of organisational priorities; knowledge of organisational activities; and beliefs about the cause-and-effect relationships linking drivers and outcomes of performance). I then drew on analysis of the empirical data in Chapters 4 and 5 to refine the preliminary conceptual framework by identifying specific relationships between the components of the primary constructs. The theoretical model, presented in Chapter 6, identifies the multiple pathways and mechanisms through which management control systems influence the development of a managers' causal mental model, and through which managers' causal mental models influence the development of management control systems. I find that this model has significant implications for the existing explanations within the literature that consider the cognitive effects of strategic performance measurement systems.

8.3.2. Accounting judgement and decision making

Together, the refined theoretical model and theoretical explanation represents a contribution to the broader accounting judgement and decision making by providing an explanation of one specific relationship between management accounting and control systems, mental representations, and individual decision making. I provide an explanation of the previously missing link in the argument for a mediating relationship between management control systems (such as strategic performance measurement systems) and judgement and decision making activity: while it is well established that mental representations act as a critical input to judgement and decision making, it had not been clearly demonstrated that the use of management control systems can influence mental representations. This approach may go some way to resolving a fundamental and confounding problem in the wider accounting judgement and decision making literature, which is that the provision of accounting information is often intended to inform judgement and decision making activity, but rarely does in practice (Bruns & McKinnon 1993; Mintzberg 2009; Tengblad & Edvin Vie 2012). I argue that rather than being used to inform judgement and decision making activity directly, engagement with management accounting and control systems can provide individual managers with an overarching cognitive framework within which they can interpret information, make decisions, and solve organisational problems. For the literature that investigates the cognitive effects of management accounting and control systems, this alternative assumption allows for the temporal and spatial separation of the inputs to decision making and the decision making activity itself, opening up many possibilities for the identification of new relationships between the use of these systems and judgement and decision making practice within organisations.

I make a further contribution to the broader accounting judgement and decision making literature by developing a novel methodological approach to studying mental representations in their naturalistic organisational context. The development of a novel methodological approach was necessitated due to the lack of prior research in management accounting which had attempted to study mental representations directly. This lack of prior research can be attributed to enduring theoretical and methodological preferences within the accounting judgement and decision making literature, which had, to a large extent, been modelled on the microcognition paradigm of cognitive psychology, and shares its interest in the “building of theories for specific phenomena and with correlating the details of the theories with available empirical and experimental evidence” (Hoc, Cacciabue & Hollnagel 1995). However, in the case of complex and context-rich cognitive

processes – such as the development and use of causal mental models – the advantages of an experimental paradigm can become inherently constraining.

The approach taken in this thesis is modelled on the Cognitive Task Analysis (CTA) technique of cognitive mapping, a data elicitation and visualisation technique commonly used in naturalistic decision making and organisational behaviour research but not previously adopted within management accounting. I use the cognitive mapping technique to elicit managers' causal mental models within the context of a longitudinal quasi-ethnographic case study, in order to understand the content and composition of the mental models within their natural organisational context. Together, the conceptual and methodological development relating to the causal mental models construct undertaken in this thesis allows for the direct observation of the content of causal mental models, and more nuanced theorisation relating the use of management accounting and control systems to mental representations, judgement and decision making outcomes, and, ultimately, managerial and organisational performance.

8.3.3. Interactive control and learning

In this thesis, I also make a contribution to the literature on interactive control by providing a theoretical explanation of the learning processes that result from the interactive use of control systems. By applying the concepts and theory associated with causal mental models to the phenomenon of interactive use of control systems, I extend Simons' (1995b) mechanisms of signalling and learning in order to more clearly understand the cognitive effects of interactive control on managerial learning, and, ultimately, performance. By applying the theoretical model directly to the concept of interactive control, I generate a set of insights into the cognitive mechanisms underlying the interactive use of results-control oriented management control systems. The identification of more specific causal mechanisms within the framework (the "why" of a theory (Whetten 1989)) provides a logical basis for evaluation of the different conceptualisations of the interactive control construct.

In Chapter 7 I applied my theoretical model directly to the concept of interactive control to generate a set of explanations of the cognitive mechanisms underlying the interactive use of results-control oriented management control systems. First, I explain why signalling alone is sufficient to facilitate the translation of senior managers' beliefs about strategic priorities into operational managers'

causal mental models as operational priorities, but is insufficient to ensure that operational managers' interpret and execute operational priorities in a way that is congruent with senior management's strategic priorities and vision. Second, I explain why at least one type of learning that occurs during the interactive use of management control systems relates to the development of managers' causal mental models of their operating environment. Third, I explain why interaction is critical for the development of managers' beliefs about underlying causal relationships, to the extent that it facilitates the articulation, challenge and generation of specific causal attributions by diverse groups of managers.

In Chapter 7 I also used the explanations that I generate to argue that all five dimensions of interactive control identified by Bisbe, Batista-Foguet and Chenhall (2007) are required for interactive control to have the hypothesised effects on managerial learning and organisational performance, and provide support for their position that interactive control should be treated as a multidimensional, emergent construct, as opposed to a latent or unidimensional construct. This is in contrast to most empirical studies which seek to operationalise the interactive control construct and include only some of the five dimensions identified by Bisbe, Batista-Foguet and Chenhall (2007) (e.g. Bisbe & Malagueño 2009; Henri 2006; Tessier & Otley 2012; Widener 2007). To the extent that the incorporation of the underlying socio-cognitive dynamics of interactive control reveals that all dimensions must be present for the effects of the construct to manifest, then it is unsurprising that empirical results based on operationalisation of only part of the construct would be inconsistent and often contrary to expectations.

8.3.4. Cognitive effects of budget participation

Finally, this thesis also makes a contribution to the literature on budget participation, by expanding the notion of participation and explaining how an expanded definition facilitates a deeper understanding of the information transferred during participative processes, and its effects on managerial cognition and capacity for judgement and decision making. I apply my refined theoretical model to the phenomenon of budget participation to identify and explain the different types of participation in budgeting processes that are possible, and explain the different effects of each participation type in terms of the potential for information transfer and effect on managerial cognition. Further, the use of the concept and operationalisation of causal mental models, as developed in this thesis, directly extends this literature by enabling researchers to unpack the

notion of “job-relevant information” allowing researchers to start to incorporate these nuances into theoretical arguments relating to the role of participative budgeting processes in information transfer. Where prior studies demonstrate that information transfer may mediate the relationship between budget participation and performance (Campbell & Gingrich 1986; Chenhall & Brownell 1988; Chong & Chong 2002; Chong, Eggleton & Leong 2006; Kren 1992; Latham & Saari 1979; Magner, Welker & Campbell 1996; Parker & Kyj 2006), I specify the nature of information transferred in terms of managers’ causal knowledge and beliefs, and identify two additional mechanisms through which budget participation can facilitate the transfer of these beliefs between levels of management.

The research design in this thesis allowed for extensive observation of budget-related discussion and interaction, as well as examination of archival material and direct inquiry relating to the design and use of budgets in semi-structured interviews with participants. In Chapter 4 I included a detailed description of the budgeting process at ResCare, and the nature and extent of involvement in the budgeting process by all levels of management. This description allowed for a broader perspective on participation to be adopted, which identified all points of managers’ involvement with the budgeting system rather than focusing only on the point at which budget targets are established. Then, in Chapter 7, I explained the implications of the theoretical model for understanding the cognitive effects of participatory budgeting processes with respect to the transfer of information between senior and subordinate managers. Application of the theoretical model to the phenomenon of budget participation generated a set of three specific explanations: first, it suggests an expanded definition of participation is necessary to completely capture the potential of budgeting for information sharing and coordination; second, it explains the theoretical value of conceptualising job-relevant information in terms of the components of managers’ causal mental models; and third, it explains why budget participation can facilitate the transfer of causal knowledge and beliefs between levels of management. Specifically, I explain that budget participation encourages increased intensity of engagement with the system by subordinate managers, and provides a platform for the articulation, challenge and collaborative generation of causal attributions within the senior-subordinate dyad.

8.4. Study Limitations and Opportunities for Future Research

8.4.1. Methodological limitations

This study adopted a form of naturalistic qualitative inquiry, in which the phenomena of interest were allowed to unfold organically in their real-world context (Patton 2002). This approach was chosen for its ability to preserve the “cognitive context” in which study participants’ developed, activated and used their causal mental models in order to develop an understanding of their relationship with the use of management control systems. The use of Cognitive Task Analysis techniques in particular was intended to surmount some of the limitations inherent in more traditional lab-based experimental methods, but is nonetheless subject to limitations of its own. Specifically, the findings of this study have been developed based on the single, specific case of ResCare. While the use of a single context provided a form of natural control over variation in the causal mental model data, this may limit the extent to which the findings can be generalised to other settings. Having established the existence of a relationships between the use of management control systems and the development of managers’ causal mental models, this study leaves for future research the task of testing the theoretical arguments across a range of different cases and contexts. These opportunities are discussed in greater detail in Section 8.4.4.

A second limitation relating to the methodological choices made in this thesis is the qualitative, cross-case analysis of variation in participants’ causal mental models and conclusions drawn about the individual and organisation-level factors driving this variation. Unlike the case of laboratory-based experimental conditions, the naturalistic approach to the study precluded manipulation of potential independent variables or other direct intervention by the researcher during the study. Instead, the inherent features of the case context (specifically relating to the organisation structure) were used to construct a kind of natural experiment within which patterns of variation in constructs could be identified and explored. As such, I am less able to make clear causal inferences about the nature of the relationships between the constructs; however, the patterns and associations identified during the analysis were carefully interpreted within the context of the entire data corpus, and conclusions about causal mechanisms were developed with close reference to existing theoretical arguments in the literature. Nonetheless, the arguments developed in the thesis should be subjected to robust empirical testing – ideally in a controlled experimental environment – in order to increase confidence in their veracity.

8.4.2. Empirical/data limitations

To the greatest extent possible, my ethnographic approach to data collection allowed me to observe each of the different types of formal interaction between management groups within the ResCare case. To a lesser extent, my continued presence in the organisation and shadowing approach also afforded me opportunities to observe informal interaction, especially at the business unit level. Further to this, I cultivated and relied on key informants to bring upcoming opportunities for observation to my attention, and inquired directly of participants about the nature of their involvement and interaction with specific management control systems. However, there remains the possibility that despite these precautions, inputs to the development of managers' causal mental models manifested at times and places that I was not present to observe. While this is unlikely to undermine the conclusions of this thesis, it is worth acknowledging the likelihood that additional mechanisms, nuances and detail may be missing from the refined theoretical model as a result.

The limitations of the use of the cognitive mapping technique to elicit participants' causal mental models should also be acknowledged. A fundamental characteristic of the mental models construct is that these cognitive representations are relatively enduring but dynamic, meaning that they are stored in long-term memory as complete structures, yet details can change in response to the receipt of new information. The elicitation of causal mental models is also likely to be subject to framing effects, in that different situations, prompts, or suggestions will trigger the activation of different models or components thereof. It is therefore possible – even likely – that the cognitive map data presented in this thesis may have been slightly different if generated on a different day, or by a different researcher. In order to minimise variation due to timing effects, I conducted all cognitive mapping interviews within as small a window of time as possible (during a 3-week period within the larger study). In order to minimise variation due to framing effects, I developed a standard but adaptable script for conducting cognitive mapping interviews, and finalised the cognitive mapping component before asking participants more direct, semi-structured questions that may have influenced the framing of my standard prompts. Despite these precautions, it can be expected that there is at least a small degree of variation in the cognitive map data that is the result of the elicitation process rather than attributable to the constructs being investigated in the study.

A further limitation relating to the empirical data and analysis is the relatively small number of participants selected as embedded case studies. The number of participants reflects the deliberate

but difficult decision to limit the scope of the study to a size that would enable robust conclusions to be drawn from the total data set, but that would also be realistic within the inherent time and resource constraints of the study. The need to perform comparative analysis both within and between classes of embedded cases (such as senior and local management, operational and functional management, and each of three management teams) meant that each additional case necessitated an exponential increase in the analysis required to make sense of the data within the context of the research question. As such, it was determined early in the process of data collection that the eleven embedded case studies represented a theoretically appropriate within-case sample that could be used to develop deep, rather than superficial, insights into the nature of the constructs and relationships between them. In future studies, replication of this approach with a significantly larger sample of participants would enable the confirmation of these insights, and testing of the model and theoretical arguments developed.

8.4.3. Theoretical limitations

This thesis is motivated by the increasing need for organisations to develop capacity for effective, congruent judgement and decision making at the operational level. However, the study is limited in scope to developing our understanding of the relationship between the use of management control systems and a key *input* to judgement and decision making: causal mental models. As a result, the relationship between the inputs of managers' causal mental models and the outcomes of effective judgement and decision making can only be inferred on the basis of ResCare's consistently high performance and outstanding reputation within its industry. For this reason, my conclusions regarding the potential mediating effect of causal mental models on the relationship between management control systems and judgement and decision making are tentative, and informed partially by the findings from the empirical study in this thesis and partially from the existing literature regarding the use of causal mental models in judgement and decision making more generally.

8.4.4. Opportunities for future research

The limitations of methodology, data, and theory outlined in the previous section suggest ample and exciting possibilities for the advancement of this line of inquiry in future research. The adoption of a naturalistic qualitative approach in this study was considered essential given the

exploratory nature of the research question and emphasis on the relatively novel and under-specified construct of causal mental models. The development of constructs and theory relating to causal mental models undertaken in this thesis now provides a basis both for the subsequent confirmation, refinement and extension of the theoretical model within a naturalistic paradigm, and for testing of the theoretical arguments using larger samples and/or quantitative methods. Furthermore, the application of theory and concepts from the field of macrocognition, and techniques based on the principles of Cognitive Task Analysis, have significant implications for management accounting research beyond what is represented in this thesis.

First, in this thesis I present early evidence of the existence and nature of a relationship between the use of management control systems and the development of managers' causal mental models. Future studies could extend these findings by using the theoretical model to explore this relationship in a variety of different contexts, including: organisations which make use of a different package of management control systems (Malmi & Brown 2008); organisations that are subject to more or less environmental volatility and complexity; organisations which exhibit a more competitive or performance-oriented corporate culture; or organisations which demonstrate a lesser capacity for effective judgement and decision making at the operational level. Each of these dimensions represent a departure from the features of the case used to develop the theoretical model, and may have implications for its refinement and extension. The use of these dimensions to identify and analyse the relationships within contrasting cases would be of particular value in advancing these theoretical arguments.

Second, the arguments developed in this thesis may be used to develop formal hypotheses and instruments for the testing of the relationships in future quantitative studies. Specifically, the identification of relevant components of managers' causal mental models may allow for more specific relationships to be identified and tested using experimental and/or survey methods, which have previously been restricted to inferring the existence of mental models/cognitive representations based on decision outputs or self-report by survey respondents. By enabling access to the underlying content of the mental models, this thesis allows for more direct observation and measurement of cognitive processes and more specific conclusions relating to the cognitive effects of management accounting. Alternatively, the highly context-specific nature of the causal mental models construct lends itself ideally to incorporation within mixed-methods research. While the

limitations of this thesis did not allow for more extensive data collection and analysis, future studies might consider investigating changes in managers' causal mental models over time by collecting mental model data at multiple points during a longitudinal observational study (with the possibility of incorporating multiple treatment conditions or interventions) and using quantitative graphical and network analysis techniques to determine the extent and nature of within-subject changes as a result.

Third, the scope of the empirical study in this thesis was limited to the relationship between the use of management control systems and the development of managers' causal mental models, which form key inputs to autonomous judgement and decision making activity. A particularly valuable extension of this line of inquiry would therefore be a more formal investigation of the entire mediating relationship between the use of management control systems, managers' causal mental models, and the effectiveness of judgement and decision making processes and outcomes. Such an investigation would seem particularly well suited to the mixed-methods approach described earlier in this section, given the inherent multi-level nature of the constructs and implications for data collection and analysis (Luft & Shields 2003).

Finally, this thesis draws on a very specific set of constructs and theory derived from a much larger body of work within the growing applied psychology disciplines of macrocognition and naturalistic decision making. I believe that the contributions of the thesis have demonstrated the great potential of the application of this set of ideas and techniques for the advancement of knowledge within our own discipline of management accounting. Future research could incorporate not only the concept of causal mental models in investigating the implications of management accounting for cognition, but also the range of other functions and processes that have been identified in this literature as critical to cognition in dynamic and complex real-world conditions. Macrocognitive functions include naturalistic decision making, sensemaking, planning, adaptation, problem detection and coordination, and are supported by the processes of maintaining common ground, developing mental models, mental simulation and story-building, managing uncertainty and risk, identifying leverage points, and managing attention. Ultimately, consideration of all of these functions and processes – as well as the relationships within and between them – is likely to be necessary in order to develop a complete understanding of the implications of management accounting and control systems for managerial cognition.

8.5. Thesis Conclusions

The notion that management accounting and control systems are used to support organisational decision making is one of the earliest and most fundamental tenets of the management accounting discipline. The significance of this role is only increasing as organisations face ever greater environmental volatility and complexity, and business models become characterised by immediacy, flexibility and disruption. As organisations become more decentralised in response to these conditions, the need to develop capacity for judgement and decision making at all levels of the organisation becomes more salient, as does reliance on management accounting and control systems to ensure the effectiveness and congruence of decisions and behaviour at the operational level.

The role of management accounting and control systems in supporting organisational decision making is not limited to the provision of information directly to decision makers; rather, the use of these systems are implicated in the provision of an overarching cognitive framework within which autonomous organisational participants can interpret information, make decisions, and solve organisational problems. Within this capacity-building paradigm, the components and information content of a management control system do not appear to be as significant as the socio-cognitive processes that the system facilitates – specifically, the use of the system as a platform for the articulation, challenge and collaborative generation of strategic priorities and causal attributions amongst diverse groups of organisational participants. It would also seem that the implications of management accounting and control systems for decision making do not start and end at the point a decision is taken, but rather can be understood as an ongoing, dynamic process that can be spatially and temporally separated from the decision itself.

This study illustrates how organisations can develop capacity for judgement and decision making within their managerial ranks by using the design of the components of management accounting and control systems to signal strategic priorities and desired outcomes, while also ensuring that there are sufficient opportunities for the rationale behind the signals to be articulated and challenged by those responsible for their translation and implementation. In similar fashion, while the information content of management control systems may be valuable to decision makers in its own right, the interaction between diverse management groups that is facilitated by the routine review of this information is what enables the development of a more sophisticated understanding

of causality, and greater capacity for effective judgement and decision making. Finally, while the use of management control systems for other purposes, such as performance monitoring and evaluation, is not entirely incompatible with this kind of capacity-building, care must be taken to ensure that the nature of the interaction is perceived by operational managers to be genuinely supportive and non-invasive in order to facilitate judgement and decision making that is effective and congruent with organisational objectives.

This thesis takes an approach to understanding the implications of management control systems for managerial cognition that is both alternative and complementary to existing paradigms in the management accounting literature. As such, the set of conceptual and methodological tools introduced in this thesis opens up a range of potential new research questions, the pursuit of which will considerably deepen our understanding of the design and use of management accounting and control systems in the future.

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Appendix A Cognitive Mapping Interview Guide

Introduction

Thank you for agreeing to take part in this project.

Background

First I'd like to know a little about you, and how you came to be working for ResCare.

Could you talk me through your CV?

- What was your previous role, before ResCare?
- And before that?
- Did you study at TAFE or university?
- Did you always want to work in aged care?

Cognitive mapping

Focus question: "What activities are important for the success of ResCare, and why?"

(As participant mentions activities, add to map as a new node)

Prompts:

- Why is that important, do you think?
- Are there any other reasons why that would be important?
- Are there any other activities that are important?
- Do any of these activities affect any of the other outcomes you mentioned? Which ones?
- Does that activity affect anything else?
- Can you think of any other important activities that haven't been included on the map?
- Why is that important?

(Add any additional nodes or links, and continue to prompt until participant can't add any additional nodes or links)

Let's have a look at the map you've created. Is there anything about this map you would like to change?

(Add any additional nodes or links, and continue to prompt until participant can't add any additional nodes or links)

Okay, this map is looking great. Thank you so much, this will be very useful.

Semi-structured questions (see Appendix B)

Debrief

Thank you for your time today. You've given me heaps to work with and I really appreciate it.

- Is there anything else you'd like to add?
- Do you have any questions for me?
- Would it be okay if I were to follow up with you at some point in the future? I may have additional questions, or need to clarify what you've told me today.

Thank you again. It was a real pleasure.

Appendix B Semi-Structured Interview Guide

(Note - Introduction and background questions conducted prior to cognitive mapping exercise if conducted in single session)

Introduction

Thank you for agreeing to take part in this project.

Background

First I'd like to know a little about you, and how you came to be working for ResCare.

- Could you talk me through your CV?
- What was your previous role, before ResCare?
- And before that?
- Did you study at TAFE or university?
- Did you always want to work in aged care?

Cognitive mapping exercise (see Appendix A)

Management control systems

- What kinds of systems, processes, or tools do you see used at ResCare to manage the organisation?
- I understand that ResCare makes use of a budget. Could you tell me a bit about the budget and how it is used here?
- I understand that ResCare makes use of the Scoreboard system. Could you tell me a bit about that system and how it is used here?
- I understand that ResCare has a lot of policies and procedures. Could you tell me a bit about the policy library and how it is used here?

For each system identified:

- Who uses the system?
- Who contributes to the system?
- Is anyone else affected by the system?
- How much time is spent preparing the system?
- What, do you think, is the system used for?
- Why do you think that system is used, instead of a different system, tool or process?
- How does the system affect the way people here behave?
- How does the system affect the way people here make decisions?

Decision-making

I have one last question for you, if that's okay?

- What would you say is the most challenging part of your role? *(or)*
- What would you say is the most difficult decision you have to make as part of your role? What makes it so difficult?

Debrief

Thank you for your time today.

- Is there anything else you'd like to add?
- Do you have any questions for me?
- Would it be okay if I ask you some follow up questions down the track?

Thank you again. It was a real pleasure.

Appendix C ResCare Budget Template

Entity [REDACTED]
 Fiscal Period Jun 2015

[REDACTED] Variance Report For the Period Ending June, 2015

Year to Date				June-2015				30th June, 2015
Actual	Budget	Variance	Prior Year	Actual	Budget	Variance	Prior Year	Annual Budget

Total Income
Care
Operational Income
Daily Care Fee
ACFI Income
CAP
Dementia Supplement
Other Subsidies
Additional Services Fee
Other Income
Payroll Tax Subsidy
Workforce Supplement
Accommodation Income
Accomm. Charge
DAP
RAD Interest
Expenditure
Care
Direct Care Costs
Wages care-cost staff
Superannuation-Care Staff
Agency
Therapy Expenses
Therapy Programs
General Supplies Medical
Incontinence Products
Food Supplements
Oxygen
Dietician
Advance Practice
Physiotherapy
Podiatry
Speech Therapy

Catering Cost

Catering - Food
Catering - Enteral Feeding
Crockery & Glassware
Wages cost - Chef and GSO
Superannuation - Chef and GSO

Cleaning & Laundry

Chemical Costs
General Supplies Cleaning
Contract Cleaning
Wages cost - Laundry
Superannuation - Laundry

Other Staff Cost

Wages Cost - Managment
Supperannuation - Managment
Wages Subsidies
Annual Leave
Sick Leave
Long Service Leave
Payroll Tax
Staff Uniforms
Workers Compensation
Training and Replacement cost
Human Resources Admin
Staff Education
Training and Conferences
Staff Amenities

Property

Contract Maintenance
Bedding
Plant & Equipment < \$300
Gardening
R & M -Property
R & M -Equipment
R & M -Breakdown
Utilities - Electricity
Utilities - Gas
Utilities - Council Rates
Utilities - Water Rates
Waste Removal

Administration

Audit
Accreditation
Advertising & Marketing
Marketing-Creative/Prod.
Advertising
Marketing-Print

Bank Charges
Computer Expense
Consulting
<i>Consulting-General</i>
<i>Consulting-Bench Marking</i>
<i>Consulting-Scoretrak</i>
<i>Consulting - HR</i>
Courier/Delivery Charges
Debt Collection
Doubtful Debt Provision
Fees & Licences
Hire Purchase Interest
General Insurance
Legal Fees
Managed Storage
Management Fees
██████████
<i>Outsourced Payroll</i>
<i>Outsourced Billing</i>
Postage
Printing & Stationery
Subscriptions
Telephone
General Expenses
Travel & Accommodation
Total Expenditure

Appendix D ResCare Scoreboard Report (Single KPI)

██████████ KPI's for Period Ending 31st July 2015

Occupancy	Last Yr Avg	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	Average
SC-C														
<i>C Budget</i>														
SC-L173														
<i>L173 - Budget</i>														
SC-L155														
<i>L155 - Budget</i>														
SC-R														
<i>R - Budget</i>														
SC-P														
<i>P - Budget</i>														
SC-S														
<i>S - Budget</i>														
SC-W														
<i>W - Budget</i>														
SC-SM														
<i>SM - Budget</i>														
SC-WD														
<i>WD - Bud</i>														
Consolidated Avg														
Consol. - Budget														