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EPISTEMIC OBJECTS IN COLLECTIVE DECISION-MAKING:
A PRACTICE PERSPECTIVE ON THE USE OF CAUSAL MAPS AS
SITUATED MATERIAL ARTIFACTS

Mikko Arevuo

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Supervisor: Professor Patrick Reinmoeller

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ABSTRACT

Recent practice-based approaches to strategic decision-making research have emphasized the importance of gaining a deeper understanding how managers think, act, and interpret strategic decisions in practice. This focus on the micro aspects of strategic decision-making has emerged from the critique that much of the 'traditional' decision-making theory may not be actionable in practice. Research should therefore concentrate on what managers do when they engage in strategic activities. This practice-based perspective considers decision-making as a situated, context specific activity, and research into the enactment of decisions constitutes an important part of understanding decision-making. Such micro focus may reveal insights to the similarities and differences between organizations and teams in the ways in which their members approach decision-making tasks.

Studies on decision-making as a situated activity provide valuable insight into managerial practice. However, few studies focus on the role of epistemic objects in decision-making. This thesis makes a contribution by investigating the role of epistemic objects as situated material artifacts in the collective decision-making context. Drawing on extensive review of the literature on epistemic objects, sociomateriality, causal maps, group decision-making, and managerial attribution biases, the thesis identifies an under-researched area in our understanding how epistemic objects interact with human activity in strategy making.

As an inductive research undertaking, the thesis makes a theoretical contribution to knowledge by developing a conceptual framework how causal maps as epistemic objects are enacted, interpreted, and used as a sociomaterial decision-making 'tool-in-use' by actors. The research reveals how the enactment of causal maps as a

'safety net' in collective decision-making increases cognitive conflict in decision-making groups that results in the consideration of multiple decision outcomes and the development of innovative solutions to decision problems. The research also shows how the enactment of causal maps increases decision acceptance among the decision-makers by making their individual knowledge claims visible to other group members, and by motivating them to work collectively towards a shared goal. Furthermore, the research reveals how causal maps act as a 'shock absorber' by deflecting the decision-makers' frustration and anger away from personal confrontation among group members thereby preventing the emergence of affective conflict. Finally, the research results indicate that the enactment of causal maps mitigates managerial biases such as groupthink and the escalation of commitment bias. In terms of managerial contribution the thesis offers a deeper insight to the affordances of causal maps, and how managers can use causal mapping as a practical decision-making 'tool-in-use' to improve the quality of decision-making processes by structuring conversations and debate, developing a shared understanding of decision problems, and achieving closure and decision acceptance of the decision outcomes.

The thesis concludes by making recommendations for future research and the testing of the conceptual framework that may provide useful guidance for the future development of strategy practice and managerial 'tools-in-use' for effective strategy work.

For Erika, Eva, and Max,

without your unconditional love,

encouragement, and support this work could

never have been written.

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My research was carried out with students and practitioners. My thanks go to numerous undergraduate and MBA students at London South Bank University and Regent's University London who participated in the research and those who unknowingly acted as a sounding board for the development of my thinking during strategic management lectures and seminars. I would also like to thank Mark Goninon who facilitated my access to conduct research at his organization.

When I reflect back to my decision to pursue a PhD it was influenced by people who have shaped me to become what I am beyond the world of academia, and without whom I could not have completed this journey. I will always remain grateful for the love and encouragement that my parents gave me. Although both of them have now passed, their memory lives on. Aimo and Irja did not have the opportunity or the luxury of attending institutions of higher learning. However, as a youngster growing up in Finland, our house was full of books and my parents were avid readers and debaters. They set a wonderful example by their striving for continuous self-improvement that was not dependent on their level of formal education, and they instilled in me the love

of life-long learning. This thesis is their wonderful legacy and testament, and I hope to carry on learning as they did for the rest of my days. Finally, I am forever indebted to and in awe of the most important people in my life, my lovely wife Erika, and my terrific children Max and Eva. It is amazing that they put up with me for all these years of study, absence mindedness, as well as some moments of frustration and tears. I know that I am not the easiest husband and dad to live with at the best of times, and when I was hit by self-doubt and ready to throw in the towel, they were always there to pick me up and spur me on. Erika, Eva, and Max - your love and unwavering belief in me kept me going and endure to the end. You guys are my rock; I love you to the moon and back!

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We shall not grow wiser before we learn that much that we have done was very foolish.

- Friedrich August von Hayek

CHAPTER I: INTRODUCTION

1.1 INTRODUCTION

My research investigates how decision-makers enact, interpret and use epistemic objects to make strategic decisions. Strategic decisions are seen as big, expensive, and precedent setting decisions that are difficult to reverse in the short term, and such decisions are made under the conditions of uncertainty and ambiguity (Mintzberg et al., 1976). Jarzabkowski (2005) argues, however, that from the practice perspective what constitutes a strategic decision is defined by managers themselves by their situated action that is a relational activity of managers as actors in the contexts that they operate. This thesis is the contextualization of the situated actions of the decision-makers how causal maps as epistemic objects are enacted, interpreted, and used as a sociomaterial decision-making 'tool-in-use' to reach a decision.

Empirical qualitative data was derived from seven video-recorded cases of students and managers who were tasked to make a decision that was based on the information provided in a teaching case study.

The narrative that ensues does not claim to create an objective account or reveal an objective truth. I readily admit this 'story' is the researcher's construct, a fusion between the literature, empirical data, and the mind of the researcher. However, the thesis provides an inductive generation of narrative reality that is derived from the collection and synthesis of multiple informant voices contained in the seven case studies. As such, this work makes a theoretical contribution to practice-based literature to advance our understanding of how epistemic objects are enacted as situated managerial activity in strategic decision-making.

The rest of this introductory chapter proceeds as follows. After a self-reflective foreword in Section 1.2 on the motivation for and the journey to the completion of my PhD studies, Section 1.3 outlines the purpose of my research by identifying the field of inquiry, the research problem, and the research question. Section 1.4 provides a summary how the thesis is positioned within the relevant literature and its theoretical framework. Section 1.5 gives an overview of the research approach followed by a graphical presentation of the research process in Section 1.6. The chapter concludes with an outline of my research contributions in Section 1.7.

1.2 FOREWORD: PERSONAL MOTIVATION AND REFLECTION

My decision to embark on this exciting and intellectually challenging PhD journey was motived by both professional and personal considerations. I had left a career in the City of London to pursue a calling of teaching and working with young eager minds in management education. The completion of a PhD and obtaining a 'license' to become a researcher was a natural motivation and an extension of my work as a university lecturer. In addition, as a mature part-time researcher I was motivated by self-actualization, personal growth, and the fulfillment of an ambition of doctoral studies that I had set for myself as a young undergraduate economics student at the University of Michigan, Ann Arbor. I had interrupted my studies after my undergraduate degree and left the university to try my luck on Wall Street and later in the City of London. Now the time had come, if ever, to embark on the PhD journey.

During my undergraduate studies I had come across the writings of Austrian School economists Ludwig von Mises, Friedrich Hayek, and Israel Kirzner. Their methodology of praxeology that focused on purposeful human action and the role of tacit knowledge in economic activity seemed to contradict, at least in the eyes of an

undergraduate student, the order given to economic decisions by elegant algorithms and statistical models that I studied in my econometrics classes. While my academic interest ebbed and flowed during my corporate career I kept noticing how little impact the various modeling tools and techniques that were applied to strategic problems had on the decisions taken in practice, and ultimately the quality of actual decision outcomes.

When the opportunity and the time came for me to think about an area of research for my thesis I was determined to pursue a field of inquiry that placed the practitioner at the center of strategy making. I wanted to gain a better understanding of how people made sense and solved strategic problems in practice. Although my PhD journey has taken me to some blind alleys, I have learned every step of the way, and my wanderings in these dark alleyways always led me into a greater understanding of human action and strategic management as an academic discipline. I was also humbled by the fact that I was not going to solve the causal ambiguity paradox, a critical aspect of the resource-based view of the firm that was my initial topic of research. The last six years have given me a wonderful opportunity to pay homage to the great minds of management, economics and psychology, and read widely across strategic management literature in general, and managerial cognition, behavioral and evolutionary economics, decision-making, and strategy-as-practice literature in particular. What follows is the product of this journey.

1.3 THE PURPOSE OF RESEARCH

Recent approaches to strategic decision-making have concentrated on how managers think, act, and interpret strategic decisions in practice. Such practice-based research has emerged from the critique that 'traditional' strategic decision-

making theory may not be actionable in actual managerial practice (Nutt and Wilson, 2010). The focus of practice-based research on managerial strategic activity, or 'strategy-as-practice' perspective (Jarzabkowski, 2004, 2005; Whittington, 2006; Jarzabkowski and Spee, 2009), is based on the premise that strategy work is not a static property of a firm, but it is continually created through the process of 'doing' strategy, or 'strategizing' (Golsorkhi et al., 2010; Johnson et al., 2007). Huff, Neyer, and Moslein (2010) clarify the focus of the practice-based inquiry by emphasizing the word 'strategizing' rather than 'strategy-as-practice' to connote micro-level behaviors by organizational actors in situations that are non-routine.

Following the practice-based inquiry, researchers should concentrate on what managers actually 'do' when they engage in strategy work (Jarzabkowski and Wilson, 2006) including the analysis of conversations, gestures and bodily conduct, organizational practices of decision-making, problem solving, knowledge sharing, and collaboration for strategy work to become an observable activity (Alby and Zuccermaglio, 2006). Other scholars point out that such research should also incorporate sociomaterial practices (Orlikowski, 2007; Tsoukas, 2010) and the tacit dimension of strategizing (Chia and Mackay, 2007; Chia and Rasche, 2010).

My thesis extends research beyond the discursive practices and modes of strategizing that have been the main focus of the research into strategy practices (Jarzabkowski and Spee, 2009; Vaara and Whittington, 2012). Previous studies have emphasized how managers' discourses shape firms' strategic direction (Hendry, 2000; Rouleau, 2005; Jarzabkowski and Seidl, 2008). Recently, however, questions have been raised in the strategy-as-practice literature that the emphasis on the discursive nature of practice has neglected the role of epistemic objects as material artifacts in strategy-making (Vaara and Whittington, 2012; Jarzabowski and Spee, 2009). Therefore, there is

a "dearth of research into material artifacts and how they are engaged in strategizing" (Jarzabkowski, Spee and Smets, 2012, p. 2). Furthermore, the way epistemic objects interact with human activity in strategy making remains a relatively unexplored area (Jarzabkowski and Kaplan, 2014; Werle and Seidl, 2015). Finally, Jarzabkowski, Spee and Smets (2012) point out that the relative neglect of the role of epistemic objects in strategy research is partly due to the inconsistent and overly broad definitions and conceptualizations of strategy practices in which actors, objects, and intentions are interwoven into a complex bundle of practices. Hence, a more comprehensive investigation of the different forms of interplay between various epistemic objects as material artifacts and their respective effect on the strategizing process is required (Werle and Seidl, 2015).

My thesis addresses this knowledge gap in the literature by researching causal maps and their affordances as situated epistemic objects that are enacted, interpreted, and used as a decision-making 'tool' by actors in a collective decision-making context. My research seeks to the answer the following research question:

How do decision-making groups enact, interpret, and use epistemic objects such as causal maps to make sense and generate solutions to strategic decision problems?

1.4 THE THEORERTICAL POSITION OF RESEARCH

My research into the role of epistemic objects in strategy-making is consistent with the strategy-as-practice area of inquiry of strategy work that encompasses not only strategy formulation, but organizing work that is involved with the implementation of strategies, and all other activities that lead to the emergence of organizational strategies, either consciously or unconsciously (Vaara and Whittington, 2012; Jarzabkowski, Spee and Smets, 2012).

Whittington et al. (2006) argue that in a world of accelerating change, approaching strategy and organization as interlinked and practical activities such as collective decision-making is "more effective than traditional static and detached approaches" (p. 615). Whittington (2007) suggests that such an activity-based approach should be founded on research that takes a 'sociological eye' to strategy to examine actors, strategy tools, e.g. frameworks, concepts, models, or methods (Jarzabkowski and Kaplan, 2014), and the rich interactions within which people and things are engaged in doing strategy work. The sociological eye with a concern for the social embeddedness of strategizing is the distinctive feature that differentiates strategy-as-practice from strategy process research. Under the sociological eye, strategy is 'another thing' or 'stuff' (Jarzabkowski and Kaplan, 2014), that people do individually and in groups that encompasses routines and procedures, discursive resources and material technologies that makes "the scope of strategy-as-practice wider than just strategy process" (Whittington 2007, p. 1584).

Sociomateriality is a critical concept in my research as it is used to inform the interaction between situated, socially constructed epistemic objects and human agents in the context of collective decision-making (Whittington, 2007; Kaplan, 2011). According to Orlikowski and Scott (2008) our understanding of organizational life will remain limited as long as management literature continues to overlook the ways in which organizing is intrinsically bound up with material forms and spaces.

Some scholars argue that there are no inherent differences between the social and the material (Leonardi, 2013). Orlikowski (2007, p. 1437) states about sociomateriality: "the social and material are considered to be inextricably related – there is no social that is not also material, and no material that is not social." However, critical realists argue that social context and the materiality that exist are different, but

the social and the material become sociomaterial as people imbricate social and material agencies through practice (Leonardi, 2003). Similarly, Barley (1986) perceives social and material as distinct but mutually dependent aspects of the social world. A clear demarcation between the social and the material, or the lack thereof, has implications on how to research the interaction between socially constructed objects and human agents. According to Werle and Seidl (2015) most strategy-as-practice research adopts a critical realist perspective of sociomateriality. Such a lens enables the researcher to identify the ways in which the social interacts with the material although they may be perceived as distinct 'entities.' Hence, the distinction between the social and the material allows the affordances inscribed into the materiality, i.e. the possible actions that are made available to actors in strategy work.

The sociomaterial perspective in practice research considers managerial engagement with epistemic objects as "organized, open-ended human activities transpiring within material arrangement, unfolding in time, carried out by skilful agents" (Tsoukas, 2010, p. 49.) Yet, not all strategy-work may be intentional or deliberate even if focal actors may articulate it as such retrospectively. When organizational actors act non-deliberately, they respond spontaneously to the changing environment to get on with things on hand. They may not pay explicit attention to what they do but they do what is needed at that point in time. Or as Chia and MacKay (2007, p. 235) put it, "agents act purposefully without having a purpose in mind." Therefore, the challenge for practice-based researcher is not only to observe what actors 'do' when they engage in strategy work, but also what is left unsaid and observe the behaviours that may manifest themselves as a result of social and cultural conditioning (Chia and MacKay, 2007).

1.5 THE RESEARCH APPROACH

Review of the literature shows that practice research rejects positivist approaches as an inadequate means to gain an understanding how agency and structure, and individual action and institutions are linked in social systems, cultures, and organizations. A constructivist approach is called for as the means of understanding human activity in strategy work. If strategy is to be understood as an activity or practice, and not something that organizations have, but something that people do then "practice research needs to be accompanied by constructivist epistemologies" (Golsorkhi et al., 2010, p. 8).

My research is designed as an inductive multiple-case study undertaking (Eisenhardt 1989; Eisenhardt and Graebner, 2007) to understand how groups enact, interpret, and use causal maps as epistemic objects to make sense and generate solutions to strategic decision problems.

The research is positioned within activity theory (Vygotsky, 1978; Leontiev, 1978; Jarzabowski, 2010) that provides a framework for investigating how the practice of 'strategizing' is being framed by the perceptions, views, and mental models of organizational agents as they strategize within their organization's structures, processes, norms, and values (Jarratt and Stiles, 2010). Activity theory conceptualizes the ongoing construction of activity and it provides a resource for analyzing strategy practice that is "socially accomplished by individuals in interaction with their wider social group and the artifacts of interaction" (Jarzabkowski, 2010, p. 127).

1.6 THE RESEARCH PROCESS

Figure 1 depicts the stages of my research process: research conceptualization, identification of the research question, data collection, analysis, and theory building.

Figure 1 - Research Process

Initial interest: Causal mapping in decision-making.		

Initial literature review: Causal mapping and group decision-making.

Pilot: Testing of a decision-making case study with student groups having taught them the principles of causal mapping (12 groups of 6 students).

Identification of research question and conceptualization

Deeper literature review: Expanded the literature review to cover the role of epistemic objects, sociomateriality, and practice-based strategy research.

Development of a conceptual framework and research question: Derived from the literature review of epistemic objects as material artifacts in collective decision-making context.

Decision-making task: (7 cases)
Convenience sampling driven approach to administer a decision-making teaching case study to informant groups that was timed and video-recorded. Video recordings were supplemented by the researcher's observations in field notes.

Data collection

Data analysis: Write-up of cases, coding structure development to analyze video evidence on ATLAS.ti seeking out similarities, differences, and patterns within and across cases.

Iterative analysis: Iterating between data, literature, and empirical findings.

Sense checking: Post-mortem meeting with one informant group; blind coding of three video cases.

Analysis and theory building

Model, typology and contribution– Model of enactment of causal maps as a "decision-making" tool-in-use. Proposition development.

1.7 CONTRIBUTION

This thesis addresses the following research question:

How do decision-making groups enact, interpret, and use epistemic objects such as causal maps to make sense and generate solutions to strategic decision problems?

Answering the research question provides a theoretical contribution to knowledge by developing a conceptual framework how causal maps, as situated epistemic objects are enacted, interpreted, and used as a sociomaterial decision-making 'tool-in-use' by actors in a collective decision-making context.

The research shows how the enactment of causal maps in collective decision-making increases cognitive conflict in decision-making teams. Causal maps become a 'safety net' that allows decision-makers to engage in robust debate and consider multiple decision outcomes. In addition, the research reveals how causal maps act as a 'shock absorber' thereby preventing the emergence of affective conflict, and how the collective enactment of causal maps increases decision acceptance among the decision-makers by facilitating them to make their individual knowledge claims visible. Finally, the research results indicate that the enactment of causal maps may eliminate managerial biases such as groupthink and the escalation of commitment bias.

The use of video evidence is a relatively novel method in strategy research. Video can be used to capture the unfolding of strategic activity and record observable human behavior in relation to and in interaction with artifacts and other tools. This research makes a methodological contribution especially to practice-based strategy research that is increasingly open to the use of video

evidence as a means of gaining a deeper insight to organizational agents' strategic activity.

In terms of managerial contribution the thesis offers a deeper insight to the affordances of causal maps, and how managers can use causal mapping as a practical decision-making tool-in-use to improve the quality of decision-making processes by structuring conversations and debate, developing a shared understanding of decision problems, and achieving closure and decision acceptance.

CHAPTER II: LITERATURE REVIEW

2.1 INTRODUCTION

The practice lens on strategy has prompted the emergence of a particular research interest in the role that material artifacts have in strategy work. Werle and Seidl (2015) state that there has been an explicit acknowledgment that all strategizing practices involve material artifacts of various types including slide decks, flipcharts, whiteboards, graphs, tables, graphic figures, documents etc. Paroutis, Franco and Papadopoulos (2015) consider strategy tools such as the BCG matrix, Porter's Five Forces, and SWOT and other strategic management analysis concepts, models, and methods employed by agents in strategy making as material artifacts. Although there is no universal classification of such tools, this "stuff of strategy" (Whittington 2007, p. 159) is an essential part of strategy work as it influences the way organizational agents 'do' strategy. Realizing the importance of this 'stuff' in strategy work Jarzabowski and Kaplan (2014) developed a framework for examining the ways that the affordances of strategy tools either enable or constrain their use in managerial practice.

Building onto this literature I introduce causal maps as situated material artifacts and apply them as a sociomaterial 'tool-in-use' in the context of collective decision-making. In this chapter I bring together a number of literature strands as follows. I start with the concept of materiality in Section 2.2 and review how the material relates to the social. I also provide evidence from the literature how 'strategizing materials' (Dameron, Le, and LeBaron, 2015) could be categorized. Section 2.3 considers how agents can interact with epistemic objects rather than use them as mere 'tools' for achieving a particular

end. I then expand the discussion in Section 2.4 to argue the case for causal maps as 'stuff of strategy' and position them as situated material artifacts. I consider their affordances in collective decision-making in Section 2.5 and highlight key group decision-making process issues and managerial biases as they pertain to causal maps in Section 2.6.

2.2 MATERIALITY

In practice-based literature, materiality is defined as the "arrangement of an artifact's physical and/or digital material into particular forms that endure across differences in place and time that are important to users" (Leonardi, Nardi and Kallinikos, 2012, p. 42). The growing importance of materiality in practice-based research is firstly based on the premise that materiality lies at the heart of strategy work as the practice of strategy is concerned with the way sociomaterial 'tools' configure strategic interactions between actors and 'things' (Dameron, Le, and Lebaron, 2015). Second, the material and the practice are entwined, and as Orlikowski (2007) points out, every organizational practice is always bound with materiality and it is an integral aspect of organizational life.

Despite this growing importance of materiality in practice-based research, materiality remains an elusive concept because different traditions within which the notion of materiality are dissimilar in terms of how the concept is constructed and how it is researched empirically (Dameron, Le, and Lebaron, 2015). A pragmatic attempt to define materiality is to categorize it into types of material that is used in strategy work. In an extensive literature review of materiality Dameron, Le, and Lebaron (2015) propose five such categories: strategy tools, strategy objects and artifacts, strategy technologies, built spaces,

and human bodies. These categories, attributes of each materiality type, their implications on organizational strategy work, and future research directions are presented in *Table 1* below.

Table 1– Types of materiality

	Strategy tools	Strategy objects and artifacts	Strategy technologies	Built spaces	Human bodies
Category description	Strategy tools allow for a formalized way to approach strategic analysis and decision-making (Jarratt and Stiles, 2010). Strategy tools are prevalent in strategy work that may be considered institutionalized (Suddaby, Seidl, and Le, 2013).	Objects and artifacts are tangible, visible or audible residue of past acts of meaning, distinct from tools that are overtly instrumental and technologies that are more mediational (Dameron, Le, and LeBaron, 2015).	Technologies in organizations extend beyond the traditional machinery or device developed from scientific knowledge (Oxford Dictionary).	Strategy work that takes place within the confines of a physical space (Cornellisen, Mantere, and Vaara, 2014).	The human body is an abiding and versatile presence in all strategy work (Dameron, Le, and LeBaron, 2015).
Examples	Scenario planning, SWOT, BCG Matrix (Jarzabowski et al., 2013; Wright, Paroutis, and Blettner, 2013; Dyson, 2004; Schoemaker, 1995); Porter's Five Forces (Paroutis, Franco, and Papadopoulos, 2015)	Concrete and/or discursive (Higgins and Mcallester 2004); textual and/or visual (Jarzabowski, Spee, and Smets, 2013); physical and/or digital (Leonardi, Nardi, and Kallinikos, 2012); "stuff of strategy" (Whittington, 2006, 2007); epistemic objects (Werle and Seidl, 2015; Knorr Cetina, 1997); cardboard cube (Whittington et al., 2006); Lego bricks (Heracleous and Jacobs, 2008); planning documents (Spee and Jarzabowski 2011; Vaara, Sorsa, and Palli, 2010).	Computer software, PowerPoint (Kaplan, 2011); technologies intertwined with textual devices (Caliskan and Callon, 2010) and human knowledge (Orlikowski, 1992; Paroutis, Franco, and Papadopoulos, 2015).	'Strategic spaces' (Jarzabowski and Kaplan, 2014; Jarzabowski, Burke, and Spee, 2015) Physical locations such as boardrooms, offices, meeting rooms, and hallways.	CEO physical dominance in strategy workshops particularly controlling the whiteboard and pen (Hodgkinson and Wright, 2012); multimodal orchestration of discourse, artifacts, and bodies in strategy workshops (LeBaron and Whittington, 2011); emotional displays in strategy meetings (Liu and Maitlis, 2014); the role of body in constructing strategic spaces for strategy work (Jarzabowski, Burke, and Spee, 2015).

	Strategy tools	Strategy objects and artifacts	Strategy technologies	Built spaces	Human bodies
Attributes	As formalized tools they encapsulate material elements such as linguistic labels, focal categories, analytical methods, and procedural steps.	Objects and artifacts are not inherently meaningful but they acquire their meaning through social interaction such as strategizing.	Physical features of technologies such as language, physical design, compatibility with other technologies and user options shape how technology may be used in strategizing.	Physical features such as layout, color, furniture, brightness etc.	The body is both an animate object and the organ of discourse as it belongs to the world of things and the world of words.
Implications for strategy work	Physical features and the affordances of strategy tools influence the final analytic output and strategic decisions based on this output (Dameron, Le, and LeBaron, 2015).	Objects and artifacts achieve more than broadcast or foster strategic ideas through decontextualization and recontextualization by shaping power relationships and social order (Spee and Jarzabowski, 2011). Objects and artifacts influence each other during the emergence and evolution of organizational strategy (Werle and Seidl, 2015; Knorr Cetina, 1997).	Technologies are pervasive in organizations and they are integrated into work practices and influence the way people do strategy. Technologies have affordances that allow it to be used in a certain way but there are limitations to what the technology can do (Kaplan, 2011).	Physical features impact work. They may inhibit or encourage certain types of strategy practice. The way an office is designed (Campbell, 1979), or the way a desk is arranged (Rosenfield, Lambert, and Black, 1985) can impact attitude and behavior. Wall color is known to affect mood (Wexner, 1952), which is relevant between emotion and strategizing (Liu and Maitlis, 2014).	Strategies are articulated through conversation (Jarzabowski, 2005). Strategic discourse is always accompanied by human bodies and artifacts, which provide interpretation of each other (LeBaron and Whittington, 2011).
Future research directions	With the exception of Jarzabowski and Kaplan (2014) we lack systematic studies of strategy tools and how their features impact strategizing (Dameron, Le, and LeBaron, 2015).	Our understanding of the interplay between various material artifacts and their respective effect on the strategizing process is required (Jarzabowski, Spee and Smets, 2012; Werle and Seidl, 2015).	Systematic studies of technologies and how their features impact strategizing is required (Dameron, Le, and LeBaron, 2015).	More studies that engage with built spaces and strategizing are required (Dameron, Le, and LeBaron, 2015).	The role of human body in strategy work has been largely overlooked by researchers (Dameron, Le, and LeBaron, 2015). The account how the body's materiality, for example its anatomy and psychology in strategizing should be further investigated (Barad, 2003).

All these studies have made a significant contribution to further our understanding of the ways that various types of materiality are involved in strategy work. They show that material gets created and used in strategizing and the studies reveal their affordances. However, more research engagement across all materiality categories and their affordances is called for. Dameron, Le, and Lebaron (2015) suggest that there are different ways to approach research into materiality that are dependent on the focus that one places on the two aspects of materiality: 'physicality' and 'significance.' 'Physicality' refers to the physical attributes of the focal objects and their 'significance' refers to the meaning ascribed to them. The forms of materiality that were detailed in *Table 1* differ in the focus that is placed either on 'physicality' or 'significance' and how the relationship is construed between them. In the recent special issue on materiality in the British Journal of Management, Dameron, Le, and Lebaron (2015, p. 56) differentiate between the degrees of focus to indicate how much emphasis certain types of materiality places "on the social interpretive element and how closely physical material and the social world are entwined." The authors label these views as 'weak' for 'object focus' where materiality is seen as mere physicality; 'moderate' for 'object and subject focus' that incorporates sensemaking activities where there is a relationship between an object and the social, but while being mutually dependent, they form distinct and separable building blocks; and 'strong' for 'entanglement focus' that perceives the social and the material as inseparable. This labeling of materiality corresponds to the differing views of sociomateriality that were discussed earlier, pages 19- 20, of the thesis. Common with the critical realist perspective of sociomateriality that enables the researcher to identify the ways in which the social interacts with the

material is considered the 'moderate view' by Dameron, Le, and Lebaron (2015).

According to Leonardi and Barley (2010) this constitutes a 'pragmatic vision'

that is most commonly represented in strategy studies that consider materiality

as artifacts that endure across time and place and that these artifacts are

important to users. The material properties of artifacts offer tangible resources

for agents to "do old things in new ways and to do things they could not do

before" (Leonardi and Barley, 2008, p. 161).

My research is limited into one particular type of materiality, epistemic

objects, as artifacts that can be considered as a resource for organizational actors

to attribute knowledge and meaning to them (Werle and Seidl, 2015). As my

focus is on how these objects are enacted, interpreted and used, and as I seek to

understand the interaction between the epistemic objects and decision-makers

in the strategizing process, I proceed in the next section with the consideration of

epistemic objects in strategy making.

2.3 EPISTEMIC OBJECTS

Epistemic objects, also often referred to as 'knowledge objects,'

are defined as open-ended objects that act as a source of interest and motivation

by the virtue of their opacity and material transcendence (Werle and Seidel,

2015). Moreover, they can be perceived as artifacts that enable actors to do old

things in new ways or they can be used to do new things (Leonardi and Barley,

2008).

In contrast to other objects, epistemic objects are not definite things

whose properties can be captured and described, but they emerge and evolve

during the activity that they are used (Ewenstein and Whyte, 2009; Knorr-Cetina,

1997, 1999, 2001, 2011); Miettinen and Virkkunen, 2005; Rheinberger, 1997, 2005). A number of social theorists posit that modern sociality, including learning and knowing, is increasingly mediated by epistemic objects and material artifacts (Knorr-Cetina, 1997), and that these objects and artifacts mediate human activity (Miettinen and Virkkunen, 2005). Organizational actors work with epistemic objects and material artifacts in their daily practices, be they problems they have to solve, models they create, projects they write, or information systems they use (Knorr-Cetina, 1997).

The literature on epistemic objects refutes the assumption that epistemic objects and material artifacts, such as flipcharts, post-it notes, or symbolic artifacts such as a 'cube', 'pledge walls' or Lego-based models have stable properties that predetermine their use (Whittington et al., 2006). Schein (2004) notes that symbols and artifacts only gain strategic meaning through the interpretations strategy practitioners assign to them within the everyday enactment of their strategizing. Since strategy work is knowledge work (Whittington, 2003, 2006; Jarzabkowski, Spee, and Smets, 2012), strategy practitioners imbue the artifacts with knowledge properties that are situated within the context of their work to make sense of a given situation. Therefore, 'strategy artifacts' do not have innate properties, but they become meaningful artifacts, or 'tools-in-use' (Jarzabkowski and Kaplan, 2014), within the context of the strategy work within which they are used by agents (Whittington et al., 2006). Thus, epistemic objects are not static, but they change continuously and acquire new properties during their use (Knorr-Cetina, 2001). However, epistemic objects as 'tools-in-use' come with affordances that enable and constrain their use (Jarzabowski and Kaplan, 2014). The materiality of the object

favors, shapes, or invites agents to use the object in creative ways, but it at the same time constrains a set of specific uses by the objects. A chair may be used as a stepping stool, a table, a bookshelf, or a barrier, but its material limitation constraints its use as a pen or a cooker. Therefore, the use of these objects depend not only on the material properties or the intended design of the tool, but also on the context and the interpretations of agents who may use them in creative and unpredictable ways within their overall material limitations (Jarzabowski and Kaplan, 2014).

Knorr-Cetina (2001) argues that learning, knowing, and collaboration is a relational process that involves both agents and epistemic objects. The characteristic of any epistemic object is its evolving nature, or what Knorr-Cetina (2001, p.181) calls the object's "lack of completeness of being." The object's "lack of completeness of being" supports and nurtures in actors a need to come to know the object, what Knorr-Cetina (2001, p. 187) refers to as a "structure of wantings." It is through the interplay between an object's 'lack of completeness of being' and the actors' 'structure of wantings' that learning, knowing, and collaboration emerges. Furthermore, since epistemic objects are always in the process of being materially defined they continually acquire new properties and change the ones they have. Such a view of a continually evolving relationship between the object and the agents helps us theorize that the enactment of an epistemic object such as a causal map by decision-makers may result in collaborative endeavors that may produce novel insights to strategic problems.

Similarly, Kaplan's (2011) inquiry into PowerPoint's role in strategy work suggests that an artifact should not be characterized simply in terms of whether it is an effective or ineffective management tool. Instead, the study indicates that

the use of PowerPoint enables a collaborative effort by managers to negotiate meaning in an uncertain environment, and the situated use of PowerPoint creates spaces for discussion that allows ideas to evolve. Kaplan's research shows how PowerPoint slides as an artifact are inter-related with discursive practices that shape the outcomes of investment decisions in a telecommunications firm. Because Power Point deck functions as both a medium and an outcome of discursive process, its use is essential to the firm's strategy making process (Kaplan, 2011).

In another research undertaking Vaara, Palli, and Sorsa (2010) illustrate how strategic plans, such as text documents, shape and are shaped by interactions between managers. Plans that related to the activity of Finnish occupational health and safety inspection service were made into an epistemic object that led to the development of a new kind of inspection practice and the creation and implementation of a new set of tools necessary for carrying it out. This research suggests that epistemic objects and artifacts mediate managerial activity and they could be instrumental as generators of new conceptions and solutions: they communicate socially negotiated meanings, legitimate ways of thinking and action while de-legitimate others, and they may produce consent among decision-makers. In addition, epistemic objects could be regarded as a central source of innovation and reorientation in societal practices through discursive practices that produce different interpretations depending on the agreement with the new discourse and its implications (Vaara, Palli, and Sorsa, 2010). It should be noted, however, that Kaplan (2011) and Vaara, Palli, and Sorsa (2010) research undertakings were limited to the role of discursive practices only in strategizing.

Jarzabkowski, Spee, and Smets (2012) assessed the impact of epistemic objects as material artifacts on reinsurance agents' appraisal of underwriting deals offered to them for the inclusion in their insurance risk portfolios to enact planned portfolio targets. Their study investigated the way reinsurance agents used spreadsheets, maps, and photos in their strategy work to make decisions on the deals offered to them by primary underwriters. The study demonstrated that strategy work is socially accomplished as a learning and knowledge creating process within the situated use of material artifacts. Moreover, the research found that the situated use of artifacts evolves with the unfolding use of subsequent artifacts. This implies that artifacts are linked to each other and each artifact builds on the knowledge and understanding embedded in the other artifact resulting in an increased level of understanding and knowledge of the nature of the problem that is being addressed. Research into causal maps as epistemic objects could provide additional insight how the decision-makers' knowledge and understanding evolves within confounds of one particular artifact rather than the enactment across different types of artifact.

2.3.1 BOUNDARY OBJECTS

Literature on boundary objects provides an additional dimension to epistemic objects as strategy work often involves actors across the organization. Top management teams are composed of senior managers across the organization and they collectively engage in strategy work including strategic decision-making (Hambrick, 1994; Crossland and Hambrick, 2011). This literature explores how repositories, forms, sketches, drawings, workflow matrices, physical and IT objects such as PowerPoint, metaphors, and narratives

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"play an important role in coordinating and in cross-disciplinary work" (Nicolini, Mengis, and Swan, 2012, p. 616), bridging divides, and sharing reference points (Jarzabowski and Kaplan, 2014). Boundary objects, although they share similar properties with material and other epistemic objects, are often seen predominately in the context of their function as translation devices, or boundary spanning tools, between and across professional boundaries and work communities.

The idea of boundary objects derives from the field of science studies, and highlights the capacity of these artifacts to support collaboration and act as bridges across diverse groups of specialists (Carlile, 2002, 2004; Carlile and Rebentisch, 2003; Levina, 2005). Although there is evidence in the literature that boundary objects facilitate cross-disciplinary collaboration and creativity, different objects can be perceived and understood differently by agents or groups taking part in the cross-disciplinary effort. In order for boundary objects to provide support for a collaborative effort they should provide the motivation and drive for collaboration to take place. In addition, these objects should allow participants to work across different types of boundaries, and they should constitute the fundamental infrastructure of activity (Nicolini, Mengis, and Swan, 2012). Most importantly, although boundary objects can create conditions for collaboration and interpretive flexibility, they may also possess the capacity to be experienced as epistemic objects that embody lack of 'completeness of being' and the 'structure of wantings' of what one does not yet know (Knorr-Cetina, 2001). As epistemic objects, boundary objects become embedded with deep emotional holding power that generates intimate attachment which in turn creates social bonds that act as a drive and desire toward a shared objective

(Knorr-Cetina, 1997). In collective strategic decision-making context, the ability of boundary objects to possess the qualities of epistemic objects, and vice a versa, is vital as actors from diverse cross-functional backgrounds face many differing strategic problems and priorities, and they may provide the means of developing goal congruence among such managers. Spee and Jarzabowski (2009) suggest that epistemic objects may provide a common language for strategic conversations between managers across hierarchical, functional and geographic boundaries. Hence, causal maps as epistemic objects may incorporate the qualities of boundary objects to facilitate cooperation and cross-disciplinary work across professional boundaries and work communities.

2.4 CAUSAL MAPS AS EPISTEMIC OBJECTS

Managerial and organizational cognition research lies at the base of the literature on causal maps. Herbert Simon's assertion that human rationality is inevitably bounded means that every environment or context contains more stimuli than the human observer can recognize or process (Huff, 2005). Hence, decision-makers are forced to construct a simplified representation of reality, or a 'mental model,' that they use in an effort to navigate an uncertain and ambiguous world (Weick, 1990).

Managerial and organizational cognition research has led to the development and application of mapping procedures to explore decision-makers' mental representations of strategic problems (Huff, 1990; Fiol and Huff, 1992; Hodgkinson and Sparrow, 2002; Huff and Jenkins, 2002; Ambrosini, 2001, 2003; Ambrosini and Bowman, 2002, 2008). These mapping techniques aim to provide

a 'tool-in-use' for revealing decision-makers' subjective beliefs in a graphical form so that they can be examined (Eden, 1992; Eden et al., 1992).

Although a map is not a full representation of an individual's or a group's entire belief system it can be deemed to provide a visual artifact of the most valuable and important beliefs as they pertain to a problem or a situation (Huff, 1990). Mapping can, therefore, be considered as an effort to elicit an individual's or a group's tacit, cognitive frames to an explicit form that can be entered into a decision-making process that may otherwise remain hidden or unexplored (Huff and Jenkins, 2002; Weick, 1990).

One of the most popular mapping methods that have been developed to explicate cognitive frames in strategic decision-making is the technique of causal mapping (Axelrod, 1976). These types of map depict the perceived pattern of causal relationships between a set of variables notated by nodes and arrows that link them together (Laukkanen, 1994). Causal maps surface issues, assumptions, concerns, facts, assertions, and constraints within a structured system of causality. These maps, therefore, enable decision-makers to make sense and develop a deeper understanding of the situation and the consequences of option outcomes surrounding a problem (Eden and Ackermann, 2010). According to Weick and Bougon (1986, p. 107) maps "place concepts in relation to one another...they impose structure on vague situations."

Kelly's personal construct theory (1955) as well as Weick's (1979) theory of 'sensemaking' underpin much of the theoretical development of causal mapping practice and the epistemic nature of causal maps as situated material artifacts. Causal maps enable decision-makers to attribute cause and effect relationships in their attempts to make sense of a situation that in turn leads to

decisive action. Kelly's cognitive theory describes how people make sense of the world in order to act on it. Kelly perceives people as problem solvers who make sense of the world through the use of a system of constructs that enable them to develop a definition of the situation they face. The map is, therefore, an attempt to capture a situation through the eyes and minds of decision-makers who are engaged in interpreting and responding to the problem situation (Jenkins, 2003).

Similarly, Weick's work on 'sense making' is a vital theoretical component in causal mapping as people strive to make sense through action. According to Weick (1990), maps provide a simplified frame within which experience can be understood. Some parts of the map confirm experience but parts of it are discrepant with it. It is this discrepancy with current experience that activates 'self-correcting' action. Maps, however inaccurate, are bound up with action, "both the action that is ongoing when the map is first invoked, and the action that occurs subsequent to the discovery of the map" (Weick, 1990 p. 9). According to Weick maps provide the managers the means to fashion disconnected abstractions into more plausible patterns. However, managers have to overcome the myth that maps are a credible version of the totality of their experience that warrants an ability to act intentionally. An important feature of a causal map is that it leads managers to anticipate some order 'out there.' Hence, it matters less what particular order is portrayed than that an order of some kind is portrayed and it prompts managers to take action. "The map animates managers, and the fact of animation, not the map itself, is what imposes order on the situation. Thus, trappings of rationality such as strategic plans are important largely as binding mechanisms. They hold events together long enough and tight enough in

people's heads so that they do something in the belief that their action will be influential" (Weick 1990, p. 8).

In other words, causal maps are epistemic objects that provide an anchor, a starting point, for managers to think about the problem situation. Once activity gets under way, the map itself may become secondary. In Weick's view the accuracy of the map is not the main objective in decision-making, but it is the process of mapping that will lead to action that provides an impetus to change a static representation of the changing circumstances that managers face. Again, to quote Weick: ".... if you are lost any old map will do...a map of a wrong competitor can get people talking so they find their way into the right niche" (1990, p. 4). The action orientation of Weick's maps is echoed by Huff (1990, p. 16): "...causal maps allow the map maker to focus on action - for example, how the respondent explains the current situation in terms of previous events, and what changes he or she expects in the future."

Although Weick and Huff theorize causal maps as action oriented epistemic objects that animate managers, it should be also be noted that the mapping process itself may lead into a development of novel insights to the problem. Miettinen and Virkkunen (2005) state that epistemic objects such as causal maps are objects of inquiry that "produce novel and alternative ways of acting" (p. 438). Furthermore, Weick's theorizing about the central role of animation as the primary provider of order may be contrary to the evidence offered by research in epistemic objects. As Kaplan (2011) points out Power Points as epistemic objects function both as a medium and an outcome of a discursive process that are essential to the firm's strategy-making. Therefore, it can be theorized that causal maps as epistemic objects animate decision-makers,

but the map itself, as an outcome of the mapping process, may also have an important role in the final decision.

2.5 GROUP CAUSAL MAPS IN COLLECTIVE DECISION-MAKING

Group causal maps as 'tools-in-use' are of particular interest in strategy work as important top management team members often make decisions collectively. An effective use of group maps can be considered important in strategy work as a decision-making group can share these visual artifacts, and they may provide potential to influence the strategic direction of a firm (Schwenk, 1988, 1995).

In contrast to individually constructed causal maps, group causal maps aggregate the thinking of many people, including conflicting views, subtly different slants on the same issues, and different perspectives held by individual group members. Group maps are socially constructed artifacts of simplified representations of the beliefs of the greater group. They may not necessarily be a representation of reality perceived by any one or all group members. Rather, a group map is a collectively constructed and shared account of a given situation by all group members. The construction of group maps can be helpful in surfacing assumptions and identifying connections and interactions between issues that surround the problem. A group map is thus a visual interactive model; it acts as a form of a transitional object that encourages dialogue (Eden and Ackermann, 1998).

Group mapping could be perceived simplistically as a form of brainstorming. However, Eden and Ackerman (2010) draw a distinction between group causal maps and a free-flowing brainstorming of ideas. Group

mapping that is used for decision-making is focused on surfacing issues and concerns. These are usually activities or events that can either support or challenge the decision-making aspiration of the group. In contrast to surfacing 'off-the-wall' ideas in group brainstorming sessions and as the means of unleashing creativity, group causal mapping focuses on surfacing the group members' current wisdom, experience, as well as issues surrounding the problem situation. Therefore, group causal mapping is a process of engaging in a dialogue to surface causality between the problem and a number of potential solution outcomes that become visually elaborated as a map. This process provides the means for the decision-making group to structure and merge differing perspectives that should lead eventually into a shared understanding of the issue in a holistic manner. Eden and Ackerman (2010. p. 243) argue "...not only is a better understanding derived from seeing the whole and thus a better outcome, but a better appreciation of the organization's context is also elicited."

Nutt (2002) in his research into 'failed' decisions has pointed out that the development of sound group decision-making processes is critical in order for groups to achieve substantive decision outcomes. Nutt (2002) considers the effective decision-making process to comprise of five stages: collecting information to understand the claims calling for action, establishing a direction that indicates the desired result, engaging in a systematic search for ideas, evaluating these ideas with the direction in mind, and managing the social and political barriers that can block the preferred course of action during the decision implementation stage. Therefore, to assess the viability of group causal maps in eliciting multiple perspectives and providing the means for managers to produce substantive decision outcomes, the mapping process has to be effective

in addressing complex group decision-making process challenges.

2.5.1 EFFECTIVE GROUP CAUSAL MAPS

Eden and Ackermann (2010) have built on Nutt's (2002) effective decision-making processes by suggesting that without addressing decision-making process issues it is unlikely that multiple perspectives of the individuals in the decision-making group will be made explicit in causal maps. They posit that in developing a group problem definition using causal maps attention must be paid to achieving both substantive mapping and process outcomes…"where process outcomes are an end in themselves but also significantly influence the extent to which substantive outcomes can be achieved" (Eden and Ackermann, 2010, p. 241). Therefore, in an effective group causal map there is a total lack of separation between the mapping process and the content that is being surfaced. The researchers suggest that an effective group causal map should possess the intertwined characteristics that are presented in Table 2 below.

Table 2 – Characteristics of effective group causal maps

Substantive Mapping Outcomes	Mapping Process Outcomes
Maps surface multiple perspectives held by group members that pertain to the problem.	Mapping addresses the fact that individuals have their own concerns/issues and claim that these factors are important for the group to address during the decision-making process.
Issues in the map should be arranged in a hierarchical structure by understanding how one issue might motivate or support, or be supported by another issue.	Mapping allows an opportunity for group members to make a point, release anger, tension, and frustration.
Maps elaborate and build on the views of group members and they explain claims through causality.	Mapping opens up the problem by encouraging divergence of opinions before a process of convergence of opinions commences.
Maps detect and reveal emergent patterns and properties within the resultant hierarchical group map.	Mapping seeks to gain ownership of the issues from the entire group. As group members become increasingly involved in the mapping process they become more committed to the decision outcome.
Maps enable creative and shared outcomes to emerge.	Group members are more likely to become committed to the decision if they think that the process of reaching it was fair and just.
	Mapping promotes shared understanding and joint learning.
	Mapping provides an opportunity for self-reflection for each group member and the group as a whole.
	Mapping provides an opportunity for the development of personal and professional relationships that enables continuing joint working among group members.

Source: Adapted from Eden and Ackermann (2010)

According to Eden and Ackermann (2010), the achievement of both substantive and process outcomes of group causal maps can be viewed to meet Nutt's (2002) criteria for effective decision-making: collecting information to

understand the claims calling for action, establishing a direction that indicates the desired result, mounting a systematic search for ideas, evaluating ideas with a direction in mind, and managing and measuring social and political barriers that can block the preferred course of action.

In addition, Eden and Ackermann (2010) posit that the shared and public construction of the group causal map increases individual ownership, acceptance, and the fairness of the decision-outcomes as the map shows evidence that all decision-making group members have been listened to and their claims have been displayed on the map.

Eden and Ackermann do not address the efficacy of group causal maps in mitigating managerial cognitive biases such as groupthink. Nor is the relationship between cognitive and affective conflict in the context of collective decision-making addressed. However, these may have been implicitly assumed as the group mapping process is posited to provide a rigorous process for surfacing and evaluation of competing views to the decision problem as well as increased level of ownership if decision-makers view the decision-making process fair and just.

2.5.2 AFFORDANCES OF GROUP CAUSAL MAPS

In order to assess the effectiveness of causal maps as a managerial decision-making 'tool-in-use,' one needs to consider the affordances that influence how managers approach decision-making problems. Affordances are a form of materiality that enable or constrain a specific tool's use (Gibson, 1986; Hutchby, 2001), and they therefore motivate skilled individuals to act and become aware of action possibilities (Demir, 2015).

Recently, Jarzabowski and Kaplan (2015) developed a conceptual framework for examining how the affordances of strategy tools and the agency of strategists interacted to shape how and when tools were selected and applied. According to the authors, organizational actors and tools interact in the selection, application, and achievement of outcomes associated with the tools-in-use. While tools may the most appropriate for a specific type of problem solving it is not clear that managers inside organizations pick or use tools for these reasons. Jarzabkowski and Kaplan (2015) suggest that the choice of a tool is shaped by actors' competence in their use and their boundedly rational satisficing where a variety of tools could be considered appropriate for solving a particular strategic problem. In addition to gaining an understanding of the tool-in-use selection, practice research should also focus on the use of tools for creating common language about strategy and offering spaces for the negotiation of interests (Jarzabkowski and Kaplan, 2015).

At present there is little understanding of the affordances of strategy tools-in-use (Jarzabkowski and Kaplan, 2015), and in particular, how organizational actors visually interact with strategy tools-in-use and the role of tool affordances in this process. One of the first studies on the visual interaction between actors and strategy tools and their affordances workshop was conducted by Paroutis, Franco, and Papadopoulos (2015). The research was conducted in a facilitated workshop setting where the actors were engaged with the help of a consulting team in the construction of a strategy map to assess the organization's strategy. However, more research is called for, especially visual research, to explore the use of tools and their affordances in

different contexts such as decision-making. In addition, as much of the research in strategy tools has a senior management bias, there is a need to expand future research to cover a wider selection of organizational participants to include both junior and middle managers as strategy practice is no longer the exclusive domain of the top management (Jarzabkowski and Kaplan, 2015).

2.6 GROUP DECISION-MAKING PROCESS ISSUES

In contrast to the earlier literature such as Huff (1990), Laukkanen (1998), Hodgkinson and Sparrow (2002) much of the recent literature on causal mapping has underemphasized the cognitive issues such as managerial attribution biases that may have an impact on mapping effectiveness. If epistemic objects such as causal maps can be used as an effective 'tools-in-use' to improve the quality of collective decision-making processes, then they need to be able to address the main group decision-making process issues. This section reviews group decision-making processes that are directly relevant to effective group mapping. It should be noted, however, that this review does not include issues that may arise from social factors such as cultural differences (Hofstede, et al., 1997; Crossland and Hambrick, 2011). Instead it covers aspects of group dynamics that are considered to be uniform across cultures such as cognitive biases (Kahneman et al., 1982; Kahneman, 2011; Thaler, 2015; Janis, 1972; 1989).

In complex decision situations, groups have been shown to have better problem solving capabilities than individuals acting alone (Daft et al., 1993; van Ginkel and van Knippenberg, 2009). This may be because group members bring a variety of information, critical judgment, solution strategies, and a wide range

of perspectives to the decision problem (Shaw, 1981). However, groups can be subject to conflict and cognitive biases that may hinder the quality of decision outcomes and group members' decision acceptance. In addition to a range of cognitive biases (Kahneman, Slovic, and Tversky, 1982), the main group biases are risky shift (Stoner, 1968), groupthink (Janis, 1972, 1989), and the Abilene paradox (Harvey, 1988), and group conflict may arise when individuals with competing claims clash.   Group decision-making, therefore, produces a managerial conundrum. On the one hand, multiple perspectives provided by group members can add insight into the problem situation. On the other hand, group diversity can produce fragmentation, conflict, action paralysis, or groupthink.

Jarzabowski and Kaplan (2104) point out that the sole focus should not be on whether strategy-makers 'get it right' in terms of firm performance. Instead, the practice lens on strategy tools-in-use points us toward outcomes related to strategy making such as the settlement of a decision, the strategy makers' overall satisfaction with the outcome, the degree of contestation in the process or the discretion of actors in the decision-making situation. Expanding the criteria for the effectiveness of outcomes to assess, scholars should examine how and why actors use tools and how the use of a tool constrains and enables strategy making beyond organizational outcomes (Jarzabowski and Kaplan, 2014).

2.6.1 COGNITIVE AND AFFECTIVE CONFLICT

Research into group decision-making has shown that group member interaction may produce two types of conflict: cognitive and affective conflict (Hambrick, 1994; Amason, 1996). Cognitive conflict has been shown to improve

decision-making quality, while affective conflict has been demonstrated to have a negative impact on group members' decision acceptance (Amason, 1996; Mooney et al., 2007; Parayitam and Dooley, 2007, 2009). Pioneering work by Amason (1996) provided a convincing argument that cognitive conflict is beneficial in decision-making, which has been corroborated in subsequent research (Amason and Schweiger, 1997; De Dreu, 2006; De Dreu and Van deVliert, 1997; Parayitam and Dooley, 2009). In contrast, decisions that are based on team consensus with a low level of cognitive conflict is considered to increase the acceptance and 'feel good' factor among the decision-makers, but the low level of cognitive conflict in consensus based decision-making is considered to produce lower quality decision outcomes (Schweiger, Sandberg, and Ragan, 1986).

The accepted assumption in the literature is that cognitive conflict improves decision-making quality (Eisenhardt et al., 1997; Mooney et al., 2007; Schweiger, Sandberg, and Ragan, 1986). This has prompted researchers to explore how to create cognitive conflict in collective decision-making situations. A great deal of research has accumulated on techniques such as devil's advocacy and dialectical inquiry, which encourage critical interaction between decision-making group members. Devil's advocacy and dialectical inquiry have been shown to create more cognitive conflict in decision-making groups compared to the consensus approach. Schweiger, Sandberg, and Ragan's (1986) research indicated that both dialectical inquiry and devil's advocacy led to higher quality assumptions and decision outcomes than the consensus approach in decision-making. Dialectical inquiry was also deemed to be more effective than devil's advocacy with respect to the quality of assumptions brought to the surface.

However, informants in the consensus groups expressed more satisfaction and desire to continue to work with their groups and indicated a greater level of decision acceptance than those who were asked to apply dialectical inquiry and devil's advocacy in their groups' decision-making process.

This type of manipulation of decision-making groups to increase the level of cognitive conflict is designed to improve the quality of the decision-making processes, as it results in the consideration of diverse perspectives (Amason, 1996; Schweiger, Sandberg, and Ragan, 1986; Schweiger, Sandberg, and Rechner, 1989; Schwenk, 1995). However, recent research suggests that although cognitive conflict may increase performance through better quality decision-making, there is a danger that the beneficial cognitive conflict spills into a dysfunctional, affective, conflict that results in a inverse relationship between decision outcome and decision acceptance (Mooney et al., 2007; Parayitam and, Dooley 2011).

Affective conflict tends to be emotional and such conflict focuses on personal incompatibilities or disputes (Jehn, 1995; Amason, 1996). These disputes result from group members' personal judgments that they are not fully able to articulate to other decision-making group members. The more these personal judgments influence decisions, the more there is potential for decision-making group members to speculate and find reasons to distrust the motivation and hidden agendas of their group members (Mooney et al., 2007). Hence, too much affective conflict may hinder overall group performance as the decision is not accepted by some decision-making group members regardless of the quality of the decision outcome (De Dreu, 2006; Van Dyne, et al., 2002; Parayitam and Dooley, 2011). Parayitam and Dooley's (2011) research indicates that too much

cognitive conflict in a decision-making group may breed contempt. Therefore, the researchers suggest that moderate levels of cognitive conflict should be maintained to ensure high quality decision outcomes, but in order to maintain group cohesion, managers should be mindful that cognitive conflict is positively correlated with affective conflict. Although there is evidence that causal maps encourage debate and the shared construction of group causal maps may increase decision-acceptance (Eden and Ackerman, 2010) the dynamic how cognitive and affective conflict evolve during the mapping process has not been addressed.

2.6.2 MANAGERIAL COGNITIVE BIASES

Managerial biases pose another challenge for group decision-making. The growing recognition of the prevalence of cognitive biases in strategic decision-making has resulted in a proliferation of studies to ascertain how managerial attribution biases affect strategic thinking, strategy development and implementation.

Hodgkinson et al. (1999) and Maule and Hodgkinson (2002) point out that bounded rationality and a variety of heuristics are deployed by managers in an effort to simplify reality. This gives rise to cognitive biases, which in turn may result in inappropriate, or suboptimal strategic decisions, as managers make decisions under conditions of information inadequacy and other forms of uncertainty and ambiguity. To deal with these challenges as they pertain to strategic decision-making processes, Maule and Hodgkinson (2002) undertook two experimental studies to establish whether or not the effects of a 'framing bias' could be eliminated, or attenuated, using an individual, self-constructed,

causal mapping technique. Their research that was conducted with students, inexperienced decision-makers, and managers, as experienced decision-makers, suggests that causal mapping techniques may help managers to overcome 'framing biases' of the sort identified by behavioral decision researchers, under controlled, experimental conditions. However, the research findings have not been collaborated as demonstrated by Wright and Goodwin (2002) who replicated Hodgkinson et al. (1999) research. Wright and Goodwin argue that the presence of confounding effects in the experimental design and the absence of appropriate control conditions in Hodgkinson et al. (1999) research meant that the incremental value of causal mapping was not demonstrated or explained. In addition, Maule and Hodgkinson's (2002) causal mapping experiments were not administered to decision-making groups but they were administered to individual decision-makers. Therefore, additional research is needed to administer causal mapping experiments not only to individual decision-makers but causal mapping should also be applied in a collective decision-making context to ascertain whether causal maps may eliminate cognitive biases in strategic decision-making.

In conclusion, epistemic objects and their affordances in collective decision-making remains an under-researched area. The review of the literature reveals a number of gaps in our knowledge. First, most practice-based studies have focused on discursive practices rather than studying the actual enactment of epistemic objects by decision-makers. Second, most causal mapping studies have been conducted in environments where the map enactment has been facilitated by expert consultants. Third, the relationship between cognitive and affective conflict, as well as decision acceptance in the enactment an epistemic

object has not been fully explored. Fourth, the effectiveness of epistemic objects of eliminating managerial biases including groupthink has not been conclusively proven by prior research. Finally, understanding how agents interact with a decision-making 'tools-in-use' in practice and whether such agent/epistemic object interaction may improve the quality of decision-making processes in a collective decision-making context remain an under researched areas of inquiry.

CHAPTER III: RESEARCH STRATEGY

3.1 INTRODUCTION

This chapter provides a link between the research question that was identified through the literature review and the later sections of the thesis that follow on the research method and the empirical work that was carried out. According to Blaikie (2007) and Easterby-Smith et al. (2008) it is vital that a clear link between the research question and empirical research is established in terms of the logics of inquiry.

Laughlin (1995) states that research strategy is not a matter of extremes. It is often presented as either/or choices between objective versus subjective, or in other words, the choice between positivist versus constructivist orientations. However, according to Laughlin (1995) methodological choices are a matter of degree.

In my research I adopt a critical realist perspective that treats social context and the materiality as separate existing 'entities.' However, the social and the material become sociomaterial as actors imbricate social and material agencies through practice. In order to gain insight into the sociomaterial practice, I will use activity theory (Leontiev, 1978) as a frame for my empirical research to consider the enactment of epistemic objects in collective decision-making context by focusing on the interaction between the individual, the collective, the epistemic object itself, and the evolving stream of praxis.

I am mindful of the tension between the two contrasting epistemological 'building' and 'dwelling' worldviews (Chia and Rasche, 2010; Chia and MacKay, 2007). Organizational actors may approach a strategic task with clear

intentionality, but one should not reject the proposition that the expression of intentionality may be a product of post-facto justification, or that agents create meaning to a task as they 'deal with a work at hand.'   Adopting the Heideggerian onto-epistemological perspective to strategy practice (Tsoukas, 2010) bridges this divide and it enables me to be stay alert to strategy practice that may emanate from actors' both intentional and non-deliberate coping activities.

3.2 PHILOSOPHICAL PERSPECTIVE

In social sciences there are two contrasting extreme research positions: positivism and social constructivism. The former research tradition posits that the social world exists externally and its properties can be examined through objective research methods. This is in contrast to social constructivism that the existence of the social world is inferred subjectively through sensation, reflection, and intuition (Easterby-Smith et al., 2008).

Positivism and social constructivism differ in their ontological and epistemological assumptions in that the positivist paradigm considers that reality is external and objective and that knowledge is only of significance if it is derived from observations of this external reality.   In contrast, the social constructivist paradigm is based on the assumption that reality is socially constructed and determined by actors rather than objective external factors. Therefore, the focus of social constructivist research should be on what people, individually and collectively feel and think; attention should be paid to ways they communicate with each other, either verbally of non-verbally (Easterby-Smith et al., 2008).

The extreme positivist notion has been modified by relativists such as Latour and Woolgar (1979) and Latour (2005) who suggest that scientific laws may not be immutable and ideas may only gain acceptance as being 'true' after much debate and discussion that is tied to the personal careers and statuses of the researchers. Furthermore, Knorr-Cetina (1983) states that the acceptance of any particular theory and the closure of a scientific debate on the theory may be highly influenced by the politics of business and commercial resources. In social sciences where the subject of the study is people rather than physical objects, a variant of the relativist position has become known as the idea of critical realism. Critical realism starts with Bhaskar's (1989) realist ontology and then incorporates an interpretive thread that makes a conscious compromise between the extreme positions. Critical realism recognizes that social conditions may have real consequences whether they are observed and labeled by social scientists and that concepts are human constructions (Easterby-Smith et al., 2008).

Positivism has been the dominant perspective in much of strategic management research. However, in order to understand the central questions of how agency and structure, and individual action and institutions are linked in social systems, cultures and organizations requires us to reject positivism as the means of understanding human activity within the 'black box' of strategy work (Golsorkhi et al., 2010). One alternative would be to work from a relativist position. This would require that multiple perspectives be adopted through triangulation of views of large survey samples, and even so, it would only be a matter of probability that the views collected would provide an accurate indication of the underlying situation. The second alterative would be social

constructivism. Easterby-Smith et al. (2008) state that researchers starting from the constructivist viewpoint do not assume any pre-existing reality and their aim is to understand how people invent constructs to help them understand what is going on around them. Therefore, much attention is given to the use of language and conversations between people as they create their own social reality. Social constructivist researchers should also recognize that as observers of this social construction they can never be separated from the actors' sense-making process that are being observed, and "that theories which apply to the subjects of their work must also be relevant to themselves (Easterby-Smith et al., 2008, p. 63).

Placing the research within the social constructivist research paradigm provides me with a theoretical basis to examine micro-level social activity and the construction of social reality by actors in the real world context. However, a critical realist perspective of sociomateriality assumes that the material exists, such as the concept of causal maps that are independent of the actors, and the social and the material become sociomaterial as actors imbricate the social and the material through practices such as intentional or unintentional action, cognition, embodied material practices, and discourse.

3.3 ONTOLOGICAL AND EPISTEMEOLOGICAL CONSIDERATIONS IN PRACTICE-BASED STRATEGY RESEARCH

This section discusses the ontological and epistemological considerations in the context of practice-based research. Different perspectives are compared and contrasted in terms of their applicability to my research problem and the empirical research undertaking.

3.3.1 ONTOLOGICAL CONSIDERATIONS

Blaikie defines ontology as "a branch of philosophy that is concerned with the nature of what exists" (2007, p. 13). The practice lens in strategy research breaks with the traditional objective ontological notion that strategy is something that organizations have. Rather, the practice perspective in strategy understands strategy as something that people do (Johnson et al., 2003). According to Golsorkhi et al. (2010) this reconceptualization of strategy as a practice implies an ontological shift in three ways. First, under the practice lens, strategy can no longer be considered as something stable that can be observed, but it constitutes a reality in flux. Second, strategy is no longer located at the organizational level but it permeates across the organization from individual action to the institutional level. Third, the world of strategy constitutes a social reality that is created and recreated in the interactions between a number of actors both inside and outside the organization.

Orlikowski (2010) distinguishes three ontological perspectives in practice-based research that are derived from different understandings of practice by researchers. The first research orientation treats strategy practice as a 'phenomenon' that studies strategy as a practical activity and a direct experience. This type of research makes a distinction between practice and theory and it recognizes that there is a gap between scientific knowledge and the lived reality. To bridge this gap researchers who apply this phenomenological lens to practice seek to engage more deeply in the empirical details of organizational life on the ground level. Research techniques in this type of research seek to get close to practitioners and their situated activities. Participant observation and ethnographical studies are the most common means

of capturing and obtaining a better understanding of the practitioners at work.

A key contribution of studies of strategy practice as a 'phenomenon' is the claim and evidence that practice is important (Orlikowksi, 2010). Research must be empirically engaged in order to understand organizational reality and act as the basis for improving this reality. The outcomes of such studies are more likely to be directly relevant to the practitioners and the contexts where the studies were conducted. However, making generalizations from these types of studies is more challenging. In particular, such study insights are bounded, both historically and contextually, and any theory that is built from participant observation studies is necessarily rooted in specific conditions. Orlikowksi (2010) states that although these types of action research projects are valuable they should not seek to build or test theory, but focus on understanding living systems in action and how to change them (Orlikowski, 2010).

The second type of ontological orientation considers strategy practice as a 'theoretical practice perspective' for studying social phenomenon. Apart from studying the actual phenomenon, researchers draw on practice-centered theory in their studies (Golsorkhi et al., 2010). Orlikowski (2010, p. 25) cites Lave (1988) in explaining the 'theoretical practice perspective' as the means of shifting attention to the routine, lived character of the everyday activity that serves as the object of analysis. However, this everyday activity is not simply a focus on the mundane and the micro-aspects of the organization. Instead, the 'theoretical practice perspective' argues that that it is through the situated and recurrent nature of everyday activity that theoretical consequences are produced and they become reinforced or changed over time. This theoretical view of practice entails a specific theoretical grounding and the main

contribution of the practice perspective is the claim that practices shape reality, and analytical rigor is gained by treating practices as a focal lens through which to inquire into social reality. This ontological view is echoed by Werle and Seidl (2015) that the 'theoretical practice perspective' is well positioned to address organizational phenomena that are posited to be relational, dynamic, and emergent because it entails a theoretically grounded understanding of recursive interaction among people, activities, artifacts, and contexts.

The third and the last of Orlikowski (2010) ontological perspectives is the notion of strategy practice as a particular 'ontology' that conceives practice as constitutive of all social reality where the actors and agency are treated as a product of their practices. This perspective assumes that if social life is constituted in practices, then so do practices of social science participate directly in the constitution of social reality. This perspective has profound epistemological implications to social science research. Orlikowksi (2010) states that in order for such ontological perspective to be adapted, then "representational epistemology needs to be displaced" (p. 30), as one could no longer adhere to the generally accepted belief in the ontological distinction between representations and entities to be represented. However, Orlikowksi (2010) acknowledges that although strategy practice as ontology may provide interesting insights to contemporary organizational life, such an orientation would necessarily challenge the established institutional norms, practices, and criteria of organizational research that is based on representational epistemology.

The majority of practice-based research in strategy is founded on the first two ontological perspectives. The first ontological perspective of strategy

practice as 'phenomenon,' has been often been critiqued for producing anecdotal studies, however interesting they might be, and for their weakness in theoretical development (Orlikowksi, 2010; Jarzabowski, 2005; Johnson et al., 2007). Hence, recent practice-based research tends to be grounded on the ontological basis that considers practice as a 'theoretical perspective' that provides theoretically grounded understanding of human activity. For example, Lave (1988) drew on practice theory to offer an argument that cognition did not only take place 'in the head' but it should also be understood as enacted in practice. Furthermore, technology studies such as Giddens (1984) and Orlikowski (1992, 1996, 2000) have applied structuration theory of memory traces to show how users recurrently enact technology structures, or technologies-in-practice, and how they shape outcomes that emerge from the use of technologies. Finally, activity theoretical perspective has been applied in the study of organizational and strategy practices (Blackler, 1993, 1995; Groleau, 2006; Jarzabowski 2003, 2005). This extension allows the activity theoretical lens to be applied to the study of the interaction between practitioners, practices, and the praxis as an integral part of an organizational activity system. Jarzabkowski (2010) states that activity theory is a particularly suitable perspective for the study of socially accomplished practice as it draws attention to the interaction between the individual and the wider social group. In other words, the focus on individual is always sensitive to the collective practices and social interactions of the system in which the individual acts. This orientation "enables a study of strategy practitioners that also pays attention to the strategy practices that they draw upon and the strategy praxis in which they are engaged" (Jarzabkowski 2010, p. 129).

Jarzabowski (2010) presents an activity system model that that can be applied to an interrelated study of practitioners, practices, and the praxis. The model is depicted in the Figure 3 below.

Figure 2 - An activity system model for studying strategy practice

Culturally and historically situated and evolving

A: Subject: strategy practitioners

D: Mediation: strategy practices

E: Stream of praxis: evolving activity system over time

B: Collective: focal community with which the subject interacts

C: Goal-oriented activity (praxis)
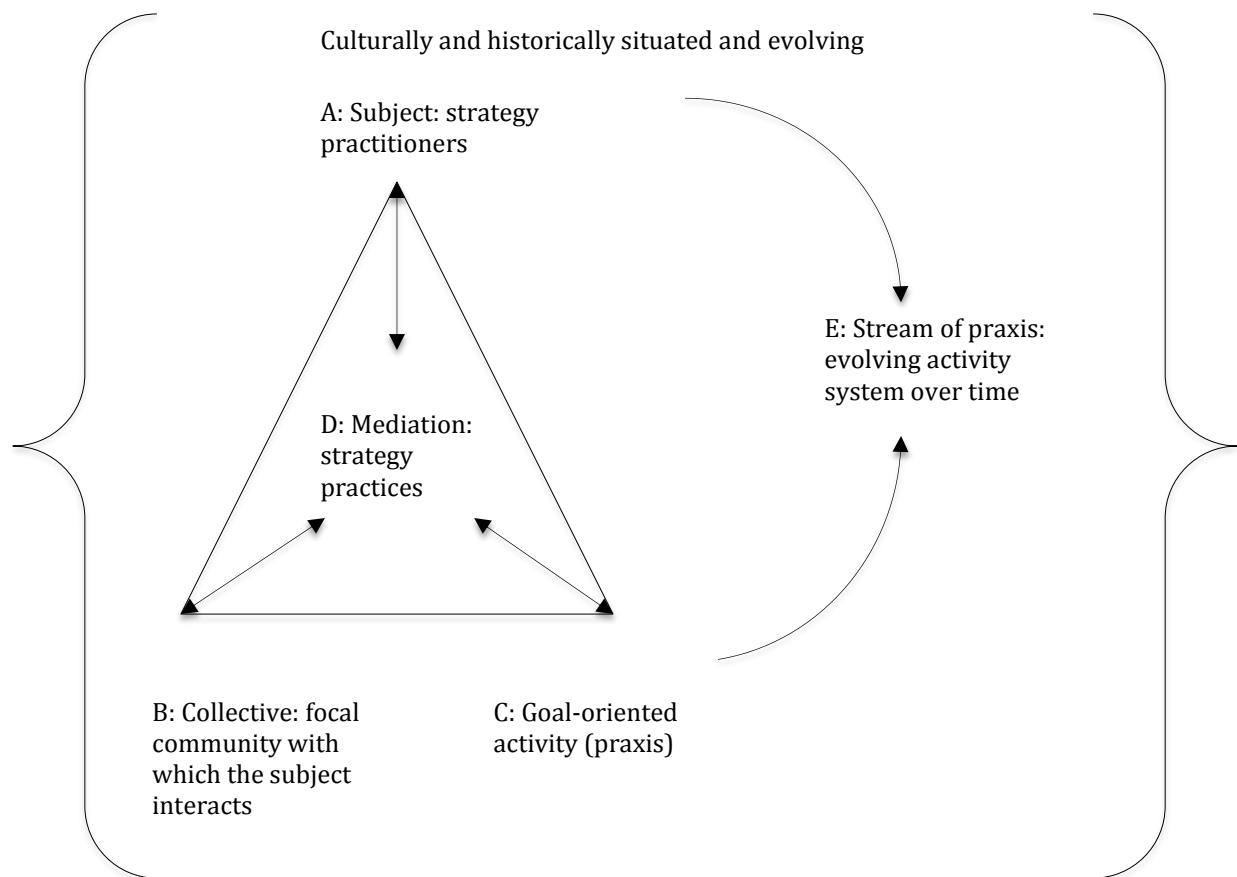
Source: Jarzabowski (2010)

In the figure subject (A) are actors who are conceptualized as strategy practitioners. Strategy practice is understood in relation to the collective (B) that comprises the other practitioners with whom individual actors (A) interact in pursuit of goal-directed activity (C). According to Leontiev (1978) activity is both goal oriented and that it is directed towards a shared outcome. Following this, different actors in the activity system input their individual actions into an

ongoing activity of an activity system. Thus, actors (A) associate with the collective (B) in constructing goal oriented activity (C) within the mediating activity system framework (D). According to Engestrom (1993) the mediation occurs through situated strategy practices such as strategy artifacts, strategy processes, and strategy language that enable interaction between the actors and they community. The strategy making activity flows over time (E) as is indicated by the curved arrows that represents that "the system is not static but is in a constant state of becoming" Jarzabowski (2010, p. 130). The implication of this dynamic activity is that although it may be studied at any given point in time it is constantly being constructed and it can give an insight into the interactions between actors, their community and the praxis that is accomplished in these interactions.

3.3.2 EPISTEMOLOGICAL CONSIDERATIONS

Epistemology is "a theory of knowledge…of how human beings come to have the knowledge of the world around them (however this is regarded), of how we know what we know" (Blaikie 2007, p. 18). The dominant epistemological view in strategy research, including strategy-as-practice research is based on two key assumptions. The first assumption is that individuals are treated as discretely bounded entities. The second assumption is that there is a clear divide between the mental and physical realm, i.e. that cognition and mental representations precede any meaningful and purposeful action. This implies that any action is a deliberately designed and planned form of activity. Therefore, strategic action is explained with reference to the

meaning and intention of actors that assumes an application of the means-ends logic of such strategic activity (Chia and Rasche, 2010).

Chia and MacKay (2007), however, critique this dominant approach in practice-based research on the basis of 'methodological individualism' that seeks to explain strategic behavior in terms of self-contained agents who act purposefully and consciously in their environment. If individuals are perceived to be separated by invisible 'walls,' then this tends to obscure and distort our understanding of the life in the society (Elias, 1978). This logic narrows the focus of research on what individual agents say or do to each other thereby excluding activities that are shaped by cultural, social, and historical norms and practices. Although Tsoukas (2010) has some sympathy with the contention of the individualist bias in strategy making he nevertheless acknowledges the role intention plays a role in strategy making. He states: "it is not often appreciated that while the making of strategy may occur in both non-deliberate and deliberate ways, strategizing is a conscious activity, typically involving deliberate actions" (Tsoukas 2010, p. 48).

Another epistemological conundrum is presented by what can be considered as strategic activity. Jarzabowski et al. (2007) consider activity as strategic only when it is consequential for strategic outcomes, directions, survival, and competitive advantage. According to Tsoukas (2010) this strict definition of what constitutes strategic activity conflates strategy making with intentionality, and it ignores activities that are considered strategic by actors, but which may not have organizational consequences. Furthermore, Chia and Mackay (2007) point out that agents may act purposefully without having a

purpose in mind as they focus on solving problems at hand. This intentionality that is not fully articulated may have strategic consequences.

Given this epistemological tension among the practice-based researchers Chia and Rasche (2010) draw on Heidegger to develop two contrasting epistemologies for strategy practice research. Consistent with Heideggerian terminology Chia and Rasche (2010) call these two epistemological orientations as the 'building worldview' and the 'dwelling worldview' respectively. Table 3 below presents these contrasting epistemologies.

Table 3– Contrasting epistemologies

Building worldview	Dwelling worldview
Actors are self-conscious, intentional and self-motivated.	Actors are non-deliberate, relationally constituted nexus of social activities.
Actions are guided by predefined goals directing efforts towards outcomes through purposeful action.	Actions are directed towards overcoming immediate impediment through purposive practical coping.
Consistency of action is assumed to be ordered by deliberate intent.	Consistency of action is assumed to be ordered by a modus operandi through an internalized disposition.

Source: Chia and Rasche (2010)

According to Chia and Rasche (2010) the 'building worldview' epistemology is the dominant perspective in much of the strategy-as-practice research. Such research is built on the assumption of an autonomous strategic actor relying on explicit knowledge to deliberately analyze, plan, and purposefully act to attain predefined goals. Moreover, Ingold (2000) points out that this view supposes that there is a pre-cognitive separation between the world and the strategy actors that necessitates them to construct a mental model of the world prior to engaging with it. Although the attention of practice-based research is directed at the more micro-level everyday sense making activities, the focus remains on "what organizational strategists actually do and the rational

choices they make" (Chia and Rasche 2010, p. 41).

In contrast to the 'building worldview,' the 'dwelling worldview' involves an intimate encounter, a 'being-in-the-world' that suggests immediate unreflective familiarity, habit and custom. People engage in 'wayfinding' (Hutchins, 1995) that creates pathways that radiate outwards from their concrete existential situations, or continually becoming of 'being' as they find their way through a world (Ingold, 2000). Chia and Rasche (2010) invoke Heidegger who writes: 'Being-in . . . is an existential . . . "in" is derived from "inn" – "to reside", "habitare", "to dwell"' (Heidegger, 1962: 80). In other words, 'being-in-the-world' implies an intimate familiarity that one has about 'inhabiting a home.' Heidegger believed that it is through this everyday dwelling activity that we achieve some form of intelligibility and not solely through having ideas and mental images. In a similar manner, Polanyi (1969) emphasized the importance of personal, socially and experimentally derived knowing when he wrote about the significance and primacy of indwelling in his discussion of tacit knowledge in contrast to the explicit, codifiable knowledge.

Chia and Rasche (2010) do not contend that all research into strategy practice should eschew manifest elements of strategic activity, but they propose that practice research should not be limited to intentional activity alone. Hence, research should make an effort to include the more mundane everyday coping actions of actors as well considering how engaging in practices is constitutive of actors themselves as subjects (Ezzamel and Willmott, 2008). Furthermore, Chia and Mackay (2007) state that instead of individuals, organizations and their processes, activities and practices, it is practices and the transmitted regularities associated with them that should form the primary focus of attention for practice

researchers. This is because the consistency of actions taken and observed over a period of time belies an immanent strategy that is historically and culturally transmitted through everyday practice.

This implies that to understand strategy emergence we need to develop research sensitivity to the unspoken, the inarticulate, and even oftentimes unconscious aspects of strategy making. Such forms of internalized knowing must therefore be gleaned from informants. Peripheral awareness and attention to seemingly insignificant details and events are a prerequisite for developing this research sensitivity (Chia and MacKay, 2007).

The question for the practice research in general, and my research in particular, becomes one of a choice of orientation and focus. Given the two contrasting epistemological orientations, should practice-based research be fenced around one or the other epistemological views? A possible solution to bridge this epistemological divide is presented by an onto-epistemological orientation developed by Tsoukas (2010). I will consider his proposed practice-based research approach in the following section.

3.3.3 HEIDEGGERIAN ONTO-EPISTEMOLOGY IN PRACTICE-BASED RESEARCH

Tsoukas (2010) states that the divide between the 'building' and 'dwelling' worldviews is not insurmountable. He argues that an onto-epistemological framework that is inspired by Heideggerian phenomenology allows us to see how strategy making can be studied in its various manifestations. Such a framework will allow: (1) practice-based research to overcome its individualist bias while allowing space for creative action, and (2) analytically relate deliberate and non-deliberate activity.

Heideggerian phenomenology can be understood as a study of consciousness that is experienced from the first-person point of view. The central structure of a person's experience is its intentionality when it is being directed toward something. An experience is directed toward an object by the virtue of its content or meaning together with appropriate enabling conditions. Hence, conscious experience is the starting point of phenomenology, but experience blends with less overtly conscious phenomena. A person is only vaguely aware of things in the margin of attention, and he is only implicitly aware of the wider horizon of things in the world around him. Moreover, as Heidegger emphasized, in practical activities such as walking along, hammering a nail, or speaking our native tongue, people are not explicitly conscious of their habitual patterns of action. Hence much of intentional mental activity may not be conscious at all, but it becomes conscious if there is a breakdown in the habitual action and people come to realize how they feel or think about something (Stanford Encyclopedia of Philosophy, 2013).

Tsoukas (2010) applies Heideggerian phenomenology to put forward an argument that practice-based research should be based on an onto-epistemology that acknowledges that strategies and sociomaterial practices may develop in various ways with a different degrees of intentionality. Therefore, researchers should be alert to exploring the tacit understandings and internalized styles of practical activity including the body and its constitutive involvement in skilled action and the use of sociomaterial tools such as artifacts as well as language by actors. As members of sociomaterial practices, organizational agents act on the basis of distinctions they have internalized through their involvement in strategy practice. Such distinctions would constitute a background that enables actors to

relate spontaneously to the tasks at hand and, therefore, act non-deliberately or purposefully without having a purpose in mind. In other words, actors do not pay explicit attention to what they do, they do what makes sense to them (Schatzki, 2007; Chia and Mackay, 2007) At the same time, researchers should also make space to consider deliberate modes of acting, and what is recognized as strategy is the outcome of the propensity to act deliberately and non-deliberately in particular ways, and strategy is immanent in practical action (Chia and Holt, 2006).

Tsoukas (2010) defines non-deliberate acting as 'practical coping' with a developing situation. Such coping is not mediated by mental representations but it comes about from an on-going integration of one's activity as a practitioner within a particular sociomaterial practice. The latter has a teleo-affective structure of acting with an orientation towards an end, as Heidegger defines it, that makes action purposive and sensible. Action that is often discernible in practical coping is mainly due to agents' acting from the same background that shapes their actions. Hence, strategy emerges over time from this coherent coping of actors within evolving practical situations.

When organizational actors encounter breakdowns in the spontaneous flow of their activities, habitual patterns, they develop explicit awareness and move to 'deliberate coping.' Actors pay explicit attention to what they do and retrospectively try to make sense of it through the articulation or re-interpretation of their activity. Weick (1995) describes this as a patterned stream of actions when actors retrospectively make sense of what they do when they become explicitly aware of what they do as a result of some difficulty they have encountered. Retrospective strategizing is evident in Porac et al. (1989)

study of the Scottish knitwear manufacturers. Although the researchers attached labels such as 'focus strategy' to describe the Scottish knitwear industry's strategy, the industry participants had to do with what they had available to them to carry out strategic actions. In a sense their strategy was a product of non-deliberate coping that was shaped by the historical and cultural norms and the resources that were available to industry participants.

Strategy and strategic thinking therefore emerges as a process of deliberate actions and thinking that are combined with the non-deliberate practical concern for the task at hand.

Finally, when agents become aware of the organization, the latter becomes a detached object of reflection to be described in terms of abstract properties. It is here where, according to Tsoukas (2010), strategizing takes place. Strategizing typically occurs in strategic planning sessions, strategy away-days, and strategic episodes at large. In strategizing, organizational actors move from coping with practical situations to being thematically aware of the properties of the objects of attention. Although strategizing involves abstraction and the formulation of intentionality, it still remains as a sociomaterial process that involves the use of tools, objects and artifacts, technologies and other forms of materiality including body and language.

Tsoukas's onto-epistemology bridges the gap between the two contrasting 'building' and 'dwelling' worldviews and its emphasis on the sociomaterial practices in strategizing provides a solid basis for my empirical research into how decision-makers enact, interpret, and use epistemic objects in practice.

CHAPTER IV: METHOD

4.1 INTRODUCTION

This section presents my research method. The ground assumptions that underpin my research are that organizational world is socially constructed and the actors in organizations know what they are trying to do. The actors can explain their thoughts, intentions, and actions (Gioia et al., 2013), although some actors may explain their actions retrospectively as some of their actions may occur non-deliberately by focusing on doing what needs to be done (Chia and MacKay, 2007).

These assumptions necessitate a research approach that gives voice to the informants without imposing prior constructs or theories on them as 'a priori' explanation for understanding or explaining their experience (Graebner et al., 2012). This means that a concerted effort must be made to give voice to the informants in the early stages of data gathering, analysis, and the reporting of the research, which will create rich opportunities for the discovery of new concepts rather than affirmation of existing constructs (Gioia et al., 2013).

My research was structured as an inductive, multiple-case research undertaking to build theory (Eisenhardt, 1989). Multiple case studies allow the replication of logic in which cases were treated as experiments, with each case acting to confirm or disconfirm inferences drawn from the other cases (Yin, 1994). The case method was chosen as it enables the researcher to answer 'how' questions that are more explanatory that deal with operational links that need to be traced over time (Yin, 2009) and they allow real-life phenomenon to be understood in-depth in contextual conditions (Yin and Davis, 2007). In addition,

the case method copes with technically distinctive situation in which there will be many more variables of interest than data points (Yin, 2009).

This chapter proceeds as follows. In Section 4.2 I justify why an interpretive qualitative research method is appropriate for my research. As my research is an inductive undertaking to build theory from multiple case studies, Section 4.3 provides a discussion of the case method and the section outlines the research setting and the case profiles. I also address the role of prior theory in theory-building case research in this section. Section 4.4 details the research instrument that was used to obtain data. Data capture and the data analysis process and method are discussed in Section 4.5. The chapter concludes with Section 4.6 that addresses the questions of research validity, reliability, and generalizability.

4.2 INTERPRETIVE QUALITATIVE RESEARCH CONSIDERATIONS

Gioia and Chittipeddi (1991) argue that in order to capture the socially constructed reality by organizational actors a qualitative research approach is required that captures actors' experiences and their subjective perspectives. Such research must be non-intrusive, capable of tracing the unfolding narrative, and it should be interpretive in nature (Gioia and Chittipeddi, 1991).

My analysis contains ethnomethodological elements as this method is designed to focus the researcher's attention on practical activities, rather than on large-scale social events (Blaikie, 2007). Although some scholars argue that ethnomethodology is not considered as an appropriate research approach to build theory as it is not concerned with providing causal explanations of observably regular, patterned, repetitive actions (Blaikie, 2007), I nevertheless

adopted elements from this method in order to give voice to the informants and capture both verbal and non-verbal communication from the cases.   This approach is justified in the literature as the expansion of research beyond discursive practice of strategizing is called for (Jarzabowski, Spee, and Smets, 2012) and ethnomethodology allows the researcher to more fully capture human action.

My research adopts an interpretive approach to build theory. This is based on the assumption, that human understanding and action is derived from the interpretation of information and events by the people who experience them (Rainbow and Sullivan, 1979). Therefore, human understanding and action depend on the meaning assigned to any set of events (Daft and Weick, 1984). Meaning, however, is a socially constructed phenomenon (Berger and Luckmann, 1966; Weick, 1979). As a result, meaning is unavoidably subjective and it is constrained by the context of goals that organizational actors seek to achieve. Understanding and action, including strategic action, is derived from the framework of meaning ascribed by the organization's members (Gioia and Chittipeddi, 1991). The implications of these assumptions in my research are that: (1) the study of interpretation and meaning that informants attribute to the enactment of causal maps as epistemic objects is fundamental to the research; (2) understanding the phenomenon of map enactment in the context of collective decision-making requires an accounting of the subjective meaning ascribed by the informants; (3) the voice of the informants from the cases is the foundational basis in the formulation of higher order themes of how causal maps operate as epistemic objects.

4.3 CASE STUDIES

The central notion of case study research is to build theory inductively. Theory building from cases involves using one or more cases to create theoretical constructs and propositions from case-based empirical evidence (Eisenhardt, 1989). Cases provide rich empirical descriptions of phenomenon that is derived from a variety of data sources (Yin, 1994) and the resultant theory emerges from patterns within and across the cases (Eisenhardt and Graebner, 2007). The emphasis of construct development and testable theoretical propositions make cases "one of the best (if not) the best of the bridges from rich qualitative evidence to mainstream deductive research" and it is likely to produce theory that accurate and interesting (Eisenhardt and Graebner, 2007, p. 25).

4.3.1 THE ROLE OF PRIOR THEORY IN CASE RESEARCH

Sound empirical research is grounded in literature that identifies the research gap and the research question that addresses the gap. However, when building theory from cases, the researcher has to justify why the research question is better addressed through theory building than theory-testing research. This requires the researcher to justify that the existing research does not address the research question at all or inadequately (Eisenhardt and Graebner, 2007). For theory driven research that extends existing theory, the researcher has to frame the proposed research within the context of the existing theory and show why inductive theory building is needed (Lee, Mitchell and Sablynski, 1999).

Graebner et al. (2012) state that many theory-building research projects misleadingly claim that no prior theory exists in order to support qualitative approaches to elaborate theory from cases. However, this is contrary to detailed literature reviews upon which many theory-building research undertakings are based. Scholars point out that because the field of organization has a dearth of process theories, in practice many process studies involve some component of theory building and that qualitative methods such as case research may be appropriate for examining processes even in areas of relatively mature theory (Langley 2007). Therefore, the justification for using case-based data should not primarily rest on the state of prior theory, but on the research that focuses on individuals' subjective perspectives or understanding phenomena that involves complex temporal dynamics or causal mechanisms that are often embedded in nuanced social interactions (Graebner et al., 2012).

Denis et al. (2001) study of organizational learning acknowledged the role of prior theory in their theory-building case research. Their approach was partly deductive (theory inspired) and partly inductive (data inspired).   The researchers considered this mixed approach fruitful because it allowed them to gain creative insights from data without necessarily denying or reinventing concepts that had been useful previously. In line with Denis et al. (2001) and more recent case study research on strategic sense-making (Garreau, Mouricou, and Grimand, 2015), and the materiality of strategizing (Werle and Seidl, 2015), my multiple case study research in the enactment of causal maps as epistemic objects uses both theory and data inspired logic iteratively to foster the development of a richer theoretical framework beyond what is covered in the literature. Although epistemic objects and group decision-making processes

possess a rich and mature research tangent, the enactment of causal maps as epistemic objects in the context of collective decision-making remains an unexplored area and the use of case research provides the means to study and understand this complex social phenomena. Finally, the multiple case study research may facilitate insights from one case to generate theoretical propositions that serve as a basis for further probing of the emerging constructs in other cases. As Denis et al. (2001) state, it is the combination of deduction and induction through time and the sequential "replication logic" that provides the basis for theoretical inferences.

4.3.2 CASE PROFILES AND THE RESEARACH SETTING

My research is based on seven (7) case studies of four (4) groups of final year undergraduate and graduate business studies student groups at Regent's University London and two (2) MBA student groups at London South Bank University. The case data for the student groups was collected from the end of spring term 2013/2014 through the autumn term 2014/2015. One (1) case was derived from a group of experienced decision-makers at Royal Free London NHS Foundation Trust in December 2014 as a part of a workshop on effective decision-making.

All case groups were recruited on the basis of voluntary participation and hence represented convenience sampling. Convenience sampling of students has been widely used, especially in behavioral economics (Thaler, 2015). Hodgkinson et al. (1999) used undergraduate students who they described as inexperienced decision-makers and postgraduate students whom were described as experienced decision-makers in individually constructed causal

mapping experiments. It should be noted that the research conducted with inexperienced and experienced decision-makers failed to reveal significant differences between informants who were advanced undergraduates and informants who were experienced practitioners completing MBA degrees (Hodgkinson et al., 1999). Hence, informants in my student groups can be considered as inexperienced decision-makers, apart from two executive MBA student groups whose members had an average of four years of managerial work experience and could be considered as experienced decision-makers.

All student groups represented different nationalities and ethnic backgrounds. However, the composition of student informant groups represented an institutional bias as London South Bank University draws a significant proportion of its students from British black ethnic minority groups living and working in London and Regent's University London, as a private not-for-profit university, has a large number of continental European and Southeast Asian students with few British native students. The informants in the experienced decision-maker case were employed at Royal Free London NHS Foundation Trust. The informants came from different hospitals within the Royal Free London NHS Trust, but they had a common interest, as they were members of 'effective management and decision-making community of interest'. Informants in this group included two (2) consultant doctors, one (1) senior nurse, a matron, and two (2) operational managers.

The seven case profiles and the decision outcomes are summarized in the table below.

Table 4 - Cases in chronological order of recording

Group	Profile	Composition	Location	Equipment	Video Run Time	Decision Outcome
Rangers	A group of four final year undergraduate students on BA International Business course. All informants had been previously taught the principles of causal mapping as a part of their strategic management course. All informants had prior course-work experience in the use of causal maps as a decision-making tool.	Age range 22-24. 2 men 2 women All informants had previously attended lectures together although they had not previously worked together as a group.	Seminar room at Regent's University London.	Video camera. Selection of different color Post-it notes. A selection of marker pens. Note paper. Whiteboard.	1hr 17 min	Reject the deal. The decision was unanimous.
Flyers	A group of four final year undergraduate students on BA International Business and BA in Management course. Two informants had been previously taught the principles of causal mapping as a part of their strategic management course. The other two informants had prior course-work experience in the use of causal maps as a decision-making tool.	Age range from 22 to 28. 4 men Two informants had previously attended lectures together. Two informants came from a different course than the two who had previous causal mapping experience. This was the first time the informants worked together as group.	Seminar room at Regent's University London.	Video camera. Selection of different color Post-it notes. A selection of marker pens. Note paper. Whiteboard.	55 minutes	The group could not reach a decision.
Ducks	A group of six executive MBA students. All informants had been previously taught the principles of causal mapping as a part of their strategic management course. Four of the six informants had prior course-work experience in the use of causal maps as a decision-making tool.	Age range 25 to 33. 4 women 2 men All informants had previously attended lectures and undertaken group work together.	Seminar room at London South Bank University.	Video camera. Selection of different color Post-it notes. A selection of marker pens. Note paper. Whiteboard.	43 minutes	Reject the deal. The decision was unanimous.
Bruins	A group of four full-time MBA students. All informants had been previously taught the principles of causal mapping as a part of their strategic management course. All informants had prior course-work experience in the use of causal maps as decision-making tool.	Age range 24 to 28. 3 women 1 man All informants had previously attended lectures and undertaken group work together.	Seminar room at London South Bank University.	Video camera. Selection of different color Post-it notes. A selection of marker pens. Note paper. Whiteboard.	50 minutes	Accept the deal with modifications to terms. The decision was not unanimous.

Group	Profile	Composition	Location	Equipment	Video Run Time	Decision Outcome
Oilers	A group of four graduate students on MA Marketing course. One informant had been taught the principles of causal mapping as a part of her strategic management course and had prior course-work experience in the use of causal maps as a decision-making tool.	Age range from 24 to 27. 4 women All informants had previously attended lectures together. This was the first time the informants worked together as a group.	Seminar room at Regent's University London.	Video camera. Selection of different color Post-it notes. A selection of marker pens. Note paper. Whiteboard.	25 minutes (incomplete recording)	Reject the deal. Informant with mapping experience assumed the role of a leader but the decision seemed to be unanimous.
Black-hawks	A group of four graduate students on MA Global Management course. None of the informants had prior experience in using causal mapping as a decision-making tool.	Age range from 24 to 31. 2 men 2 women All informants had previously attended lectures together. This was the first time the informants worked together as a group.	Seminar room at Regent's University London.	Video camera. Selection of different color Post-it notes. A selection of marker pens. Note paper. Whiteboard.	57 minutes.	Reject the deal. Strong conflict between the male informants. The informant who advocated the acceptance of the deal never bought into or supported the final group decision although the decision seemed to be unanimous.
Wolverines	An experienced decision-making group from Royal Free NHS Foundation Trust 2 x Consultant Head of pediatric nursing Senior Matron Senior operational manager (most junior of the group) Informants knew each other and they had experience in working together across the Trust hospitals with the exception of the senior operational manager. Informants were taught the principles of causal mapping as a part of a workshop on effective decision-making. None of the informants had prior experience in using causal mapping as a decision-making tool.	Age range: N/A 3 women 2 men This was the first time informants worked together as a group.	Conference room at Royal Free Hospital, Hampstead, London.	Video camera. Selection of different color Post-it notes. A selection of marker pens. Note paper. Whiteboard.	60 minutes	Reject the deal. The decision was unanimous although a male informant (consultant) advocated deal acceptance. However agreed with accepted the group logic behind rejecting the deal.

4.4 RESEARCH INSTRUMENT

All case groups were set a decision-making task using causal mapping as a decision-making tool to reach a decision on teaching case study "John Hamond at First National Bank" that presented a strategic decision problem.

Prior to the final administering of the research instrument, a pilot study was conducted during autumn term 2013/2014 with final year undergraduate business studies students at Regent's University London. The pilot was conducted as a part of the students' strategic management module where causal mapping as a strategic decision-making tool-in-use was covered and two pilot teaching case studies were administered to different groups. A total of 12 groups of six students participated in the pilot, six groups for each pilot teaching case. The cases were sourced through the Case Centre located at Cranfield University. The search criteria for the cases were that the cases had to be no longer than five pages so that they could be read in 30 minutes; the cases had to involve a strategic decision problem either to the organization or the decision-maker; the cases did not involve quantitative analysis or require previous industry or technical knowledge. Five cases were identified and two cases were selected as they did not require any calculations or detailed industry knowledge, nor were the cases technically complex.

The final teaching case study "John Hamond at First National Bank" was selected from the pilot as it stimulated more debate among the students than the other pilot case during the pilot, the decision problem in "John Hamond at First National Bank" teaching the case was framed as an escalation of commitment bias, and unlike the other pilot case, it had a 'correct' answer to it, e.g. not to

make the loan available to the new prospective client. The problem framing in the "John Hamond at First National Bank" teaching case as an escalation of commitment bias corresponded to my research interest. Moreover, previous research by Hodgkinson et al. (1999) and Maule and Hodgkinson (2002) had also been carried out by using an escalation of commitment bias case study. However, their research was administered to individuals rather than groups. In addition, the pilot study revealed that the "John Hamond at First National Bank" was quicker to administer within a reasonable time frame of one hour than the other pilot case. Finally, "John Hamond at First National Bank" teaching case study presented a strategic problem for both the individual decision-maker, the lending manager, as well as for the organization, the bank, of acquiring a new potentially financially attractive client.

Instructions on how to undertake the decision-making exercise were piloted during the pilot sessions and the final wording of the instructions was clarified based on the questions that students asked about them during the pilot stage.

The student informant groups were given the teaching case study one day in advance to read it and the managerial group was given the case at the beginning of a workshop and 30 minutes reading time was allocated for the managerial group informants to read the case. All informant groups were instructed at the beginning of the session to use causal mapping as a decision-making tool during the decision-making task. The task was timed to last one hour. Five of the seven informant groups had at least one group member who had previous experience in causal mapping as a decision-making tool. One

student group and the managerial group had no members with prior experience in causal mapping.

The decision-making task was preceded by 45 minutes of instruction/review of causal mapping and a brief exercise on the mechanics of causal mapping. The mapping instructions were based on a causal mapping protocol developed by Eden and Ackerman (2010). This causal mapping protocol is attached as Appendix I. Other materials that were made available to case informants were a whiteboard, marker pens and pencils, different colored post-it notes, and an instruction sheet to the decision task, and a sheet for recording the final decision made by the group and its underlying assumptions. After the exercise the group was asked to retroactively reflect on their mapping experience.

A fresh copy of the teaching case study was given at the beginning of the session to all informants. The case study is attached as Appendix II, and the decision task protocol is attached as Appendix III.

4.5 DATA CAPTURE AND THE ANALYSIS PROCESS

My primary data collection method was to collect qualitative data using video recordings supported by my observations during the mapping sessions that I wrote down into a field notebook. In addition, the informant groups were asked to retroactively reflect on the mapping process immediately after the decision-making task. The mapping process and the informant reflections were captured on the video.

As the aim of my research was to gain an understanding how decision-makers interacted as teams with epistemic objects and with each other, video-

based research was selected as the means of dealing with and capturing a dynamic, particular, and subjective reality as opposed to methods that are based on the understanding of reality as static, general, and objective phenomena.

Video evidence based research is a relatively new method in strategy research but it enables the capture of micro-behaviors and interactions that are the 'stuff' of strategic practice (Johnson et al., 2007). Moreover, video recordings capture real time behaviors and activity and they constitute a permanent record that can be verified by others. While strategy-as-practice research has traditionally focused on discourse analysis, video recordings may provide additional ontological opportunities for researchers. Specifically video recordings may provide added insight to materiality as organizations have 'things' such as objects, artifacts, and tools that are central to work and warrant careful attention and consideration. Video evidence may provide insight in how people interact with these 'things' by relating to them, and how they are coordinated and organized (Jarzabowski, 2014). Furthermore, video recordings can capture the human body at the center of social interaction and organizational activity. Finally, video recordings capture talk, text, pictures, drawings, gestures, facial expressions, and embodied maneuvers that can be analyzed in activities such as decision-making, negotiating, team interactions, and communicating (Jarzabowski, 2014).

Given the opportunities that visual research methods avail themselves to gain a deeper insight to strategy practice, the study of visual is a growing phenomenon in organization and management research (Bell and Davidson, 2013; Warren, 2009). Visual data such as pictures, graphs, film, web-pages, and architecture (Bell and Davidson, 2013) are "socially meaningful material objects

that are created, employed, and manipulated in organizational context, making them a constitutive part of social practices" (Meyer et al., 2013, p. 505). Such visual data are important for identifying different contextualized types of materiality (Collier and Collier, 1996). A small but a growing number of empirical practice-based studies derived from visual data include recent research to the production of strategic knowledge in workshops (Paroutis et al., 2015), materiality of strategizing (Werle and Seidl, 2015), emotion in strategy work (Liu and Maitlis, 2014), and material artifacts in the practices of doing strategy (Jarzabowski, Spee, and Smets, 2013.)

4.5.1 DATA ANALYSIS PROCESS

Data analysis is at the heart of building theory from cases, but it is both the most difficult and the least codified part of the research process (Eisenhardt, 1989; Eisenhardt and Graebner, 2007; Graebner et al., 2012).

Eisenhardt (1989) recommends a three-step case analysis process. The first step is within-case analysis that typically involves a detailed write-up for each case. These write-ups are often pure descriptions, but they are central to the generation of insight. This early stage data analysis is often presented in tabular displays although Eisenhardt (1989) acknowledges that there is no standard format for such analysis. However, the aim of this early stage research is to become intimately familiar with each case as a stand-alone entity that allows unique patterns of each case to emerge before an attempt is made to generalize across cases. The second stage of data analysis involves across-case search for patterns. The number of cases in my research facilitates a selection of categories or dimensions and then looks for within-group similarities coupled

with intergroup differences. Bourgeois and Eisenhardt (1988) applied this tactic to assign cases into various categories revealing both patterns of within-group similarity and across-group differences. At the final stage of the case analysis process the overall impressions, tentative themes, and possibly even relationships between variables begin to emerge through an iterative process. The analysis task is to systematically compare the emergent frame with the evidence from each case in order to assess how well or poorly it fits the within-case data. According to Eisenhardt (1989) the research challenge at the final third stage is for the researcher to compare theory with the emerging data thus iterating toward a theory that closely fits the data from the cases. It is this process that enables good theory to be built because it takes an advantage of the new insights garnered from the data and it yields an empirically valid theory.

Gioia et al. (2013) and Mantere et al. (2012) propose an approach that complements Eisenhardt case method that allows a systematic presentation of case data at the level of 1st and 2nd order analysis. The 1st order analysis uses informant centric terms and codes, and the 2nd order analysis applies researcher-centric concepts, themes, and dimensions. The 1st order analysis tries to adhere faithfully to informant terms, while the 2nd order analysis provides a theoretical realm for the researcher to assess whether the emerging themes suggest concepts that may help describe and explain the phenomena that is being observed. Once a workable set of themes and concepts has been achieved, or the research has reached theoretical saturation, the research will culminate with an investigation whether it is possible to distill the emergent 2nd order themes even further into aggregate dimensions. Together, the tandem reporting of both informant and researcher voices allow not only a qualitatively rigorous

demonstration of links between data and the induction of new concepts but for "the kind of insight that is the defining hallmark of high-quality qualitative research" (Gioia et al. 2013). Furthermore, the 1st order terms and 2nd order themes and the final aggregate dimensions provide the basis for building a data structure to help the researcher to configure data into a sensible visual aid and a graphic representation of the research that progressed from raw data to informant centric terms and theoretical themes in the analysis process

4.5.2. CASE DATA ANALYSIS PROTOCOL

Informed by the case and Gioia methods (Eisenhardt, 1989; Eisenhardt and Graebner, 2007; Gioia et al., 2013; Denis et al., 2001; Mantere et al., 2012), my case research progressed from a detailed, empirical analysis of the case evidence to a greater generality in three analytical rounds. The three rounds of the case analysis and the data structure of the research are depicted in Figure 3 below.

Figure 3 - Case analysis and data structure

1st order concepts	*2nd order themes*	*Aggregate Dimensions*
Detailed write-up of each case from informants' perspective giving them an active voice. Development of informant centric terms and codes. 1st order concepts to be derived from within each of the cases independently.	Comparative analysis of within-case data with across-case data for patterns and differences. Focus on the use of researcher centric analytical realm to generate concepts, themes, and dimensions. Tandem reporting of informant and researcher voices for induction of new themes and constructs.	Integration of previous coding from 1st and 2nd order analysis into the explanation of map enactment by informants. Final analysis round includes an abductive research approach to develop propositions for future research.

Source: Adapted from Eisenhardt, 1989 and Gioia et al., 2013

The first analysis round began by writing a detailed account of the causal map enactment process from the viewpoint of the informants for each of the seven cases. I attempted to place myself in the position of the informants as they began enacting the map. I relied on visual and verbal clues that I perceived to include emotions and behaviors such as hesitation, confusion, uncertainty, assertiveness, cooperation etc. The case write-ups are attached as Appendix IV. Like Mantere et al. (2012) I used Atlas.ti software to catalog and arrange the within-case data that allowed me to construct an event history for each case. The emphasis of the case write-ups was focused on what appeared to be important events (Mantere et al., 2012) during the map enactment process from informant groups' perspective. These important events included the informants' progression from independent note making to collective map enactment, the

intensification of debate, the iterative process of reflection and further map enactment, and the emergence of the final decision and its final justification.

At this stage it was important to keep an open mind what was unfolding in front of me. However, it has to be acknowledged that my initial observations and analysis were influenced by the literature on epistemic objects and group decision-making. Hence, I was aware that I was looking for signs when some important events may have included evidence of when and why maps became epistemic objects, what role did the emerging maps play in the unfolding discussion, how and when maps influenced the emergence of cognitive and affective conflict, and what emotional attachment was attributed to the maps by the informants. I noted down my initial reflections in field notebook and I used the informant groups' retrospective reflections at the end of the mapping process to augment my initial observations. Gioia et al. (2013) point out that this 1st order coding produces a great number of themes as little effort should be made at this stage to distill them.

At the second round of coding, my attention focused on comparative analysis of across-case evidence to seek similarities and differences among the cases. Themes that emerged from this level of analysis included when and why some maps appeared more or less influential in engaging the group members and generating debate of alternative decision outcomes.

At the 2nd order analysis it is also fruitful to select pairs of cases to identify similarities and differences between each pair. According to Eisenhardt (1989) this tactic may help the researcher to look for and identify subtle similarities and differences between cases. At this stage of analysis the researcher becomes a knowledge agent (Gioia et al., 2013) who thinks at

multiple levels simultaneously taking into account the informant terms and codes, and the more abstract 2nd order theoretical level of themes, dimensions, and the larger narrative that seeks to understand the phenomenon of what's going on. Developing tentative answers to this question by the way of gestalt analysis (Gioia and Chittipeddi, 1991) led to the emergence of nascent concepts that didn't seem to have adequate theoretical references in the existing literature.

At the final round of analysis Gioia et al. (2013) suggest that the researcher cycles between emergent data, themes, concepts, and dimensions and the relevant literature, not only to see whether what has been found have precedents, but also whether new concepts have been discovered. Upon consulting the literature, this final round of the research process can be viewed as a transition from inductive to a form of abductive research as the research data is considered in tandem with existing theory (Gioia et al., 2013). My research culminated in investigating whether the emergent themes that were derived from the data and informed by the literature could be distilled into higher order aggregate dimensions to provide an explanation of the map enactment phenomenon.

4.6 RESEARCH VALIDITY, RELIABAILITY, AND GENERALIZABILITY

Easterby-Smith et al. (2008) state that the issue of research validity, reliability and generalizability depends on the philosophical perspective of the research.   Given my constructivist ontology, three tests should be applied to research: (1) whether "the study clearly gain(s) access to the experiences of those in the research setting?" (Easterby-Smith et al., 2008, p. 109); (2) whether

there is "transparency about how sense was made from the data?" (Easterby-Smith et al., 2008, p. 109), and (3) whether the "concepts and constructs derived from this study have any relevance to other settings?" (Easterby-Smith et al., 2008, p. 109).

Research validity was sought through research design, the pilot testing of the research instrument and, the method of observation to establish that the meaning of the phenomena was discovered. Bryman (1989, p. 379) states that data triangulation should be carried out through the use of "multiple observers, theoretical perspectives, sources of data and methodologies." An independent coder was used to undertake a double coding of video data. Where agreement about some coding or codes was low, data was revisited and mutual discussions were held between the primary researcher and the second coder to develop a consensual interpretation. In addition, I conducted one 'sensemaking' session with two members of the managerial decision-making group to present my observations and the analysis of their particular case to challenge my conclusions.

Reliability was sought by data capture through video recordings, a detailed field notebook where I recorded my observations during the decision-making sessions, retroactive informant reflections that were video recorded, and by the write-ups of each individual case that focused on the significant events during the map enactment process. These methods were detailed in the method chapter of the thesis to make the techniques that I employed in my empirical research transparent to other researchers.

The research findings chapter that follows adds transparency by clearly recording how empirical findings emerged through the analysis process.

However, the qualitative research process and the coding of data are a series of interpretations and subject to a researcher bias. In addition, my views and thoughts may change over time with additional experience of similar situations being gained through future research. Finally, additional limitations of the research may include the following: (1) Convenience sampling that was based on voluntary participation in the decision-making groups may not be representative of the population as a whole. However, as a qualitative research undertaking the thesis makes no claim for the findings to be generalizable to the population in general. (2) The mapping sessions were conducted in different study rooms rather than in controlled laboratory conditions. The differences in the physical features and the layout of the rooms may have had an impact how the informants interacted with each other and the whiteboard on which the maps were constructed. However, I feel that the research process was robust and it provided a reliable account of the map enactment process and the meaning that informants attributed to the mapping process.

Socially constructed structures and processes are idiosyncratic as they are fashioned and performed by individuals acting in unique contexts. This and the limited number of seven cases pose a question whether such research can be generalized. For purist interpretivist researchers the answer would be a resounding no. However, Gioia et al. (2103) argue that if the research generates concepts and principles with obvious relevance to other domains where these concepts and principles are portable from one setting to another then it is feasible to generalize from research beyond theory.

Eisenhardt (1989) and Eisenhardt and Graebner (2007) suggest that case research should yield good theory that is parsimonious and testable. Gioia et al.

(2013) agree with this but they take a more moderate stance in their view of proposition development as they consider that propositions often impose a positivist hallmark on an interpretivist research approach. They recognize that propositions make research more accessible and useful to other scholars as the propositions may provide a roadmap for future qualitative research for further theoretical development. Moreover, in line with Eisenhardt (1989) they note that propositions can act as a bridge between qualitative and quantitative research as they can demonstrate to quantitatively oriented researchers that qualitative findings may offer guidance in developing emergent constructs into measurable constructs (Gioia et al., 2013).

CHAPTER V: RESEARCH FINDINGS

5.1 INTRODUCTION

This chapter presents the research findings that were derived from the data contained in seven video recorded case studies. In addition to the analysis and the dissemination of the research findings this chapter aims to provide a clear record of the process how my empirical findings emerged through the data coding and the analysis. This is to ensure the transparency in the research process.

The chapter proceeds as follows. Section 5.2 provides insight into the analysis process that I used to start making sense of the rich qualitative data and the analysis output. This is followed by Section 5.3 where I provide a temporal analysis of the map enactment process. The map enactment process was revealed in five stages of problem identification, planning and mapping mechanics, individual idea generation, map enactment, and the final decision. The output of this analysis stage was a generation of additional questions that provided further focus for me to gain added insight and depth to my research. Section 5.4 details the development of the coding scheme, within and across the case analysis and the conceptual model of causal map enactment. The chapter closes with the aggregation of codes to higher order themes and the generation of propositions for future research in Section 5.5.

5.2 GETTING ACQUAINTED WITH THE DATA

In order to become familiar with the rich qualitative video data I commenced the analysis process by watching each of the case videos through to

familiarize myself with the general flow of the individual and group activity in the enactment of causal maps as a decision-making tool. A total of seven hours of video data was recorded, one hour for each case.

At first I could not identify any real discernable patters within and across the cases in the mapping activity beyond the superficial activities of individual idea generation and note posting on the board. Moreover, I was surprised how little the actual mapping processes in the seven cases reflected the elegant mapping processes outlined in the causal mapping literature.

It was not until I circled back to the literature that I realized that each case represented an effort by the informants to make sense of a messy strategic problem and develop their own individual and collective understanding of the decision problem (Weick, 1979, 1990). As the maps represented a social construction of reality interpreted by each informant group independently from the other groups then it could be feasible that the sensemaking and the mapping processes that the different informant groups used in enacting the maps produced visually different outcomes, although the final conclusions to the problem, the decision outcome, could have been the same for each group. In addition, as the informant groups were tasked to enact the maps without any external intervention they were messy in contrast to the elegantly constructed maps in the literature that had benefited from consultant or facilitator guidance. The groups in my research had to develop their own mapping mechanics as the map enactment progressed without a specific template beyond the basic instructions how to undertake causal mapping or expert guidance. This is an important factor to consider in terms of the affordances of maps as a managerial tool-in-use whether mapping can be undertaken without expert facilitation.

Having watched the videos and consulted the literature with the questions that arose from the first video viewing sessions, I watched the videos through again and began making notes what I was seeing in the data. The data analysis was highly iterative at this early stage with more new insights being revealed each time I watched the videos. I also referred to my observations that I had recorded in my field notebook and the retrospective reflections by the informant groups. My field notes and informant reflections added depth and support to the emerging trends that I was slowly beginning to identify in the data.

At the next stage of data analysis I began writing up the case studies. These case studies are included as Appendix IV to the thesis. I initially wrote a rough draft from memory of what I had seen in the cases having watched the videos. My focus was to identify key moments of activity such as the informants leaving the table, posting individual notes on the board, debating the placement of the notes, adding new notes, drawing connectors between the notes, reflecting what had been posted, debating the outcomes, reaching the final decision, and justifying the final decision outcome.

Once I had identified some key moments in each of the cases I watched the videos again and added more substance and additional key moments to the initial draft case documents. Guided by the activity theory model (Jarzabowski, 2010) and the Gioia method (Gioia et al., 2013; Mantere et al., 2012) I attempted to give a voice to the informants by trying to observe how each individual informant interacted as a member of the collective and how they used the map to make knowledge clams and make sense of the decision problem. I then focused my attention to the collective, i.e. each group, and how they collectively enacted the causal map. By using these theoretical frameworks and through the writing

of the cases I began to see patters and differences emerging within and across the cases.

Once I had finished writing the more fully developed case studies, I began developing a framework to produce a structured way to analyze the data and present my initial findings. I broke each case study into two interlinked analytical activities: (1) the analysis of the map enactment process and (2) the development of the coding scheme that I could apply within and across the cases. I was guided by both Gioia method (Gioia at al., 2013) and Eisenhardt (1989) case method to cycle between emergent data, themes, concepts, dimensions, and the relevant literature to see if the emerging findings had precedents but also to ascertain if I was discovering new concepts. Gioia et al., (2013) comment that upon consulting the literature with the emerging evidence, the research process transitions for inductive to abductive research. Therefore, it is important to maintain a combination of knowing and not knowing to balance the discovery "without reinventing the well-ridden wheels" (Gioia et al., 2013).

The following two sections present (1) the analysis of map enactment process and (2) the development of a coding scheme and resultant analysis across all informant groups. The analysis was derived from video observations and supported by my field notes, the written case studies, and the retrospective reflections by the informant groups at the end of the mapping sessions.

5.3 OVERVEW OF THE MAP ENACTMENT PROCRESS

The map enactment process across all cases was revealed in five steps of problem identification, planning and mapping mechanics, individual idea generation, map enactment, and the final decision. To some extent the overall

map enactment process was preprogrammed and constrained by the instructions provided to the groups how to undertake the decision-making exercise with causal maps (Appendix III – Decision-making protocol). The informant groups were instructed to read the decision-making case study first independently, note down thoughts independently first, and then commence the map construction as a group. The five steps of the mapping process are depicted in the Figure 4 below.

Figure 4 – The mapping process

Problem identification	Planning the mapping mechanics	Individual idea generation	Map enactment	Final decision
Limited group identification of the decision problem that was framed as a "yes" or "no" binary decision by all groups.	Some general debate how to start the mapping on the board.	Long periods of up to five minutes of individual idea generation on post-it notes. Some groups had to be prompted to move on from individual idea generation.	Mainly started by one individual and then others joining in with their notes.	Once the addition of new notes and movement of existing notes on the board stopped, the decision seemed to emerge without a conscious effort of "let's make a decision" type discussion.
One group was quick to post the binary decision outcome on the board prior to discussing mapping mechanics and individual idea generation.	In all groups no consensus was reached initially how to proceed with the map construction.	Individual effort in all groups, bar one, was interrupted by one group member beginning to post notes on the board.	Notes posted in no particular order initially. Map construction was interrupted by collective reflection, addition of new notes either individually or collectively, and by moving the existing notes around on the board.	All groups circled back to the decision problem to confirm the initial problem framing.
In all groups a binary decision outcome was the first to posted on the board. .	The mapping mechanics evolved during the map construction stage.	Informants returned back to individual note writing throughout the experiment as the map evolved.	Mapping mechanics evolved during the map construction. The decision-problem became more fully articulated during the map construction.	Decision was justified individually and collectively by reference to the map.

5.3.1 PROBLEM IDENTIFICATION

At the beginning of the session all informant groups identified the decision problem presented in the "John Hamond at First National Bank" teaching case study as a binary problem, a "yes" or a "no" decision. This agreement about the alternative decision outcomes was unanimous in all informant groups once the informants had read the teaching case study and the binary option was expressed by all informant groups before they proceeded to discuss how to undertake mapping and prior to individual idea generation.

The "John Hamond at First National Bank" teaching case study posed a decision problem: *"It was now 1.00 PM on Friday, March 31. The Kitchener Group's contract-to-buy would expire at the end of business that day. John Hamond wondered what to do?"* All informant groups framed the question as 'whether' or 'not' lend money to the bank's client, The Kitchener Group. All groups enacted a map with a binary outcome (1) to lend and (2) not to lend as the starting point of the mapping process. This narrow framing could have been the result of the way the decision-making teaching case study was structured with a 'correct' outcome. However, the data showed that the map construction led into the laddering of the consequences of the binary decision and the informant groups explored a number of ways of making the deal work. I interpreted this exploration of decision-options as innovative solution seeking activity.

The binary decision outcome was the first note(s) posted on the board by all groups, see Exhibit 1 below.

Exhibit 1 – Binary decision problem definition

Planning the mapping mechanics

Having identified the binary decision outcome, informants made an effort to discuss how to proceed with the mapping mechanics. All informant groups found this part of the mapping process difficult. Although the groups had been instructed how to undertake mapping, there seemed to be hesitancy in all groups how to get started. This hesitation was evident from the limited discussion that took place at the beginning of the mapping session how to proceed. None of the groups reached a consensus about the mapping mechanics. However, once some notes were posted on the board after the individual idea generation by one or two informants this seemed to encourage the other informants to leave the desk and start posting notes on the board. There was no particular order to the initial posting of notes except that the binary decision was posted in the middle of the board. Once the map enactment got underway all groups seemed to develop a particular mapping mechanics that suited their own way of thinking and how the discussion of the decision problem evolved during the map enactment.

The mechanics of mapping was an iterative process and the map was defined and redefined throughout the map enactment. Although the maps looked different across the informant groups they all demonstrated a laddered pattern of seeking out and defining the pros and cons and consequences of decision alternatives. In effect, the enacted maps conformed to the causal nature of the causal maps in the literature.

5.3.2 INDIVIDUAL IDEA GENERATION

Having had a limited discussion about the general mapping mechanics, individual informants across all groups began the mapping exercise by writing down their own thoughts on post-it notes while seated at the desk, see Exhibit 2 below. This activity was preprogrammed into the mapping instructions. However, some groups had to be prompted to commence the mapping on the board. These groups were the ones with the least previous experience in causal mapping. Although these groups knew that they should enact a map on the board, they seemed hesitant to use the causal map as a decision-making tool. A comment was made after the mapping exercise by informants in the groups that had to be prompted to get started with the map enactment on the board that they were more comfortable in trying to reach the decision "the old way" by sitting around the table making individual notes while discussing the decision problem.

Exhibit 2 - Individual idea generation at the start of the mapping process

Once informants began posting their individual notes on the board, some informants wrote new notes in addition to their initial post-it notes and posted them onto the board. This was particularly pronounced during the early stages of the map enactment. In some groups informants added new notes on the board throughout the map enactment process, see Exhibit 3 below. The groups that added new notes throughout the map enactment produced a more complex map and exhibited a greater degree of debate about the decision outcomes in terms of their pros and cons as well as the consequences of the decisions.

Exhibit 3 - Individual idea generation during the mapping process

5.3.3 MAP ENACTMENT

This was a messy process with much debate and moving of post-it notes on the board and drawing of connectors to create causal connections between the notes. All groups worked in an iterative way creating the map as the mapping progressed. There was a noticeable increase in the sound level as the groups became increasingly involved and animated with the mapping. This was a moment when the groups became fully engaged with the map as the focal point of attention. This increased focus on the map also reduced the degree of face-to-face discussion between individual informants. The discussion and the points made by informants were addressed to the map rather than to each other.

All groups exhibited a pattern of map construction that was followed by reflection when the group members looked and reflected jointly and severally at the map. This was followed by more map construction either by moving notes around on the board, drawing additional connectors, or writing new notes and adding them onto the board.

Exhibits 4 and 5 demonstrate the intense focus on mapping by the informants and how statements and knowledge claims were made by informants pointing at the map. Groups who did not fully engage on the mapping by congregating around the board demonstrated a lower degree of group engagement with the map. This is demonstrated by Exhibit 6 where the informants consult the map but they do not become animated by it nor do they make statements by pointing at the map. Rather, the discussion between the informants ebbed and flowed in a subdued fashion around the table.

Exhibit 4 - Map enactment and intense focus

Exhibit 5 - Making a point

Exhibit 6 – Consulting the map

5.3.4 FINAL DECISION

The groups continued with iterative reflection, construction, reflection and so on, until they seemed to run out of thoughts or new ideas to post, move existing notes around the board, draw connectors, and there was a noticeable abatement of debate.   Perhaps this was due to the time constraint in the experiment, but the video evidence supports that the groups ran out of ideas naturally and a discussion about the decision was made by looking at the causal connections and clusters of post-it notes on the map.   My research indicates that for most groups the map enactment came to a natural conclusion once the informants ran out of ideas to discuss or new thoughts to post on the board. None of the groups had allocated an informant to act as a timekeeper and I only had to prompt one group to make a decision, as they would have run over the allocated time of one hour.

At the final decision stage all groups circled back to the initial problem definition and there was evidence as demonstrated in Exhibits 7 and 8 that individual informants took turns in articulating and justifying the decision based on their own perceived understanding of the process that the group had gone through the map enactment. Exhibits 7 and 8 come from the same group that clearly illustrates this individual decision justification activity at the end of the mapping process.

Exhibit 7 – Justifying the decision and articulating it individually

Exhibit 8 – Justifying the decision and articulating it individually

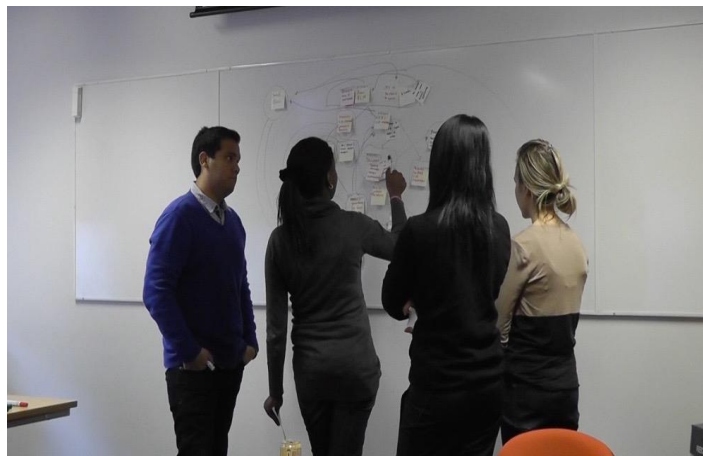Exhibit 8 is especially interesting as the informant articulating the decision and pointing at the notes on the board had been quiet during map enactment but her justification of the decision and the engagement with the map shows that she had been fully absorbed in the map enactment process and the decision although she had been rather shy during the map enactment, perhaps due to language aptitude.

Finally, the decision outcome was explained by using the map as the justification and explaining the variables that influenced the outcome, see Exhibit 9 below.

Exhibit 9 – Explaining the final decision

The above analysis gave me a better understanding of the mapping process and it highlighted the critical areas where my research should focus in detail: the map enactment and the how the final decision emerged from it. Furthermore, this analysis generated additional questions that had not been explored clearly in the literature:

1. When and how do the maps become epistemic objects? To understand this I was faced with the challenge of trying to understand how and when the individual informants became members of the collective, and how and when the collective began to interact and attribute meaning and knowledge to the emerging map on the board?

2. The map construction animated informants as was evidenced by the increased volume and the intensity of discussion. As there seemed to be

limited evidence of affective conflict among the informants in the cases, I wanted to find out what was the relationship between cognitive conflict that was clearly evident from the intensity of discussion and debate during the map enactment process, and affective conflict.

3. Individual informants justified the final group decision by articulating the decision in their own words and using the map as a reference point. This indicated that there was high degree of usage of the collectively enacted artifact that led into a high degree of individual buy-in to the collectively made decision. This opened up a question what was the relationship between the enactment of the causal map and the decision acceptance by individual informants.

In order to gain a deeper understanding of the map enactment process both within and across the cases, and seek answers to these additional questions, I moved to the second level of analysis by developing a coding scheme that I could apply across all cases. The development of the coding scheme and the resultant analysis are presented in the section below.

5.4 CODING DEVELOPMENT AND ANALYSIS

In order to gain a deeper understanding of map enactment and answer the additional questions that emerged from the first round of analysis I set out to develop a coding scheme. To develop such a coding scheme I initially circled back to the literature on decision-making processes that was discussed in the literature review of the thesis. In addition, I referred to mapping practices discussed in strategy-as-practice literature (Jarzabkowski, 2005; Jarzabkowski and Seidl, 2008), coding practices for management team interactions (Beck and

Fisch, 2000; Currall et al., 1999; Liu and Maitlis, 2014), methodological literature on seeking qualitative rigor in inductive research (Gioia et al., 2013), and how to present empirical evidence in inductive theory building (Eisenhardt and Graebner, 2007).

Examples of strategic decision-making coding categories in the literature included issue initiation, proposition making, counter-proposing, elaborating activity, information seeking and giving, voting, agreeing, rejecting, and selecting and deselecting a proposal (Liu and Maitlis, 2014). Although these categories seemed very general and generic they nevertheless provided top-level behaviors to focus on initially when I commenced the development of a coding scheme.

The rich video data lends itself well to the analysis of naturally occurring human interactions from multiple perspectives: (1) the map enactment activity by individual informants and informant groups, (2) discourse, and (3) displayed emotion. Discourse analysis has been the default option in strategy-as-practice literature but this focus has neglected the role of epistemic objects as material artifacts in strategizing (Jarzabkowski and Seidl, 2008). Therefore, the way epistemic objects interact with human activity has remained a relatively unexplored area (Werle and Seidl, 2015) and my coding scheme focused in gaining a better understanding of this interaction. In order to address this shortcoming in the literature, my effort was to observe the behaviors and the interplay of the informant group members among themselves, as well as members of a collective and the map enactment.

Displayed emotion is an additional lens to analyze the data. Recent work on emotion in strategy making has been conducted by Liu and Maitlis (2014). I did not make this the focus of my research although I refer to displays of emotion

in terms of cognitive and affective conflict. The reason for the exclusion of emotion from the research frame is justified on the basis that the literature that focuses on this aspect of strategy-making is derived from studies of micro-behaviors of informants often carried out in controlled laboratory environments or through close micro-observational techniques. Such analysis employs microethnography that involves the microscopic analysis of recorded pieces of human activities and interactions (Streeck and Mehus, 2005). However, displays of emotion are situated in discourse in general (Mangham, 1998) and they are present in strategy discourse in particular as they are embodied and conveyed in discursive acts (Perinbanayagam, 1991). To isolate emotion in strategic activity, although a valuable lens to gain further insight into strategizing, would necessarily exclude the map enactment process by the individual informants and the collective beyond that of the emotional content.

In terms of presenting empirical findings Eisenhardt and Graebner (2007) suggest that although it is not generally realistic to support every theoretical proposition with every case within the text itself, the use of extensive tables and other visual devices that summarize the related case evidence are central to signaling the depth and detail of empirical grounding. These construct tables summarize the case evidence and indicate how the focal construct is "measured," thus increasing the "testability" of the theory and creating a particularly strong bridge from the qualitative evidence to theory-testing research (Eisenhardt and Graebner 2007: 29). Adopting this approach my coding analysis is articulated in tables such as the codebook (Table 6) and the across-case analysis (Table 10) that will be presented later.

5.4.1 CODING SCHEME

I developed a coding scheme by using Atlas.ti qualitative analysis software package. I transferred video data into Atlas.ti and began the coding development by identifying 'key moments' of activity during the mapping process for each video case. I paid particular attention to the individual and group dynamics in the map enactment process.

Guided by the top-level coding categories derived from the literature on decision-making, e.g. issue initiation, proposition making, counter-proposing, elaborating activity, information seeking and giving, voting, agreeing, rejecting, and selecting and deselecting a proposal, I developed summative and essence-capturing codes for each of the video cases. The resulting codes were more detailed and nuanced in their description compared to the above-mentioned top-level coding categories thus giving added insight into the map enactment by the informants.

I used process coding, or action coding, to analyze the video case data. Process coding uses gerunds to connote action in the data. Charmaz and Belgrave (2002) point out that general conceptual action such as negotiating, struggling etc. can be coded as such through process coding. Process coding is considered particularly appropriate for qualitative studies that search for "ongoing action/interaction/emotion taken in response to situations, or problems, often with the purpose of reaching a goal or handling a problem" (Corbin and Strauss, 2008, pp. 96-7).

At the next stage of the analysis I wrote comments for each of the codes, gerunds, to describe the action and interaction between the group informants and the emerging map across all the video cases. I then circled back to the data

and added additional codes and comments until I reached saturation with my coding. Finally, I reviewed all the codes and their descriptors across all the cases and distilled them into common codes and descriptors that accurately reflected the activity across the cases. Table 5 below summarizes the analytical steps in coding development.

Table 5 – Analytical steps of coding development

Analytical steps	Activity description
Transfer video into Atlas.ti.	Transfer video into the qualitative analysis package that allowed coding development in situ.
Assign codes to video data.	Process coding was used to connote activity in the video data for each case. Coding for each case was carried out until a saturation of codes was reached.
Code definition.	Developed descriptors for each of the codes.
Initial coding of the cases.	The initial coding produced the following number of codes per individual case: Blackhawks – 54 Bruins – 27 Ducks – 33 Flyers – 33 Oilers – 19 Rangers – 43 Wolverines – 47
Code review.	Reviewed the codes and their descriptors for each case. Distilled codes and their descriptors into common codes that reflected the activity across the cases. Generated 23 unique codes.

A total of 23 unique codes were identified across the video cases.   These final codes were distilled from the total code list across the cases as per the

above table. Much of the coding that was eliminated was redundant duplicate coding of the same activity.

The resulting codebook is presented in the Table 6 below. The table lists 23 unique codes including sitting and standing, their descriptions and the frequency of occurrence across and within all the cases. The higher the frequency of occurrence of a specific code within the cases demonstrates a higher level of code specific activity in that particular case. The final row of the table provides the sum total for the frequency of coded activity for all cases jointly and on the individual case basis. However, it should be noted that coding is a subjective activity that may be subject to researcher bias. Hence, other coders could identify and assign more or fewer coding frequencies in the cases. Nevertheless, as the following analysis demonstrates, the code frequencies in my data allows for significant similarities and differences to emerge between the cases

Table 6 - Codebook

Data specific codes	Description	Total frequency of occurrence	Frequency of occurrence (Rangers)	Frequency of occurrence (Flyers)	Frequency of occurrence (Ducks)	Frequency of occurrence (Bruins)	Frequency of occurrence (Oilers)	Frequency of occurrence (Blackhawks)	Frequency of occurrence (Wolverines)
Idea generating. - Sitting. - Standing.	Ideas are generated individually to start with while sitting at the table.	7	1	1	1	1	1	1	1
	New ideas are added onto the map as the map construction progresses. At this stage informants are standing at the board.	11	3	1	2	1	-	2	2
Problem defining.	Initial problem defining takes place at the beginning of the mapping process.	18	2	2	1	3	1	5	4
Hesitating.	Hesitation to get started with the mapping.	5	-	1	-	1	1	1	1
	Hesitating to stand up from the table and start posting notes on the board.	5		1		1	1	1	1
Facing each other.	Predominately addressing each other face to face. (The informants face each other less frequently as the mapping progresses. More attention is focused at the map and discussion is carried out between informants facing the map.)	14	2	1	1	1	3	5	2
Constructing.	Constructing the map together, adding new notes as new ideas emerge, moving notes to new locations, drawing connectors between notes and using laddering to think about consequences.	41	8	4	6	7	2	8	6

Data specific codes	Description	Total frequency of occurrence	Frequency of occurrence (Rangers)	Frequency of occurrence (Flyers)	Frequency of occurrence (Ducks)	Frequency of occurrence (Bruins)	Frequency of occurrence (Oilers)	Frequency of occurrence (Blackhawks)	Frequency of occurrence (Wolverines)
Facing the map.	The group is engaged with the map, facing it. (This activity is demonstrated by informants pointing at the map, facing the map, rather than each other. This behavior becomes pronounced when the groups are fully engaged with the mapping.)	46	8	4	6	6	3	10	9
Engaging.	There is simultaneous discussion and construction of the map. This activity is combined with a noticeable increase in the volume of discussion.	36	8	2	6	6	1	5	8
Non-engaging.	An informant who either withdraws from a group or does not make a contribution to the group discussion or the mapping process.	5	-	-	-	1	-	4	-
Discussing	A free flowing discussion about how to go about constructing the map and the emerging issues.	36	8	3	5	4	2	4	10
Reflecting	Once the map begins to take shape informant groups fall silent and reflect on the map. After reflection groups begin discussing the map again and may add additional notes and generate new ideas. (This activity is demonstrated by iterative behavior of map enactment – reflection – map enactment etc.)	25	6	1	3	4	1	5	5
Dominating.	An individual informant dominates the discussion	9	1	-	2	2	2	-	2

Data specific codes	Description	Total frequency of occurrence	Frequency of occurrence (Rangers)	Frequency of occurrence (Flyers)	Frequency of occurrence (Ducks)	Frequency of occurrence (Bruins)	Frequency of occurrence (Oilers)	Frequency of occurrence (Blackhawks)	Frequency of occurrence (Wolverines)
	and/or takes over the mapping.								
Consulting.	A dominant informant asks other informant group members for their views.	7	3	-	2	-	-	-	2
Contrasting.	The informants compare and contrast the positive and negative factors that relate to the decision problem by pointing at them on the map.	13	3	1	2	2	-	1	4
Clarifying.	As the map enactment is an iterative process the map is used to clarify the thinking of the group. (This behavior is demonstrated by informants asking the others to clarify their thinking by pointing at the map and making statements and asking questions.)	24	7	-	3	4	-	3	6
Explaining.	Explaining is a part of the construction process as informants explain and often point at their knowledge claims on the map and how they fit into the overall map construct.	27	6	3	3	3	1	4	7
Agreeing.	Informants use the map to agree to the claims made on the map by pointing at the map and notes.	10	2	-	2	1	-	2	3
Disagreeing.	Voicing objections to different views.	13	2	3	-	1	-	5	2
Deciding.	The informant groups cycle between agreeing, contrasting, clarifying, and justifying once the map has	14	2	-	3	2	-	5	2

Data specific codes	Description	Total frequency of occurrence	Frequency of occurrence (Rangers)	Frequency of occurrence (Flyers)	Frequency of occurrence (Ducks)	Frequency of occurrence (Bruins)	Frequency of occurrence (Oilers)	Frequency of occurrence (Blackhawks)	Frequency of occurrence (Wolverines)
	been finalized before reaching a final decision with the aid of the map.								
Finalizing the map	The map has been constructed and the informants are beginning to run out of ideas. Claims on the map are agreed upon, contrasted, clarified, and justified	7	1	1	1	1	1	1	1
Justifying.	The map is used by informants to justify the decision by pointing at the map. (This occurs at various stages of the mapping process but most clearly at the decision stage.)	13	3	1	-	3	-	2	4
Voting.	Group takes a vote on the decision outcome by the show of hands.	3	-	-	-	1	1	1	-
Total	**All coded activity frequency.**	**389**	**76**	**30**	**49**	**56**	**21**	**75**	**82**

Coding is a subjective activity, and as was already stated, different researchers may assign more or fewer code frequencies, or even develop different codes to the activities in the cases other than the ones I developed in the codebook. However, the code frequency calculation in the above table indicates that the cases could be examined in sub-groups based on their differing levels of activity. This type of analysis is in line with Bourgeois and Eisenhardt (1988) research where the researchers assigned cases into various categories revealing both patterns of within-group similarity and across-group differences. The three sub-groups based on similar coded activity frequency are presented in the Table 7 below.

Table 7 – Sub-groups based on coded activity frequency

Group	Code activity frequency
Blackhawks	75
Rangers	76
Wolverines	82
Ducks	49
Bruins	56
Oilers	21
Flyers	30

The table shows that three groups, e.g. Blackhawks, Rangers, and Wolverines exhibited the most coded activity and Oilers and Flyers the least activity. Ducks and Bruins fell between these other groups with a medium level of activity. In order to undertake the analysis to gain insight to these three groups I first needed to produce a conceptual map of the map enactment process

for the cases as a whole and develop a detailed analysis of each of the cases within the code categories. This analysis allowed me to identify unique patterns for each case that would then allow across-case comparisons on a sub-group basis.

5.4.2 CONCEPTUAL MAP

With a large number of codes the challenge I had was to produce a conceptual map of the map enactment process across all the cases. Using Atlas.ti conceptual mapping facility I produced a detailed map of the map enactment at an aggregate level. I linked the 23 codes with connectors to show their relationship with each other. The map is included as Appendix V in the thesis. It should be noted that the shortcomings of Atlas.ti emerged at this stage as the titles of connectors between the code nodes were preprogrammed into the software and they could not be changed. However, the software allowed me to create a visual model of the map enactment process and undertake a basic manipulation of nodes to show how the mapping activity evolved from initial idea generation to the final decision making stage.

In order to give the conceptual map further clarity I redrafted the conceptual map from the Atlas.ti generated map by retaining the 23 codes but changing the descriptors and links of the connectors to more accurately reflect the map enactment process. This redrafting was derived from the video evidence for the cases. The revised conceptual map is presented in Figure 5 below.

FIGURE 5 – CONCEPTUAL MAP
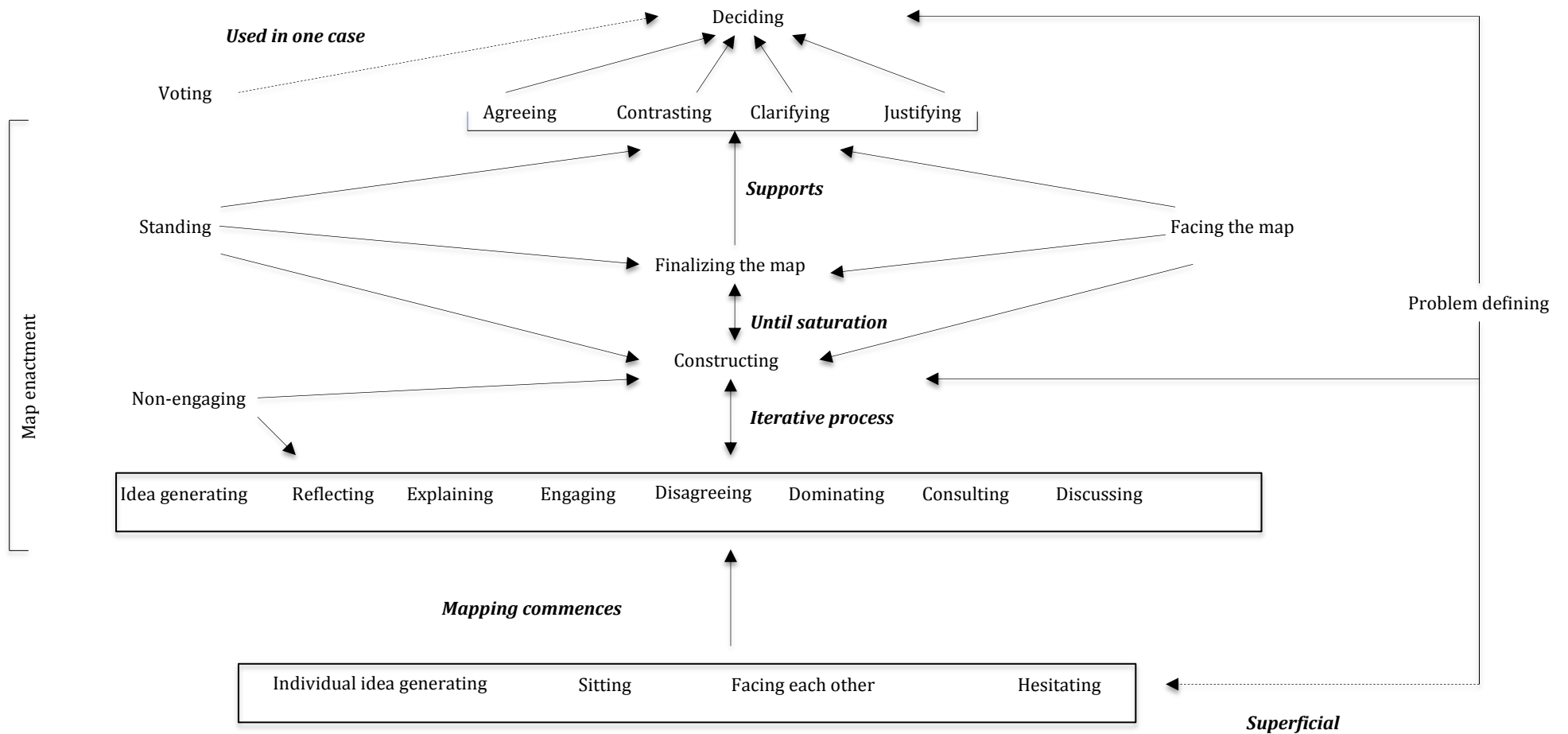
The conceptual map shows the intense activity that results once the informant groups started engaging with the map enactment on the board. As I pointed out earlier in Section 5.3, the overview of the map enactment process, some informant groups had to be prompted to commence mapping on the board and stand up from the table where they had generated ideas individually. The data also showed that group discussion regarding the mapping and problem definition was muted, superficial, and hesitant when the informants sat around the table addressing each other face to face. The retrospective reflections of the mapping process revealed that the groups that were prompted to commence mapping commented that they found getting started with the mapping difficult. An informant from Wolverines stated:

"We usually have meetings and make decisions sitting around the table…. sometimes somebody may use a flipchart to make bullet points while others sit around."

An informant from Oilers echoed this view:

"We always meet to discuss case studies in the library…we sit around and make notes on either laptop or notepads…."

These comments indicate that most groups were used to working by sitting around a table and either making notes individually or appointing a note taker. Hence, having to stand up and engage in collaborative work on a real-time basis creating a visual epistemic object was a novel approach to working for these informant groups.

Besides for being a novel way of working could the hesitancy by the groups who had the least experience with mapping to get stared with the

mapping be explained that mapping is a skilled activity that needs to be learned for it to be used effectively as decision-making tool-in-use? Mapping as a skilled activity was highlighted by Ambrosini (2001) in her research into tacit organizational routines. Some case evidence may suggest that mapping is a skilled activity. An informant from Blackhawks reflected that the reason for the group's initial hesitancy to get started with the mapping was for not knowing how to get started with the map enactment. He stated:

"We understood to mapping concept but we did not really understand how we could get started with it."

This may well have been the case, but once Wolverines began the map enactment process they became the most active group with code activity frequency of (81) although none of the group members had any previous experience in causal mapping.   Furthermore, Blackhawks had no previous experience with mapping and they were the third most active group with code activity frequency of (75). This indicates that although previous experience with mapping may remove the initial hesitancy to get started using the mapping tool, it can be learned quickly through trial and error as long as the concept of mapping is understood.

Once the mapping got underway, informants in active mapping groups began engaging with the mapping process. The map enactment was an iterative activity and the decision problem was defined and redefined throughout the map enactment process until the mapping activity reached its natural saturation. The map enactment was characterized by intense discussion, explaining, reflection, new idea generation, and continuous problem refinement. Cognitive conflict was

evident from knowledge claims and counterclaims made by the informants, but there was limited evidence of affective conflict apart from the case of Blackhawks. The two male informants in Blackhawks disagreed over the decision outcome and this conflict seemed to spill into an affective conflict. However, it is noteworthy that the conflict between the two informants did not result in a face-to-face confrontation but both informants addressed the map with their conflicting opinions. It should be noted, however, that this conflict was probably spurred on by one of the male informants who was negatively disposed to the mapping from the beginning of the exercise. He reflected at the end of the mapping session that *"mapping was a waste of time, as I could have made the decision in ten minutes myself,"* a view that was challenged by other informants during the retrospective reflection of the mapping session.

This same male informant also stated to the group during the map enactment that he had previous work experience in banking and finance and hence he knew how lending decisions were made. He promoted a positive lending decision, which would have produced a 'wrong' answer to the teaching case. Furthermore, it was interesting to observe that this informant was the least engaged informant in the group having made up his mind about the 'correct' decision outcome from the outset.

There was little evidence of an emergence of a dominant informant who unduly controlled the mapping process in groups that demonstrated a high level of mapping activity. Dominant informants emerged in Ducks and Bruins, but this did not seem to have a significant impact on the level of cognitive conflict in

these teams. All members felt comfortable making knowledge claims and remained fully focused on the map enactment.

The case data supports the argument that causal maps are epistemic objects. Table 8 below is an extract from the codebook (Table 6) that shows the code frequencies for what can be described as knowledgeable activities that the map enactment animated in informants. These activities accounted for 61% of all data specific codes.

Table 8 – Sub-groups based on coded activity frequency

Data specific codes	Description	Total frequency of occurrence
Constructing.	Constructing the map together, adding new notes as new ideas emerge, moving notes to new locations, drawing connectors between notes and using laddering to think about consequences.	41
Engaging.	There is simultaneous discussion and construction of the map. This activity is combined with a noticeable increase in the volume of discussion.	36
Discussing	A free flowing discussion about how to go about constructing the map and the emerging issues.	36
Reflecting	Once the map begins to take shape informant groups fall silent and reflect on the map. After reflection groups begin discussing the map again and may add additional notes and generate new ideas. (This activity is demonstrated by iterative behavior of map enactment – reflection – map enactment etc.)	25
Clarifying.	As the map enactment is an iterative process the map is used to clarify the thinking of the group. (This behavior is demonstrated by informants asking the others to clarify their thinking by pointing at the map and making statements and asking questions.)	24
Explaining.	Explaining is a part of the construction process as informants explain and often point at their knowledge claims on the map and how they fit into the overall map construct.	27
Agreeing.	Informants use the map to agree to the claims made on the map by pointing at the map and notes.	10
Disagreeing.	Voicing objections to different views.	13
Deciding.	The informant groups cycle between agreeing, contrasting, clarifying, and justifying once the map has been finalized before reaching a final decision with the aid of the map.	14
Justifying.	The map is used by informants to justify the decision by pointing at the map.	13
Total	**All coded activity frequency.**	**239**

Once the maps began to emerge on the board they became vested by knowledge claims posted by informants and the maps became vested by individual and collective knowledge. When informants had posted their initial

notes on the board they began discussing the map and posting additional knowledge claims on new notes on the board and their attention became increasingly focused at the map. This was a significant moment in map enactment as informants began facing the map instead of each other; they began moving notes on the board, and adding new notes to make a greater sense of the decision problem. This moment was further characterized by the informants becoming physically more connected by congregating in a tight-knit group around the map. This is evident from Exhibit 10 below.

Exhibit 10 – A closely-knit group in front of the map

Moreover, arguments and counterarguments were directed at the map, instead face-to-face. It can be theorized that in addition of emerging as an epistemic object, the map became a type of a 'safety net' that made informants feel comfortable to express their opinions at the map without feeling intimidated by having to address co-informants directly. The map also became a type of a 'shock absorber' that allowed informants to engage in a free expression of

opinions and robust debate. These finding are supported by the male and two female Bruins informants who reflected at the end of the mapping session that in mapping:

"You can push your own view in a polite way;"

"Allows you to write down your own opinions and you don't feel isolated with your opinions because they blend in with the others;"

"It's easier to communicate as the others don't focus on you so that you don't have to aggressively defend your own view;"

The final decision emerged once mapping had reached its saturation without any additional notes being posted or connectors drawn between the notes. At this stage the decision problem was revisited and informants took turns in articulating and clarifying the decision problem and reiterating the agreed decision in their own words using the map as a decision support aid or an aid memoir. The decision that was made seemed to represent the most creative decision possible within the confines of the "John Hamond at First National Bank" teaching case study as the consequences of the alternative decisions had been laddered during the map enactment. It can be theorized that the map enactment process created significant individual and group buy-in to the final decision outcome as informants had jointly and severally engaged in the map enactment by making their own knowledge claims being made visible on the board and they had been discussed collectively. Hence, the map enactment by the decision-making groups seemed to increase decision acceptance as a result of the effort that was expended on the creation of the map.

Finally, Table 9 below lists the pros and cons of mapping that I noted down in my flied notes and gleaned from the retrospective reflections by the informant groups at the end of the mapping sessions.

Table 9 – Pros and cons of mapping

Advantages of mapping	Disadvantages of mapping
Mapping allows different perspectives to emerge.	Difficult to know how to get started with mapping in practice.
Mapping allows new ideas to emerge.	Mapping is messy.
The visualization of the knowledge claims reduces confusion.	Mapping is time consuming.
The map allows new scenarios to be identified.	Mapping can be confusing, especially at the beginning.
Mapping helps with problem visualization.	Mapping represents a new way of working that is contrary to the established norm.
The mapping of the consequences of decision alternatives allows creative solutions to emerge.	
Mapping allows one's opinions to be posted for discussion.	
Mapping makes communication easier as the group's focus is on the map.	
Mapping forces people to work together.	
Mapping allows own opinions to be 'pushed' gently.	
Mapping reduces the need to aggressively defend one's own opinion as the knowledge claim has been posted.	
Mapping is a non-judgmental as the focus is on the map, not the individual.	
Mapping allows with the arriving to and agreeing with the conclusion.	

The advantages and the disadvantages of mapping are in line with previous research on the characteristics of effective mapping by Eden and Ackermann (2010). However, although mapping is messy and all informant groups had trouble deciding on the mapping mechanics from the outset and some groups had difficulty to get started with the mapping, once the mapping got

underway the groups seemed to master the mapping logic quickly through trial and error. Additional advantages of mapping by the informant groups in my research indicate that mapping increases cognitive conflict, but it does not spill into affective conflict. Moreover, apart from one informant group, all groups that were able to come to a decision rejected the deal. As the teaching case "John Hamond at First National Bank" was written as an escalation of commitment bias case with a 'correct' answer to reject the deal, the evidence offers some support that causal mapping eliminates managerial biases including groupthink.

Finally, as the coding analysis and informant reflections indicate causal maps are epistemic objects and that the activity that informants undertake in map enactment results in a high degree of cognitive conflict, but it does not spill into affective conflict as the maps act as a 'shock absorber' and a 'safety net.' The map enactment results in a high level of decision acceptance of the final decision outcome as all informants individually and collectively have a stake in the map construction. This is a result of the informants' own knowledge claims having been made visible on the map and having received due collective consideration during the map enactment process and the effort that was expended on the map enactment by informants individually and collectively may produce further commitment to the decision outcome.

The next section takes a closer look at the across-case similarities and differences to gain a yet deeper understanding to the mapping. This analysis is required for the final theoretical development of the research.

5.4.3 ACROSS-CASE ANALYSIS

This section presents a detailed analysis of the codes across the cases. Data is presented in the Table 10 below. In order to facilitate across-case analysis, the cases are presented in a sub-groups based on the frequency of activity occurrence as outlined in Table 7 eralier. Data manipulation on a sub-group basis is undertaken to gain a deeper understanding of the key themes that allow maps to emerge as an effective decision making tool-in-use. Informant centric codes are collated into aggregate dimensions in Table 10 that allows proposition development for future research.

Table 10 – Across-case analysis

Data specific codes	Description	Blackhawks	Rangers	Wolverines		Ducks	Bruins		Oilers	Flyers
Idea generating. - Sitting. - Standing.	Ideas are generated individually to start with while sitting at the table. New ideas are added onto the map as the map construction progresses. At this stage all informants are standing at the board.	The group did not add new notes during the map construction but decided to create another map on a separate sheet of paper that replaced the original map.	New notes were added throughout the mapping process.	New notes were added throughout the mapping process.		New notes were added throughout the mapping process. Additional notes were written on the board by hand.	No new notes were added onto the board but some notes were written on the board by hand.		Limited idea generation and limited mapping. The group remained sitting most of the time. No new notes were added during the map construction.	Limited idea generation and limited mapping. The group remained sitting most of the time until the group decided to split into pairs and undertake a devil's advocate approach. One of the sub-groups stood at the board and added notes during the mapping process.
Problem defining.	Initial problem defining takes place at the beginning of the mapping process. Problem definition is revisited at the deciding stage at the end of the mapping process.	Limited initial problem definition beyond pros and cons of the binary decision. The problem was redefined especially after the second map as constructed replacing the initial map on the board. Explored ways of making the deal work.	Limited initial problem definition. The problem definition was defined and redefined throughout the mapping process. Explored ways of making the deal work.	Limited initial problem definition. The problem definition was defined and redefined throughout the mapping process. Explored ways of making the deal work.		Limited initial problem definition. The problem definition was defined and redefined throughout the mapping process. Explored ways of making the deal work.	Limited initial problem definition. The problem definition was defined and redefined throughout the mapping process. Explored ways of making the deal work.		Limited initial problem definition. Limited reference to the problem during the mapping process.	Limited initial problem definition. Limited reference to the problem during the mapping process.

Data specific codes	Description	Blackhawks	Rangers	Wolverines		Ducks	Bruins		Oilers	Flyers
Hesitating.	Hesitation to get started with the mapping. Hesitating to stand up from the table and start posting notes on the board.	Hesitant start to mapping.	No hesitation to get started with mapping.	Limited hesitation to get started with mapping.		Limited hesitation to get started with mapping.	Limited hesitation to get started with mapping apart from one informant.		Hesitant start to mapping.	Hesitant start to mapping.
Facing each other.	Predominately addressing each other face to face. This activity becomes less frequent as the mapping progresses.	Focus on the map construction became more pronounced when the new map was constructed on a separate piece of paper.	Limited face to face discussion beyond the initial stages of the mapping process.	Limited face to face discussion beyond the initial stages of the mapping process.		Some face-to-face discussion throughout the mapping process.	Limited face to face discussion beyond the initial stages of the mapping process.		Mainly a face-to-face discussion sitting at the table.	Mainly a face-to-face discussion sitting at the table.
Constructing.	Constructing the map together, adding new notes as new ideas emerge, moving notes to new locations, drawing connectors between notes and using laddering to think about consequences.	Effectively constructed three maps: initial map on board and a map on the piece of paper that was transferred onto the board and added to.	Intense map construction activity.	Intense map construction activity.		Mapping was mainly taken by one individual but in consultation with other informants.	Intense map construction activity.		Limited map construction.	Limited map construction especially by one pair. The other pair did engage with map construction.
Facing the map.	The group is engaged with the map, facing it. Individual informants point to the map and do not address each other face to face. This behavior becomes pronounced when the groups are fully engaged with the mapping.	This was pronounced as three maps were constructed.	Very pronounced.	Very pronounced.		Very pronounced at times, but as two informants sat at the table they group did turn to face them at times.	Very pronounced.		Limited.	Limited.
Engaging.	There is simultaneous discussion and construction of the map taking place. There is a noticeable increase in the volume of discussion.	After a hesitant start three of the four informants became fully absorbed with map construction and debate.	Very pronounced.	Very pronounced.		Very pronounced.	Very pronounced.		Limited.	Limited.

Data specific codes	Description	Blackhawks	Rangers	Wolverines		Ducks	Bruins		Oilers	Flyers
		A noticeable increase in volume.								
Non-engaging.	An informant who either withdraws from a group or does not make a contribution to the group discussion or the mapping process.	One informant was negatively disposed to the mapping exercise and did not fully engage with the mapping having decided independently what the solution should be. (To lend, contrary to the 'right' answer to the case.	None.	None.		Two informants remained seated throughout the mapping process. They had not previously participated in mapping.	One informant was quiet and did not make much of a contribution probably due to language issues. However, she explained the map and the decision at the end.		None.	None.
Discussing.	A free flowing discussion about how to go about constructing the map and the emerging issues. This is also an activity that incorporates disagreements, consultation, and further problem definition.	Initially no discussion how to map but this became an issue when the new map was constructed. Lively discussion among three informants.	Some discussion how to undertake mapping. Intense discussion.	Limited discussion how to undertake mapping. Intense discussion.		Limited discussion how to undertake mapping. Intense discussion.	Limited discussion how to undertake mapping. Intense discussion.		Some discussion how to undertake mapping. Limited discussion.	Some discussion how to undertake mapping. Limited discussion.
Reflecting.	Once the map begins to take shape informant groups fall silent and reflect on the map. After reflection groups begin discussing the map again and may add additional notes and generate new ideas.	Construction-reflection-construction	Construction-reflection-construction	Construction-reflection-construction		Construction-reflection-construction	Construction-reflection-construction		Limited reflection.	Limited reflection.
Dominating.	An individual informant dominates the discussion and/or takes over the mapping.	No dominant informant.	No dominant informant.	No dominant informant.		Dominant informant who mainly held onto the marker pen.	Dominant informant but consultative.		Dominant informant who had previous experience in mapping. Led the discussion but did not encourage the	No dominant informant.

Data specific codes	Description	Blackhawks	Rangers	Wolverines		Ducks	Bruins		Oilers	Flyers
									group to undertake mapping.	
Consulting.	A dominant informant asks other informant group members for their views.	Not relevant.	Not relevant.	Not relevant		Yes.	Yes.		Yes.	Not relevant.
Contrasting.	The informants compare and contrast the positive and negative factors that relate to the decision problem by pointing at them on the map.	The binary decision, pros, and cons were discussed and pointed at on the map.	The binary decision, pros, and cons were discussed and pointed at on the map.	The binary decision, pros, and cons were discussed and pointed at on the map.		The binary decision, pros, and cons were discussed and pointed at on the map.	The binary decision, pros, and cons were discussed and pointed at on the map.

The group expanded the solution search beyond the binary decision. | | Limited interaction with the map. | Limited interaction with the map. |
Clarifying.	As the map enactment is an iterative process the map is used to clarify the thinking of the group. This is behavior is for informants to clarify the thinking of others by pointing at the map and making statements and asking questions.	Clarifying of thinking was through the creation of multiple maps.	This activity continued through the whole map enactment process.	This activity continued through the whole map enactment process.		This activity continued through the whole map enactment process.	This activity continued through the whole map enactment process.		Limited.	Limited.
Explaining.	Explaining is a part of the construction process as informants explain and often point at their knowledge claims on the map and how they fit into the overall map construct.	Explaining was accompanied by pointing to the notes on the map.	Explaining was accompanied by pointing to the notes on the map.	Explaining was accompanied by pointing to the notes on the map.		Explaining was accompanied by pointing to the notes on the map.	Explaining was accompanied by pointing to the notes on the map.		Limited.	Explaining was accompanied by pointing to the notes on the map for one sub-group. The other group's map was not developed beyond a few notes and not referred to in explaining.
Agreeing.	Informants use the map to agree to the claims made on the map by pointing at the map and notes.	Agreement was accompanied by pointing at notes on the map.	Agreement was accompanied by pointing at notes on the map.	Agreement was accompanied by pointing at notes on the map.		Agreement was accompanied by pointing at notes on the map.	Agreement was accompanied by pointing at notes on the map.		Map was not used for this.	Map was not used for this.

Data specific codes	Description	Blackhawks	Rangers	Wolverines		Ducks	Bruins		Oilers	Flyers
Disagreeing.	Voicing objections to different views.	Pronounced conflict between the two male informants that spilled into an affective conflict. Arguments were made by pointing at the map.	Arguments were made by pointing at the map.	Arguments were made by pointing at the map.		Arguments were made by pointing at the map.	Arguments were made by pointing at the map.		Limited disagreement.	Disagreement resulted from the group using devil's advocacy approach. This resulted in a disagreement that could not be reconciled in the end.
Deciding.	The informant groups cycle between agreeing, contrasting, clarifying, and justifying once the map has been finalized before reaching a final decision with the aid of the map.	Limited review of the map in the end and a vote was suggested but not acted on.	Yes.	Yes.		Yes.	Yes.		No.	Could not make a decision.
Finalizing the map.	The map has been constructed and the informants are beginning to run out of ideas. Claims on the map are agreed upon, contrasted, clarified, and justified	Limited evidence of final justification.	Yes.	Yes.		Yes.	Yes.		No real evidence of this.	No real evidence of this.
Justifying.	The map is used by informants to justify the decision by pointing at the map. This occurs at various stages of the mapping process but most clearly at the decision stage.	Occurred during the map enactment but little evidence of this at the end of the mapping process.	Decision justified by using the map as a reference. Individual informants articulated the decision individually using the map as a reference.	Decision justified by using the map as a reference. Individual informants articulated the decision individually using the map as a reference.		Decision justified by using the map as a reference. Individual informants articulated the decision individually using the map as a reference.	Decision justified by using the map as a reference. Individual informants articulated the decision individually using the map as a reference.		No reference made to the map in decision justification.	No decision was made and no reference to the map was made.
Voting.	Group takes a vote on the decision outcome by the show of hands.	Voting was suggested but not acted upon.	No.	No.		Voting took place after the decision had been made to check unanimity.	No.		Voting was suggested but not acted upon.	No.

The across-case analysis indicates that those groups e.g. Blackhawks, Rangers, and Wolverines that engaged fully in map enactment produced a more detailed map. In addition, in these groups there was evidence of more cognitive conflict, limited face-to-face discussion, alternative decision outcomes being debated, and there seemed to be a higher level of informant buy-in to the final decision outcome with the exception of the male informant in Blackhawks that was discussed earlier.

The emergence of a dominant informant in the case of Ducks and Bruins seemed not to have a negative impact on the group dynamic. This may have been a result of the individual informants having had the opportunity post their own knowledge claims on the board and having made an individual contribution to the emergence of the final map.

The groups with the least engagement with map enactment were Oilers and Flyers. Oilers remained seated around the table for most of the time and there was limited group engagement with mapping. The group made a decision after 10 minutes of debate and then decided to create a map to 'test' their decision outcome. One informant was allocated the task of posting notes on the board written down by the other informants. Another noticeable difference between Oilers and Flyers and the other informant groups was that the level of debate remained muted throughout. The pre-emptive decision that was taken by Oilers perhaps also muted debate, as the mapping could have been perceived as an unnecessary activity by the group. The informants in Oilers looked at the map on the board from time to time, but the map did not seem to become an integral part or the focus of the group's attention. Video data shows that the 10 minutes of discussion that preceded the decision was not animated or questioning of the

alternative decision outcomes, nor were the pros and cons of alternative decision outcomes debated.   Exhibit 11 shows the map enactment by Oilers and contrasting this to maps of the active groups in previous Exhibits 4, 7 and 9 the Oilers' map looks underdeveloped.

Exhibit 11 – An underdeveloped map

Flyers did not reach a decision as the group decided to divide itself into two sub-groups and apply devil's advocacy to the decision problem. Although one pair engaged with map enactment, the other pair remained seated at the table as is shown in Exhibit 12.

Exhibit 12 – Devil's advocacy mapping

In the end Flyers could not agree on the decision and one of the informants reflected at the end of the mapping session that *"there should have been an objective decision maker to make a decision based on our discussion."* Moreover, as both pairs in Flyers did not engage with the mapping together on the board, the level of discussion remained limited and muted throughout.
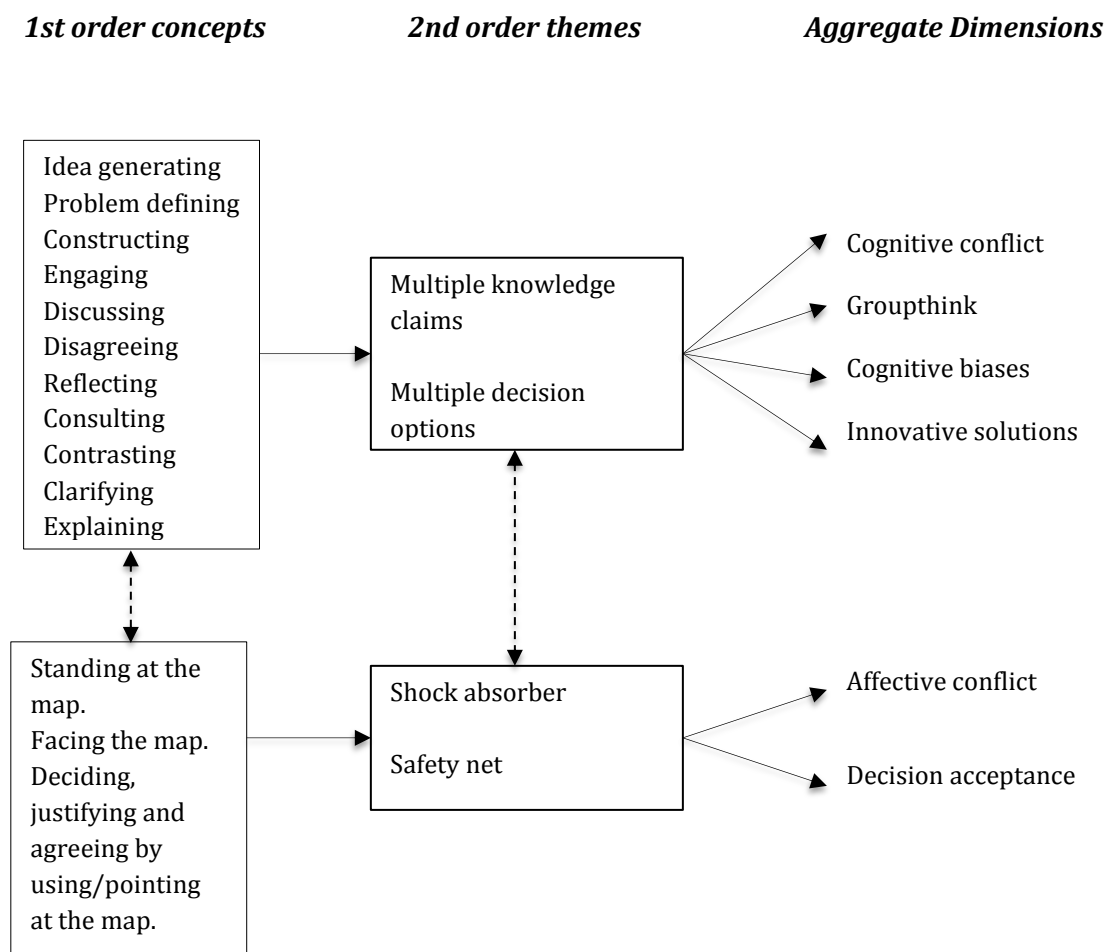
The across case analysis shows that in order for mapping to be used as an effective tool-in-use, decision-making groups have to engage in mapping collectively. In addition, remaining seated at the table acts as a barrier for effective map enactment that stifles the expression of competing knowledge claims, debate, and ultimately decision-acceptance and ownership.

5.5 THEORETICAL DEVELOPEMNT

The final stage of the analysis process is the development of aggregate dimensions from the 1st order informant centric codes and concepts and the 2nd order themes. This is in line with the Gioia et al. (2013) and Mantere et al.

(2012) approach to derive the theoretical realm of the research. Figure 7 outlines the emerging theoretical themes and dimensions. The resulting themes and aggregate dimensions in the Figure 6 below will be used as the basis for proposition development (Gioia et al., 2013).

Figure 6 – Theoretical themes and dimensions

1st order concepts   *2nd order themes*   *Aggregate Dimensions*

| Idea generating
Problem defining
Constructing
Engaging
Discussing
Disagreeing
Reflecting
Consulting
Contrasting
Clarifying
Explaining | Multiple knowledge claims

Multiple decision options | Cognitive conflict
Groupthink
Cognitive biases
Innovative solutions |
| Standing at the map.
Facing the map.
Deciding, justifying and agreeing by using/pointing at the map. | Shock absorber

Safety net | Affective conflict

Decision acceptance |

The 1st order concepts that were derived from informant centric codes have been amalgamated into two groups. One group comprises codes that are associated with the informants making and generating multiple knowledge claims and decision options. The second group includes coded activities where informants directly interact with the causal map while enacting it, and where the

causal map demonstrates the qualities of a shock absorber and a safety net. The connectors between the two groups of 1st and 2nd order concepts and themes indicate that the causal map as a shock absorber and a safety net are linked with the emergence of multiple knowledge claims and decision options generated by informants in interaction among themselves as well as the causal map as an epistemic object.

Comparing and contrasting my research findings with the relevant literature on group decision-making suggests that causal maps as epistemic objects in the collective decision-making context are associated with key group-decision making process issues of cognitive and affective conflict, groupthink, cognitive biases, decision acceptance, and innovative solution development. These issues are identified as aggregate dimensions in the above figure.

My research findings suggest that epistemic objects facilitate organizational actors to make sense of a problem situation, the map enactment enables decision-makers to surface multiple decision perspectives, elaborate and build on the emerging alternative knowledge claims, and create innovative, de-biased and shared outcomes to strategic problems. The map as a safety net allows informants to engage in robust debate and make competing knowledge claims visible. However, the causal map also acts as a shock absorber that moderates cognitive conflict and prevents it from becoming affective conflict between informants. This moderating impact may also improve the level of decision acceptance by informants (Nutt, 2002; Hodgkinson and Sparrow, 2002; Eden and Ackermann, 2010).

Gioia et al. (2013) and Eisenhardt (1989) suggest that good inductive theory building research should generate testable propositions for future

research. In order to achieve this I constructed a conceptual framework that presents the aggregate dimensions that were derived from the 1st order concepts and 2nd order themes. The theoretical construct in Figure 7 below is structured as five testable propositions that were revealed from my empirical research.

Figure 7 - Conceptual framework
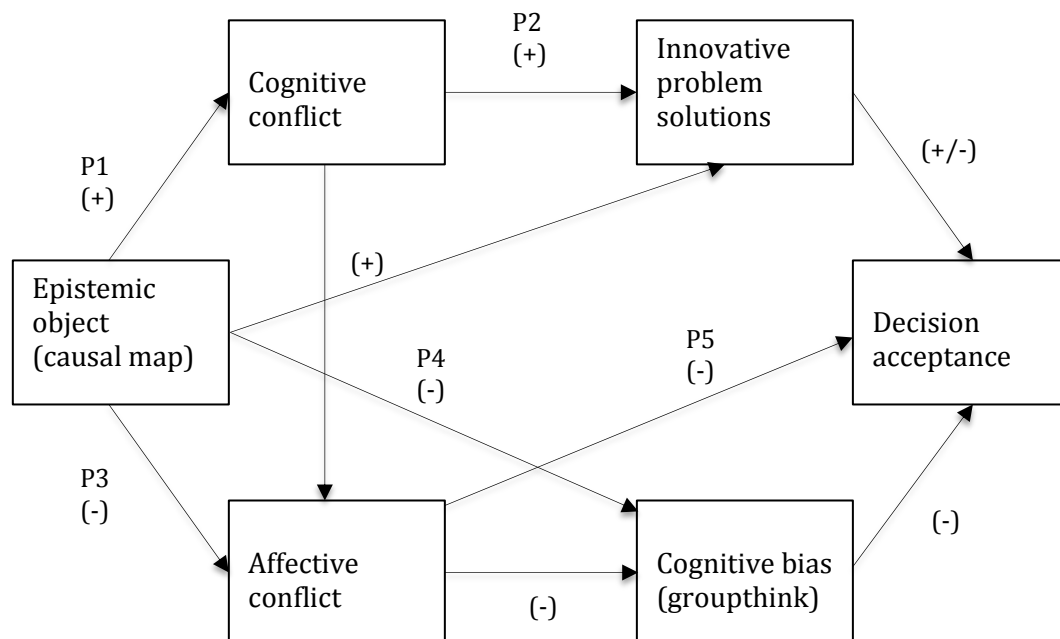
Five testable propositions are depicted in the above figure as follows:

P1 - The construction of an epistemic object as safety net in a collective decision-making context creates cognitive conflict that allows multiple perspectives to be surfaced and debated.

P2 - The construction of an epistemic object in a collective decision-making context results in innovative problem solutions.

P3 - The construction of an epistemic object as shock absorber in a collective decision-making context mitigates affective conflict.

P4 - The construction of an epistemic object in a collective decision-making context mitigates cognitive biases including groupthink.

P5 - The construction of an epistemic object in a collective decision-making context increases decision acceptance by the decision-making group members.

The conceptual map proposes that epistemic objects as a safety net increases cognitive conflict (P1) as multiple perspectives are surfaced and debated by informants. The enactment of epistemic objects such as causal maps may produce innovative problem solutions and insights (P2) as informants surface multiple perspectives and ladder the consequences of the various potential decision outcomes during the map enactment process. The conceptual map proposes that epistemic objects act as a shock absorber that absorbs conflict and allows ideas to be freely debated thereby reducing affective conflict (P3). It is proposed that mapping mitigates cognitive biases including groupthink as multiple perspectives are surfaced by informants in a decision-making situation that is characterized by the presence of cognitive conflict (P4). As epistemic objects act as a safety net and a shock absorber and as individual informants' knowledge claims are made visible for collective consideration during the map enactment process, it is proposed that epistemic objects such as causal maps increase decision acceptance by individual informants of the collectively made decision (P5).

To summarize, my inductive theory building research that was derived from multiple case studies provides us with new insight to how epistemic objects

are enacted, interpreted and used in a collective decision-making context. The case studies show how the decision-makers enacted, interpreted, and used causal maps to create new knowledge and meaning, and how this the shared meaning and knowledge evolved through map enactment to the final decision. The conceptual framework that was derived from rich qualitative data gives us a framework for future research to deepen our understanding of this dynamic interaction between the individual decision-makers, the decision-maker group, epistemic objects that mediate decision-making activity, and the impact this interaction may have on the quality of collective decision-making processes. My research contributions and future research directions are discussed in the next chapter.

CHAPTER VI: DISCUSSION AND CONTRIBUTION

My research was motivated by a call for practice-based research on how managers think, act, and interpret strategic decisions in practice (Nutt and Wilson, 2010), and advance our understanding of the 'stuff' of all kinds that strategy work entails (Whittington, 2007), a key concern of the strategy-as-practice perspective (Vaara and Whittington, 2012). Much of the practice-based research has emphasized the discursive nature of practice and neglected the role of epistemic objects as material artifacts in strategy making (Vaara and Whittington, 2012; Jarzabowski and Spee, 2009). Therefore, there is a "dearth of research into material artifacts and how they are engaged in strategizing" (Jarzabkowski, Spee, and Smets, 2012, p. 2). Consequently, the way epistemic objects interact with human activity in strategy making remains a relatively unexplored area (Jarzabowski and Kaplan, 2014; Werle and Seidl, 2015).

To address this research gap the primary research question was formulated as follows:

How do decision-making groups enact, interpret, and use epistemic objects such as causal maps to make sense and generate solutions to strategic decision problems?

A further set of questions emerged from the initial data analysis of the seven video recorded cases of the collective map enactment process. The sub-questions were articulated as follows:

- *How and when do the maps become epistemic objects?*

- *What is the relationship between cognitive conflict, affective conflict, and the causal map?*

- *What is the relationship between the enactment of the causal map and decision acceptance by individual informants?*

In order to discharge these questions I adopted a sociological eye to strategy work that enabled me to focus on the rich interactions within which the actors and strategy tools were engaged in strategizing (Whittington, 2007). The sociological eye encourages the researcher to pay close attention to strategy tools in the context they are used and make an attempt to understand the purposes for which they are applied, and their potential to produce an variety of outcomes, some of which may be unanticipated (Jarzabowski and Kaplan, 2015). Seeing strategy tools through the sociological lens and treating them as sociomaterial tools-in-use (Orlikowski, 2000; Orlikowski and Barley, 2001) shifts the discussion about strategy tools away from their characteristics as good or bad technologies to produce intended outcomes as 'technologies of rationality' (March, 2006) or tools of 'procedural rationality' (Simon, 1978) to a discussion that aims to gain a deeper understanding of how tools are used in strategy work in environments that are characterized by uncertainty and ambiguity. Stated differently, practice-based research from a sociological perspective is directed at understanding epistemic objects as tools-in-use that are fluid artifacts that, through their selection and application by particular actors in particular contexts, may produce a variety of outcomes for different stakeholders, including the degree of exploration provoked, resolution achieved, satisfaction with the process, discretion or competence of the actor, and routinization of the tool-in-use in organization's practice (Jarzabowski and Kaplan, 2015).

My research makes a theoretical contribution to knowledge by developing a conceptual framework how causal maps, as situated epistemic objects are

enacted, interpreted, and used as a sociomaterial decision-making 'tool-in-use' by actors in a collective strategic decision-making context. The study of epistemic objects as material artifacts in collective strategic decision-making offers a particularly interesting research context as strategic decision problems are characterized by complexity, ambiguity, decision-outcome uncertainty, and the importance of strategic decisions often requires a buy-in and agreement by a number of agents from various parts and across the organization (Hambrick, 1994).

Epistemic objects as situated material artifacts enable decision-makers make sense of complex decision problems and develop potential solutions to them. In addition, epistemic objects promote collaboration that motivates participants to work across organizational boundaries (Nicolini, Mengis, and Swan, 2012). To make sense and develop solutions to strategic problems, material artifacts are considered to have affordances that enable actors to engage in collaborative activity to negotiate meaning by creating platforms for discussion (Kaplan, 2011), engage in collective construction of new shared meaning (Stigliani and Ravasi, 2012), and appraise potential solutions to problems (Jarzabowski, Spee and Smets, 2013). My research builds on this literature by offering added insight how the enactment of causal maps without expert facilitation enables decision-makers to make sense of complex problems and seek innovative problem solutions. My research also shows that map enactment increases cognitive conflict in decision-making teams. Causal maps become a 'safety net' for actors that motivate decision-makers to engage in robust debate and consider multiple decision outcomes. In addition, my research reveals how causal maps act as a 'shock absorber' thereby preventing

the emergence of affective conflict, and how the collective map enactment increases decision acceptance among the decision-makers by facilitating them to make their individual knowledge claims visible to other members of the decision-making group. Finally, my research results indicate that the enactment of causal maps may eliminate managerial biases such as groupthink and the escalation of commitment bias.

The affordances of causal maps may be constrained by their time consuming nature, messiness, and that they present a way of working that requires a basic competency by actors to be able to use mapping effectively as a decision-making tool. Much of causal mapping literature in strategic episodes is situated in contexts where experts have been present to facilitate the map enactment process (Bryson et al., 2004). Ambrosini's (2001) research to the surfacing of tacit sources of competitive advantage considered that causal mapping was a skillful activity. In my research decision-making groups had to undertake the mapping task without expert facilitation. Research showed that the decision-making groups who had prior experience in causal mapping were faster to get started with map enactment than the groups with no previous experience in mapping. However, the two groups where none of the informants had prior mapping experience and who had only been taught the rudimentary basics of causal mapping at the beginning of the decision-making exercise were able to produce complex maps through trial and error. These two groups were nevertheless able to use the maps to make sense of the decision-problem, ladder alternative solutions, and their maps motivated the informants to engage in robust debate about potential decision outcomes. The map enactment by the groups that had no previous mapping experience and the way these groups used

the maps to make sense of the decision problem and develop solutions to it did not differ from the map enactment process of the groups with previous causal mapping experience.

All decision-making groups in my research framed the decision problem presented in the research instrument "John Hamond in First National Bank" teaching case study as a binary decision: to approve or deny the loan to the new prospective client. This binary decision-outcome represented narrow framing of the decision-problem. In the literature, narrow problem framing has been associated with 'poor' decision-making processes. Nutt's (1993) study of 168 managerial decisions found that of the teams he studied, only 29% considered more than one alternative. In addition, in a study of teenagers' decisions Fischhoff (2008) found that 65% of teenagers' decisions had no explicit alternative beyond the 'yes' or 'no,' or only one alternative was considered that resulted in a narrowly framed decision-problem. According to Nutt (1993) narrowly framed 'yes' or 'no' decisions failed 52% of the time over the long run, in contrast to only 32% of decisions where two or more alternatives were considered by decision-makers. Extrapolating from Fischhoff and Nutt's research findings, the informant groups in my decision-making task seemed to fall into the same narrow framing trap as the informants in Fischhoff and Nutt's studies. It should be noted, however, that the "John Hamond in National Bank" teaching case study had a 'correct' answer that was not to approve the loan. All informant groups considered a number of ways how to get the loan approved, but they were constrained by the information that was presented in the teaching case study. The depth of debate of the two alternative decision outcomes and the laddering of the alternative decision outcome consequences indicated that the

informant groups engaged in innovative solution development to the decision problem.

My research findings indicate that the enactment of causal maps in collective decision-making context surfaced multiple perspectives and knowledge claims by the decision-making groups. The process of the surfacing of multiple perspectives and knowledge claims is a collective sensemaking process (Weick, 1990) that mediates decision-makers' activity (Miettinen and Virkkunen, 2005). This collective sensemaking process also creates cognitive conflict as multiple perspectives and knowledge claims are discussed during the enactment of the epistemic object. The enactment of the epistemic object engages the decision-makers to debate multiple perspectives and knowledge claims as the enactment process opens up the decision problem by encouraging divergence of opinions and views (Eden and Ackerman, 2010). This divergence of opinions creates cognitive conflict when decision-group members debate different views about the decision problem (Mooney et al., 2007). As the enactment of the epistemic object becomes the focus of decision-makers' attention it creates a space for discussion that encourages actors to negotiate meaning through a discursive process that allows ideas to evolve (Kaplan, 2011).

My research shows that causal maps became epistemic objects once some knowledge claims were posted on the board. As the epistemic object lacks the 'completeness of being' it nurtures decision-makers' need to come to know the object through a 'structure of wantings' (Knorr-Cetina, 2001). This need to come to know the object creates further meaning in the decision-making group as the object's construction leads into a generation of multiple perspectives and knowledge claims. The enactment of the maps with notes that were posted on

the board motivated informants to engage in iterative sensemaking activity of the decision problem by adding new notes to the exiting ones on the board, moving notes that had been posted on the board around to new locations, and drawing connectors between the notes. All groups enacted the map through a process of map construction and collective reflection that was followed by further map construction. This iterative process of map construction and reflection continued until the informant groups had ran out of new ideas to post or move the existing notes around on the board.

In addition to gaining epistemic qualities the maps became a 'safety net' that encouraged informants to post their own knowledge claims on the board without feeling intimidated by having to express their knowledge claims verbally to others and it allowed individual informants to address their own concerns and issues that they considered important for the group to consider. Moreover, those informant groups that actively engaged with map enactment and focused on the emerging map rather than face-to-face discussion exhibited a higher degree of cognitive conflict that was evidenced by animated debate among the informants. This surfacing of diverse perspectives and knowledge claims resulted in the elaboration of ideas and the laddering of the consequences of the alternative decision outcomes. Literature shows that the surfacing of competing perspectives and knowledge claims is instrumental in generating new conceptions, innovative problem solutions, and the elimination of cognitive biases (Vaara, Palli, and Sorsa, 2010; Hodgkinson et al., 1999; Maule and Hodgkinson, 2002).

Cognitive conflict, although beneficial to the quality of decision-making processes, may trigger affective conflict that can be destructive to the functioning

of a decision-making group in terms of the group's failure to achieve individual and collective decision acceptance. This may also damage the group's ability work together in the future (Amason, 1996; Mooney et al., 2007; Parayitam and Dooley, 2007, 2009). Affective conflict arises if individual informants interpret differing opinions by one or more decision-making group members as a personal attack, or as a manifestation of a hidden agenda (Jehn, 1995). My research findings show that the maps acted as a 'safety net' that mitigated the tendency of cognitive conflict to trigger affective conflict. As the decision-makers began to work in collaboration with each other to solve the decision problem they became behaviorally integrated. This behavioral integration motivated the informants to effectively air ideas without affective repercussions (Eisenhardt et al., 1997). Moreover, the maps become the target of frustration and anger (Eden and Ackerman, 2010), a type of a 'shock absorber' as the informants' anger, frustration, and disagreement was directed at the map rather than each other. My research shows that the maps became a 'shock absorber' that enabled informants to engage in a robust debate over the competing knowledge claims put forward by the other informants in the decision-making group. The evidence of the maps as a 'shock absorber' was demonstrated by informant behavior of facing the map rather than each other while debating or disagreeing what was posted on the board. Additionally, informants addressed the board by pointing at the map rather the addressing each other during the episodes of intensive debate.

My research shows that the enactment of causal maps continued through the elaboration and consideration of diverse opinions and views held by the informants until all views and knowledge claims had been exhausted (Eden and

Ackermann, 2010).   It was at this stage when all knowledge claims were exhausted that the final decision was made. Knorr-Cetina (1997) points out that epistemic objects become embedded with deep emotional holding power that generates intimate attachment which in turn creates social bonds that act as a drive and desire toward a shared objective.   As the enactment of the epistemic object is a form of modern sociality that includes learning, knowing, and collaboration (Knorr-Cetina 1997), and as such objects mediate human activity (Miettinen and Virkkunen, 2005), it can be theorized that the map enactment created decision acceptance by the decision-making group members. Eden and Ackermann (2010) note that that decision-group members are more likely to become more committed to the decision if they think that the process of reaching it was fair and just as evidenced by the sense that their own concerns, issues and claims had been addressed during the construction of the epistemic object. As the informants became increasingly involved with map enactment the more committed to the decision outcome they became.   There is evidence in behavioral economics literature that the so-called 'IKEA-effect' (Norton et al., 2011) may increase commitment to decisions that are derived from enacted objects. The literature notes that we tend to attach more value and emotion to something we make ourselves (Franke, Schreier, Kaiser, 2009). People take pride and ownership in something that they have constructed themselves however mundane the task or the accomplishment, such as putting together a pre-fabricated IKEA bookcase rather than buying a ready assembled case from a shop. Hence, it can be theorized that the enactment of a map by the decision-making group may increase decision acceptance as a result of the effort that was expended on its construction.

There is weak evidence in the literature that the construction of epistemic objects may eliminate cognitive biases (Hodgkinson et al., 1999; Maule and Hodgkinson, 2002). Their research provided preliminary but contested evidence (Wright and Goodwin, 2002) that the enactment of causal maps as epistemic objects eliminated 'escalation of commitment bias.' Moreover, Hodgkinson et al. (1999) and Maule and Hodgkinson (2002) experiments were administered to individual decision-makers alone and there is no evidence in the literature that group causal maps would have the same effect in eliminating cognitive biases, including groupthink and the 'escalation of commitment bias' in decision-making groups. My research indicates that group causal mapping eliminated 'escalation of commitment bias.' The decision-problem that was administered to the informant groups in the research instrument "John Hamond in First National Bank" teaching case study was framed as an 'escalation of commitment bias' with the 'correct' answer not to approve the loan to the new prospective client. Five groups reached the 'correct' decision not to approve the loan. One group could not reach a decision and one group proposed that a way was to be found that would allow the loan to be approved. This latter group proposed a change to the decision parameters in the "John Hamond at First National Bank" teaching case study. In addition, my research provides evidence that the cognitive conflict that was evident in the map enactment process eliminated groupthink. Most groups worked without a dominant informant. However, a dominant informant emerged in two groups but there was no suggestion in the data that the dominant informant shut down the debate prematurely, or that the presence of the dominant informant reduced the level of debate in these groups. In addition, individual informants in the groups with the dominant informant justified the

agreed group decision in their own words as the final decision was reached and agreed.

Finally, my research makes a contribution visual organization studies. A number of studies point to the potential of visual methods for practice based research (Bell and Davison 2013; Meyer et al. 2012). Bechky (2008) notes that visual evidence of the use of artifacts is a rich source of data. Although visual research methods are yet to be fully established in management research and journals, it is argued that visual analysis will become a crucial aspect of future research on strategizing (Jarzabowski and Kaplan, 2014). Given the opportunities that visual research methods avail themselves to gain a deeper insight to strategy practice, the study of visual is a growing phenomenon in organization and management research (Warren, 2009). Visual data such as pictures, graphs, film, web-pages, and architecture (Bell and Davidson, 2013) are "socially meaningful material objects that are created, employed, and manipulated in organizational context, making them a constitutive part of social practices" (Meyer et al., 2013, p. 505). Such visual data are important for identifying different contextualized types of materiality (Collier and Collier, 1996). A small but a growing number of empirical practice-based studies derived from visual data include recent research to the production of strategic knowledge in workshops (Paroutis et al., 2015), materiality of strategizing (Werle and Seidl, 2015), emotion in strategy work (Liu and Maitlis, 2014), and material artifacts in the practices of doing strategy (Jarzabowski, Spee, and Smets, 2013.) The use of video-based research to observe and record how people interact with objects, artifacts, and tools may provide significant future opportunities for researchers. Video evidence may provide insights how human

activity unfolds through time and space, how the human body and motion affect social interaction, and how talk, text, pictures, drawings, gestures, facial expressions, and embodied maneuvers orchestrate the basic social functioning such as negotiating, team interactions, and communicating (Jarzabkowski et al., 2014).

The managerial contribution of my research was to address the affordances of epistemic objects as a strategic decision-making tool-in-use. Jarzabowski and Kaplan (2015) state that there has been much debate about the usefulness of management education and management tools. The main concern has been that managers do not use the tools taught at business programs, or if they do, they are not operated as they are ostensibly designed to do. An analysis of causal mapping as a practical decision-making activity may provide us with a greater insight into how managers use epistemic objects in practice for structuring conversations, achieving shared understanding and closure to decision problems. Such research may have implications on how strategy tools are taught in a classroom and it may provide guidance for the future development of strategy tools for effective strategizing.

6.1 LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

My research was based on seven case studies that raise issues regarding the generalizability of the findings. Socially constructed structures and processes are idiosyncratic as they are fashioned and performed by individuals acting in unique contexts. This and the limited number of seven cases pose a question whether such research can be generalized. For purist interpretivist researchers the answer would be a resounding no. However, Gioia et al. (2103)

argue that if the research generates concepts and principles with obvious relevance to other domains where these concepts and principles are portable from one setting to another then it is feasible to generalize from research beyond theory.

Qualitative research and the coding of data are a series of interpretations and subject to a researcher bias. Although this limitation was addressed by using a second coder for the data, the nature of qualitative research as a series of human interpretations will never eliminate researcher bias totally and other researchers may interpret the data differently. In addition, my views and thoughts may change over time with additional experience of similar situations being gained through future research.

Additional limitations of the research may include the following: (1) Convenience sampling that was based on voluntary participation in the decision-making groups may not be representative of the population as a whole. However, as a qualitative research undertaking the thesis makes no claim for the findings to be generalizable to the population in general although the principles of the research may be transferable to other settings. (2) The mapping sessions were conducted in different study rooms rather than in controlled laboratory conditions. The differences in the physical features and the layout of the rooms may have had an impact how the informants interacted with each other and the whiteboard on which the maps were constructed. However, I feel that the research process was robust and it provided a reliable account of the map enactment process and the meaning that informants attributed to the mapping process. (3) One could argue that the informants were not representative of managerial decision-makers in general as the informant groups encompassed

undergraduate and postgraduate students and only one group of managerial decision-makers. However, it should be recognized that human sensemaking is always influenced by social, cultural, and circumstancial conditions of the decision-makers. (4) It is possible that that the use of a case study as the basis for the collective decision-making task did not reflect real-world strategic decision situations and the informants approached the decision-task as a risk-free exercise. However, it can be theorized that the benefits of epistemic objects in collective decision-making could be even more pronounced in real-world decision-situations where risks to the decision-problem are real.

My thesis opens up a number of opportunities for future research. The research findings have looked at one particular type of strategy work: to understand how causal maps, as material artifacts, are enacted, interpreted, and used by actors in collective decision-making. It is suggested that the research can provide a basis for future research of other material artifacts in decision-making such a flip charts, graphs and how other visual artifacts are enacted, interpreted, and used in collective decision-making. In addition my research did not take account of national, cultural, and social influences. A possible extension of my research is to administer the decision-making teaching case in different national and cultural contexts using the same research design.

Furthermore, Jarzabowski and Kaplan (2015) suggest that managers may create new tools for their own purposes that may or may not be based on the standard portfolio of management tools taught on management programs. Another research undertaking could be to understand what types of decision-making artifacts are developed by managers and why, as so many different frameworks and techniques are already available.

Much of the work on causal maps has a senior management bias (Ambrosini, 2001; Ambrosini and Bowman, 2002, 2008; Eden and Ackermann, 2010). However, scholars have pointed out that middle managers have an important role in strategizing (Balogun and Johnson, 2004). It would seem natural that different actors may use epistemic objects differently based on their level of experience and the types of strategic decisions they face (Jarzabkowski and Kaplan, 2015). A possible extension of the research could be to assess how different organizational actors at different organizational levels use causal maps in different decision-making situations.

In order to conduct practice-based research on strategy work, methods used should be able to capture the rich qualitative data on how strategy work is socially organized. Research should be able to capture conversations, gestures and bodily conduct, organizational practices of decision-making, problem solving, knowledge sharing, and collaboration in order for strategy work to become an observable activity (Alby and Zucchermaglio, 2006). Current work is predominately dominated by observational field studies (Kaplan and Orlikowski, 2013). Although this approach will remain the main source of data it is limited by the difficulty in keeping track of organizational actors' interactions requiring the researcher to be present at the right place at the right time (Bechky, 2008). One possible research method is the application of controlled experiments to understand at a micro-level how epistemic objects shape group interactions. Hodgkinson et al. (1999) observed that a major methodological challenge in researching the use of epistemic objects such as causal maps is the need to develop procedures that are suitable for the mass assessment of organizational actors' mental representations and interactions in dealing with strategic issues

and problems. To address this challenge these researchers have proposed a partial solution through a greater use of experimental techniques using case studies in controlled experiments.

Finally, the conceptual framework presented this paper should be subjected to testing and it provides a basis for future research to examine the implications of epistemic objects in strategic decision-making and as a tool-in-use in strategy work.

APPENDIX SECTION

APPENDIX I – CAUSAL MAPPING PROTOCOL

Mapping logic

- The direction of an arrow should indicate the direction of causality and influence: e.g. means to ends, options/actions to outcomes.

- One person's means can be another person's ends:

  - For example: A → B might be what one person thinks, while another person may think B → A is correct.

  - *For example: 'turning things around' means we have to win every battle in the next 5 years' may be coded with 'winning every battle' as the desired outcome from 'turning things around', or alternatively 'winning every battle' is required in order to 'turn things around', depending on the participant's perception.*

  - Bear in mind that some 'objective' truths might be subject to debate.

  - *For example: 'putting more policemen on the beat will reduce crime' may be an objective truth to one person; nevertheless, another person might argue the objective truth is that more crime leads to more policemen on the beat.*

  - Sometimes A → B can be treated as so consensual that it need not be debated e.g. 'obvious' arithmetic relationships.

  - *For example: more sales causes more sales revenue*

- Means to ends are most difficult to judge when considering a hierarchy of criteria – that is, values and goals:

- *For example: is 'be unhappy and upset much of the time' more disastrous than 'crawl into my shell and give up'? That is, does 'be unhappy' lead to 'into shell' or vice versa? This can only be judged by the person being mapped, or at least this choice must be open to consideration.*

- It sometimes helps to work with the hierarchy of goals, such as 'objectives' led to 'goals', which led to 'ideals and values'. So objectives are shorter term and more easily measurable; whereas goals are expressive of desirable longer term outcomes; whereas ideals and values are unlikely ever to be attained but guide purposeful behavior.

- Avoid mapping time sequences, which are not causal relationships (as this will produce flow diagrams or process maps that are not amenable to same sort of analyses or meaning as causal maps.

Mapping technique

- Ensure that the map does not contain duplication of links.

  - For example: where the map shows A $\rightarrow$ B $\rightarrow$ C $\rightarrow$ D along with A $\rightarrow$ C and C $\rightarrow$ D and A $\rightarrow$ D, ensure that the latter three links show different causal chains through additional material.

- Avoid double headed arrows as these are implicit feedback loops suggesting either:

  - Muddled thinking that can be resolved by determining means and ends.

- A legitimate feedback loop consisting of additional statements that might provide more intervention options.

Source: Adapted from Eden and Ackerman (2010)

APPENDIX II – CASE STUDY

JOHN HAMOND AT FIRST NATIONAL BANK

At 1:00 P.M. on Friday, March 31, 2006, John Hamond, Senior Business Development Manager at the First National Bank in Kitchener, Ontario, stared at the useless papers in his hand. A borrower had failed to produce a key document, causing the bank's risk manager to refuse approval on a million-dollar real estate loan. The borrower's contract-to-buy would expire in a few hours.

Commercial Real-Estate Banking At First National Bank in Kitchener

First National Bank (FNB), a Canadian bank with revenues of $12 billion and offices around the world, offered a full range of services. One of its operating units, the Commercial Real Estate branch in Kitchener, Ontario, specialized in commercial real-estate loans. It wrote over $1 billion in new loans every year, primarily to local developers and private investors.

A commercial real estate loan was normally transacted in two-stages, competitive bidding followed by closing. In the bidding stage, the buyer of the real estate solicited quotes from lending institutions (banks, insurance companies, or private investors). The lending institutions then "bid" by sending a letter of intent, which proffered a loan at a stated rate of interest. Finalization of the loan itself was contingent on completion of due diligence paperwork and approvals. The buyer chose an offer, signed the letter of intent, and, to secure the offer, paid 1/4% to 1/2% of the loan value to the lender as a non-refundable deposit.

In the closing stage, the legal documents and approvals necessary to finalize the loan agreement were completed. FNB's due diligence required certified financial statements from the buyer, copies of leases from the seller, bonded property appraisals, and many other documents. These documents needed the approval of two FNB "gatekeepers", the Vice President for Commercial Banking, who managed the bank's loan portfolio, and FNB's risk manager, who reported directly to corporate headquarters.

To close on a piece of property, then, the buyer needed to assemble a complicated three-cornered deal between the seller, the buyer, and the lender. Successful closing of the deal required all three parties to cooperate in the preparation of numerous documents. The closing process typically required four to six weeks. The time available for closing was limited by an expiration date in the contract-to-buy between vendor and buyer – in effect, a deadline.

John Hamond

FNB's commercial real estate loans were negotiated and executed by their Business Development Managers. The Business Development Managers met with prospective borrowers, selected an interest rate, secured preliminary approvals, prepared the letter of intent, and then shepherded the loan through the closing process.

John Hamond, a former real estate broker with an MBA from the Ivey School, was the most experienced and highest-grossing Business Development Manager at FNB in Kitchener. He dealt only with loans over $1 million, and single- handedly wrote more than $100 million of new business each year. He attributed his

success to his strong relationships both inside and outside of FNB, and to his longstanding reputation as a reliable closer of loan transactions.

The Kitchener Group Loan

In December 2005, Hamond began working on a loan for the Kitchener Group, a privately held local company that was new to commercial real estate. The loan was relatively "small", at $1 million, but highly attractive because Kitchener planned to borrow only 30% of the property's appraised value of $3 million. This unusually low ratio of loan-to-value suggested the possibility of much future business from Kitchener. In addition, FNB was bidding against a former co-worker, which made Hamond's supervisor, the Vice President of Commercial Banking, especially eager to win the Kitchener business.

In December 2005, Kitchener made a successful offer on a property and entered a contract-to-buy with the seller. In January 2006, Kitchener invited lenders to bid on the loan, and several did so - aggressively. In February 2006, Kitchener asked FNB to reduce its already low bid, and John Hamond, somewhat reluctantly, did so. On March 6, Kitchener signed a letter of intent with FNB. Kitchener then asked FNB to expedite the closing process, as their contract to buy expired on March 31, leaving less than half the usual time for closing. John Hamond agreed to work closely with the Kitchener Group's attorney, Paul Talley, who, like the Kitchener Group, was new to commercial real estate transactions.

Hamond expedited the FNB approvals as agreed and sent the draft loan agreement to Talley on March 14. Talley returned the draft loan agreement on March 21. Talley was finding it difficult to procure some of the due diligence

documents, and asked for leeway. Hamond agreed to be as flexible as possible.

Missing Documents

Talley submitted a set of due diligence documents on Thursday, March 30, one day before the expiration of the Kitchener Group's contract-to-buy. But the set of documents was incomplete. There were no "tenant acknowledgements", routine but essential documents, procured by the seller from his tenants, saying that the tenants do in fact have leases (and, equally importantly, do *not* have disputes with the seller). Hamond contacted the FNB risk manager, who said that the loan would be rejected if it lacked tenant acknowledgements.

On the morning of Friday, March 31, Talley and Hamond manned the phones and scrambled madly to procure tenant acknowledgements. But the scramble produced only one faxed tenant acknowledgement, which would have been insufficient even if it had been legible. Talley wanted Hamond to seek approval of the loan nevertheless. He asked for FNB to release the money so that the closing could be consummated, and offered to give FNB a document "guaranteeing" that Kitchener would produce the tenant acknowledgements within 30 days.

It was now 1:00 PM on Friday, March 31. The Kitchener Group's contract-to-buy would expire at the end of business that day. John Hamond wondered what to do.

APPENDIX III – DECISION-MAKING PROTOCOL

Read the following instructions carefully. They describe the process that you should follow to reach a decision required in the case "John Hamond at First National Bank":

Your group should decide what John Hamond should do.

The exercise is timed to last one hour. You will have 15 minutes additional reading time.

Key steps in the decision-making process:

- Read the case independently first without discussing it with your group members.

- Write down your initial reflections and ideas without discussing them with your group members.

- Once you have written down your initial thoughts start discussing the case with your group members.

- You have been given different color post-it notes, and color pens to undertake causal mapping on the whiteboard as instructed at the start of the workshop.

- Undertake causal mapping as a group to outline decision options and their consequences using the laddering technique. Continue with the mapping exercise until all options and their consequences have been

exhausted or once you reach the allocated time limit of one (1) hour allocated to the task.

- Record the group's final recommendations as well as the supporting assumptions, facts, and data on the "final recommendations form."

FINAL RECOMMENDATIONS FORM - TO BE COLLECTED

RECOMMENDATIONS

ASSUMPTIONS

KEY FACTS/DATA

APPENDIX IV – CASE VINGNETS

Case Study 1 – Blackhawks

A group of four graduate students on MA Global Management course

As none of the informants had prior experience in using causal mapping as a decision-making tool, and the informants had never worked as a group before, initially the mapping process was hesitant. The group spent a lot of time brainstorming ideas independently. There was very little initial group organization of how to tackle the decision-making task except to agree that individual thought generations should focus on negatives and positives.

Two female informants seemed to look at each other and around to other informants as if to prompt them to get started with the mapping on the board. The other two informants who carried on with their own idea generation activity ignored these subtle glances and body movements. As the task was timed the researcher was forced to prompt the group to commence the mapping on the board. After the prompting there was a hesitancy to get started with the mapping on the board, as there seemed to be a degree of "embarrassment" for making the first move. This was evidenced by some laughter and shifting on the seats until three informants decided to get up on the board at the same time.

Informants started posting notes on the board without consideration of the others' placements of notes thereby making their own knowledge claims visible. However, the notes were placed vertically reflecting the positives and negatives of the decision problem. This is probably the result of the initial group

agreement of focusing on pros and cons of the decision to be made. Once some notes were put on the board, the group spent a considerable time thinking and discussing how the map should look on the board.

The discussion mainly took place between three group members. The fourth informant observed the board and listened to the discussion but remained standing behind the three informants. When the three informants seemed to come to a halt with the mapping, the fourth informant who had until now remained relatively silent, distant, and aloof proposed that a binary decision is put on the board. The fourth informant took the marker and wrote the binary decision on the board and moved some of the notes around but then passed the task on to the other three informants.

A binary decision "accept" and "reject" was written as headings on the board. This seemed to create new energy among the other three group members and they began making sense of the problem on the board by moving notes around. The notes were grouped under negatives and positives although the discussion was focused on the consequences of decisions. The group seemed to be laddering in their discussion but as no connectors were drawn, the map seemed to become an obstacle for creating a structured debate. The group dynamic followed the pattern of map construction – reflection – map construction – reflection.

As the group was uncertain how to proceed and incorporate new thoughts it was decided that the map they had constructed was too messy and the group decided to construct another map on a piece of paper and then transfer this new map onto board, erasing the first map.

The new map construction on the sheet of paper became the focal point as

all group members turned their back at the map on the board and focused their attention to the map that was being drawn by one informant. However, there was much more face to face discussion between the informants with the new map as it was on a piece of paper rather than a large whiteboard on the wall. The discussion did not seem to flow as fluently compared to the activity undertaken at the board.

When the contents of the second map were transferred on the board having erased the first map, the decision was again defined as a binary problem, and the consequences of each alternative were considered. The map became a "pros and cons" map. The first map had prompted the group to consider widening the solution from the strict binary decision, but this was not translated onto the new map. The second map, although more structured and clear, seemed to narrow to scope of the discussion and purely considered a decision to lend or not to lend but consider options for the bank to keep the deal alive.

It was at this stage when the decision was narrowed down a significant degree of conflict emerged between the two male group informants. Although the two male informants did face each other, they tended to avoid eye contact by looking at the case study that they held in their hands while the two female informants seemed slightly embarrassed by the conflict. The conflict of managed by one informant gesticulating at the map and emphasizing his view by pointing at notes on the map. This seemed to reduce the degree of face-to-face confrontation as if the map had become a shock absorber. The justification of a decision by one male informant was made by him pointing at the evidence on the map. This seemed to convince the two female informants and the second male informant did not challenge the perspective put forward although he seemed

opposed the decision that was emerging from the other three informants. He also withdrew from the discussion. Sensing this, one female informant suggested voting, but in the end the group seemed to come to a unanimous decision. The male informant who had not agreed to the decision went along with the majority view. However, in the discussion after the exercise this informant stated that he did not agree with the decision although he had agreed with the rest of the group at the end of the exercise. He had at the end of the mapping stated that the final decision "made sense."

Decision outcome:

Not to lend.

Reflections after mapping:

The fourth informant who did not agree with the decision stated that the mapping was a "waste of time," as he could have made the decision by himself in minutes.

This view was contradicted by other informants who stated that the mapping was a useful tool:

"it helps you to come up with a conclusion as you have everything in front of you";

"rather than writing everything down…. seeing it makes us less confused";

"makes us see more scenarios…. what would happen with this and what would happen with that."

Case study 2 – Rangers

A group of four final year undergraduate students on BA International Business course.

All informants had been previously taught the principles of causal mapping as a part of their strategic management module, and they all had had prior course-work experience in the use of causal maps as a decision-making tool. However, the informants had never worked together as a group.

The group began the exercise by defining the problem as a binary problem. Before engaging in idea development the group sat at the table and discussed how the mapping process would work and how different color notes could be used to express different ideas on the board. In addition, the group discussed how laddering of the consequences of different options could be expressed on the board.

Having agreed the principles of the mapping process and defined the decision as a binary problem, one member wrote up two notes: to accept and to decline the deal. These two notes were posted on the board establishing the decision as a binary problem.

Informants then began generating ideas individually and writing them down on notes. One informant had identified a possible bias in the decision, put this note immediately onto the board, and connected it with the lending decision. The same informant kept adding more notes on the board relating to the bias posting a "sunk cost fallacy" as a follow-on note. This was done while the other informants worked on their notes at the table.

As one informant had immediately put his thoughts on the board there

was no hesitancy to get started with the map on the board. Two female informants also came up to the board and started posting their ideas in no particular order. Once the three informants had posted their initial notes on the board, there was some reflection of what was being posted and they returned back to the table to write further notes. The informants, who had posted notes on the board, turned to reflect on what was on the board and then wrote additional notes as an individual idea generating activity. This implied that the notes that had been posted on the board generated further ideas. This pattern of idea generation was also evident in later in the mapping process when the group as a whole engaged in map construction and reflection. It can be observed the mapping process followed two cycles: construction – reflection – construction; construction – reflection – new idea generation on notes – construction.

Three informants kept posting their notes on the board, but there was litter discussion between these informants as they added their own thoughts on the board and as they returned to write additional thoughts on the notes at the table. At this stage there was little reflection of what had been posted on the board. The fourth informant did not pay attention to what the other informants had been posting on the board and what connectors one informant had drawn between the notes. This fourth informant was fully focused on his own idea generation on the notes as if not to be influenced by the other informants' ideas.

When three informants happened to come to the map at the same time, a discussion started about the notes on the board. The informant, who had drawn connectors between the notes, began explaining the meaning of the connectors and a discussion of the map started among the three informants. The fourth informant was not drawn into the discussion but kept adding his own thoughts

on the notes sitting at the table.

After a brief discussion the three informants returned back to the table to write additional notes having discussed the emerging map on the board, and returned back to the board with new notes. There was a high degree of activity as the informants moved between the board and the table. It was at this stage when the fourth informant began passing his notes to another informant to start posting them on the board. He then joined the other group on the board and reflected on the map. In the meanwhile the other informants began moving notes on the board and there was a degree of conflict when one informant moved a note from one place on the board and attempted to place in a different location. The note was snatched back by another informant and returned back to its original place.

When all four informants were at the board and once the notes had been arranged into some kind of order, the informants reflected on the map to make sense of the problem. After this initial reflection, more notes were added on the board and more connectors were drawn between the notes. At this stage all informants were fully engaged and facing the board as the map was developed further. The fourth informant stayed in the background looking at the map and made clarifying comments to how the map was shaping up and providing additional insights and ideas. Although this informant stood in the background there was no indication that he was not fully engaged in the mapping process and the group.

The moment that ensued was one of iteration. The group constructed the map, reflected on it, discussed it, clarified their thinking, and proceeded with further map construction activity either by adding new notes, or moving existing

notes around on the board.

Differing opinions were discussed and clarified by informants by pointing at the map. There was little face-to-face discussion taking place, informants mainly faced the map when expressing opinions and especially differing opinions.

At one point one informant tried to remove one note from the board. The informant who had posted this knowledge claim snatched it back with a strong "no" and placed it back it its original location. It is interesting to observe that this not lead into a conflict or it was not perceived as conflict. However, it was interesting to not how possessive the informant was of her idea and how important it is for the map to have all notes posted as this allows all knowledge claims to be visible.

Once the informants had constructed the map and began to run out of additional thoughts on the board, and once the map began to reflect the problem it causes, potential solutions, and their consequences, the informants engaged in debate and began moving towards a decision. At this stage the fourth member who had stood in the background began leading the debate. However, it was clear that the other informants did not feel that they were being dominated by the fourth informant as all informants were actively contributing to the debate and the decision. The decision emerged by the members adding justifications for the decision by pointing to the map and drawing additional connectors between the notes.

It was not clear how the decision emerged except that all informants came to the same conclusion and each in turn indicated by using the map to justify the unanimous decision in their own words. This seemed to result in a collectively agreed and shared ownership in the decision.

Decision outcome:

Unanimous decision was not to lend.

Reflections after mapping:

The group's reflection was interesting in the sense that rather than elaborating on the actual map construction process, the informants used the map to present the logic behind their decision.

All informants were fully engaged with this post mapping decision justification. This showed shared ownership and pride with the fully justified decision they had made using the map as a decision-making tool.

Case study 3 – Oilers

A group of four graduate students on MA Marketing course

One informant had been taught the principles of causal mapping as a part of her strategic management module and she had had prior course-work experience in the use of causal maps as a decision-making tool.

The group was taught the principles of causal mapping before the mapping exercise but the group remained very hesitant throughout the mapping process. The informant who had previous experience in causal mapping was the dominant participant in the exercise and led the process. She also tried explaining the mapping to the other informants in her own words.

The group was very hesitant to move away from discussing the decision problem by staying seated at the table and engage with the mapping on the board. It may well be that the table was close to the whiteboard and hence there was less room to move around.

There was no individual reflection at the start of the exercise and the ensuing discussion remained very stilted thought the exercise. The informant who had previous experience with causal mapping seated herself at the head of the table and took possession and charge of the marker pens and post-it notes.

She led the discussion asking for other informants' opinions and ideas and marked them down onto the notes. There was no individual idea generation.

As the informants were seated at the table they faced each other and the conversation remained stilted throughout the mapping process, and there was a low degree of debate throughout.

The mapping really never got underway. The informant who was leading

the discussion wrote down the ideas based on the discussion and then instructed another informant to put notes on the board. There was no full engagement with the map on the board. Only two informants engaged with the mapping on the board the one who had be instructed to post the notes on the board and the leading informant who got up and drew some connectors between the notes. The engagement was individual, as these two informants did not jointly engage with the mapping on the board. The lack of mapping activity was demonstrated by the fact that only 12 notes were put on the board during the decision-making exercise.

When some of the notes were placed on the board, the informants' attention did briefly shift from a face-to-face discussion to the map. However, as the informants who had posted notes on the board sat back at the table the attention shifted immediately back to the face-to-face discussion. The dominant informant referred to the map occasionally to make a point but that was not enough to maintain the other informants' attention at the map.

It was interesting to observe that the group decided to take a vote on the decision outcome very early on after 10 minuets, even before any notes were posted on the board. The vote was proposed by the leading informant. The vote did not result in a show of hands but one informant proposed to reject the deal and the leading informant suggested that they constructed a map around that proposition. It seems that the map became a post-facto justification of a decision that had already been made.

It should be noted that the video recording failed during the exercise. My field notes supplemented this case, but they did not add any significant events

that were not present in the video data. The final decision and reflections after mapping were recorded in my field note.

Decision outcome:

The informant group decided very early on to reject the deal through a form of voting. It was difficult to tell if the decision was unanimous in reality, as the decision did not emerge from the mapping process. All informants, however, agreed that the decision not to lend had been unanimous.

Reflections after mapping:

The informants found the mapping process confusing and they were uncertain what to do.

One informant observed that she had already made the decision and did not see what value the map could add to it.

The leading informant with previous causal mapping experience observed that mapping allows thinking to be visualized and options to be considered.

Case study 4 – Bruins

A group of four full-time MBA students

All informants had been previously taught the principles of causal mapping as a part of their strategic management module. All informants had prior course-work experience in the use of causal maps as a decision-making tool, and they had worked together before in other course-work assignments.

It was surprising to observe that the informants had to be prompted to start the mapping process as they had previously worked together as group and they all had had undertaken a causal mapping exercise.

Mapping began when two informants got up and started posting their thoughts on the board. Notes did not seem to follow any particular order initially. The posting by the two informants was conducted without any consultation with each other. However, when the third informant began posting her notes, discussion began about the placement of notes and what had been posted on board. There was also some individual reflection of the notes on the board. One informant observed what the other two had posted previously.

The fourth informant of the group was disengaged at this stage and sat at the table writing down her own thoughts. She then joined the group on the board and began posting her notes next to the map that was beginning to take shape and constructed by the other three.

The male informant emerged as the leader of the group by directing the conversation and holding onto the marker to draw connectors between the notes. The mapping process followed a pattern of construction – reflection - construction and the dominant player allowed other informants to engage with

the map building process. As the making progressed more thoughts emerged and these were posted on the board. The mapping process at this stage became one of construction – reflection – new idea generation – construction.

The map was initially laid out as a binary problem but the laddering of the decision outcomes resulted in an innovative solution to ask for extension rather than closing the door rather than taking yes/no decision.

As the mapping progressed the whole group was deeply engaged with the mapping facing the board and the discussion was addressed to the board and points were made by pointing at the map. There was evidence of significant laddering for various decision solutions that were considered by the group. It did not appear that the dominant role assumed by male informant had a negative influence on the other informants.

Although the fourth informant was quiet and did not make much of a verbal contribution, she was fully engaged with the discussion by observing the mapping process. This was evident later when the dominant informant asked for her opinion and she justified her thinking by pointing at the map and its component parts.

There seemed to very little conflict present during the mapping process and it did not emerge as the dominant informant moved to suggest a solution to the decision-making problem. He seemed to pull other informants to his solution by consulting with them. Other informants sought further clarification and the dominant informant, although holding onto the marker pen, drew on the map and made additional connectors between the notes on the board.

A unanimous agreement seemed to emerge and there seemed to be evidence of real ownership of the map and the subsequent decision by all

informants.

Decision outcome:

Seek more time to give the prospective client a chance to come up with the missing documents.

Reflections after mapping

It was interesting to observe how the group started their reflection by explaining the decision. The dominant informant presented the solution with other informants making additional comments indicating ownership.

The informants found the mapping process messy.

Other comments included the following impressions and observations made by the informants (quotations):

- allows different aspects to emerge;

- new idea generation during mapping;

- allows the problem to be visualized;

- easier to communicate as one's views blend to others;

- communication is easier as the focus is not on you so that you don't have the aggressively defend your own point;

- write down your own opinions and don't feel isolated with your opinions and they blend with the others;

- push your own view in a polite way;

- it's non-judgmental.

Case study 5 – Ducks

A group of six executive MBA students

All informants had been previously taught the principles of causal mapping as a part of their strategic management course. Four of the six informants had prior course-work experience in the use of causal maps as a decision-making tool. All informants had worked together in other course-work assignments.

One informant stood up to post her initial notes on the board, but the rest raiment at the table and proceed to discuss initial reflections and how to undertake the mapping on the board. This discussion was mainly for the benefit of the two informants who had not undertaken a mapping exercise previously. There seemed to be limited writing of thoughts on notes independently.

Three informants who had participated in the initial causal mapping exercise all stood in from of the board while the two who had not undertaken the previous mapping exercise remained seated at the table.

One informant emerged early on as a dominant member. She led the initial discussion at the table and once upon the board commenced drawing a binary solution to the decision problem on the board. It is noteworthy that the map that emerged was a mix of notes on the board and handwritten notes.

As a dominant player, the informant was handed notes by the informant seated at the table and she began placing them on the board in an order that she created while also writing headings on the board. One of the other three informants at the board attempted to place her notes on the board but the dominant player did not seem to notice this as she was consulting with the two

informants at the table. The third standing informant was left in the background although he was following the map construction.

The fourth informant stood up and joined the other three informants on the board but she did not bring any notes for posting. It was also at this stage when the group split in two. The informants who had participated in the mapping exercise all stood at the board while the other two remained seated at the table where they remained for the duration of the mapping exercise. They observed the map construction process and made some observations, but they did not engage in the physical map construction process.

The four informants standing at the board were fully focused on the map with their backs turned against the two informants sitting at the table. Although the dominant informant did turn to face the informants at the table when they made comments, these comments were not noted on the board. As the dominant informant held on to the marker pen the map seemed to be very much her construction. It is noteworthy that she wrote "notes or headings" on the board that seemed to place a secondary importance on the posted notes.

The resulting map was a combination of hand written items on the board and posted notes. The notes were not moved much during the mapping process, as the hand written notes seemed to replace them.

It was suggested that the clustering of the posted notes and hand written notes indicated a decision. However, the group decided to take a vote at the end of the exercise and the decision was unanimous at the conclusion of the mapping exercise but in reality did not turn out to be the case.

Decision outcome

Not to lend.

Reflections after mapping

During the reflection session it emerged that one informant wanted to make a positive lending decision but did not speak out. This informant was one of the two informants sitting at the table throughout the mapping exercise. Unfortunately this was a late night session and the students were in a hurry to leave, and this revelation could not have been pursued further.

Case study 6 – Flyers

A group of four final year undergraduate students on BA International Business and BA in Management course

Two informants had been previously taught the principles of causal mapping as a part of their strategic management module. The other two informants had prior course-work experience working together but had not been taught the principles of causal mapping.

The group immediately defined the problem as a binary outcome decision. The group then engaged in individual and group idea generation. Binary decision outcomes were put on the board. Returning back to the table the dominant informant wrote down additional notes and post them on the board, drew a skeleton map and retuned back to the desk. This pattern was repeated and the group made limited progress

The dominant informant suggested that the group should be split in pairs. One pair would work on a positive the other a negative outcome and the pairs would then come together and apply 'devil's advocacy.'

The pair with the dominant informant started working with the map on the board and the pair engaged in deep discussion facing the board and posting notes. In contrast, the other pair remained seated at the table and one informant began writing note and posting them on the board and retuning back to the table.

To compare and contrast the activity of the two informant pairs, the one at the board was much more active in building a map as well as discussing and debating the problem.

The pairs worked on their respective outcomes and once they came together as a larger group they explained their respective positions. This led into a deadlock situation. There was a conflict of competing outcomes and the group could not agree which decision to take.

Decision outcome

The group could not agree to a decision.

Reflections after mapping

- "At the beginning we tried to do it together and realized that this is not the way to go, let's split up…. easier to work in pairs and compere your outcomes."

- "Can express more individually in pairs'" – commenting about working in pairs.

- Had the group divided into to pairs and applied devil's advocacy – "it would have been more time consuming…. and we would have talked about the same thing."

- "That's why we would have needed to have one more person right there…to make a judgment call."

Case study 7 – Wolverines

An experienced decision-making group five senior clinicians and managers from Royal Free NHS Foundation Trust

All informants knew each other and they had experience in working together across the Trust hospitals with the exception of the senior operational manager. Informants were taught the principles of causal mapping as a part of a workshop on effective decision-making. None of the informants had had previous experience with causal mapping.

The informants started by generating ideas and reflecting on the problem individually, but they had to be promoted to start putting the notes they had written on the board.

After having been prompted to start constructing map on the board, one informant stood up and stated to the group what the problem was: "to release the money, or not." This was confirmed by another informant. The group identified the problem as a binary decision and this was written on the board by one informant.

All informants stood up from the table and brought their notes to the board, having been prompted, and started posting their notes in no particular order.

Before notes were posted informants already pointed at the board while making initial claims and expressing their ideas. This was combined with the discussion of where to post notes on the board. The activity of posting notes resulted in the discussion of the details of the problem.

At the initial stages of the map construction, the group members

addressed each other face-to-face each while making gestures towards the board.

Points were made by informants while explaining what they were doing and posting notes on board at the same time. Once more notes were added on the board the focus shifted from face-to-face discussion to facing the board. The group moved into the pattern of construction – reflection – construction; as the mapping and discussion progressed the additional ideas were generated and the pattern of construction – reflection – new idea generation – construction emerged.

All informants seemed to be fully engaged with the discussion and the map construction. One informant seemed to be the most active at the board but she did not dominate the discussion or the map construction. She seemed to draw connectors and move notes as others were making claims.


Decision outcome

Not to lend although the decision was not unanimous but the informant who opposed it initially seemed to buy into the decision.

Reflections after mapping

Feedback from the group was positive. The junior member of the group came to me after the exercise and said that NHS has a rigid structure where people express opinions in a rank order. She viewed this exercise was a leveling device that allowed all participant to work on an equal footing and it allowed this informant to make a equal contribution to the debate.

APPENDIX V – ATLAS.TI CONCEPTUAL MAP
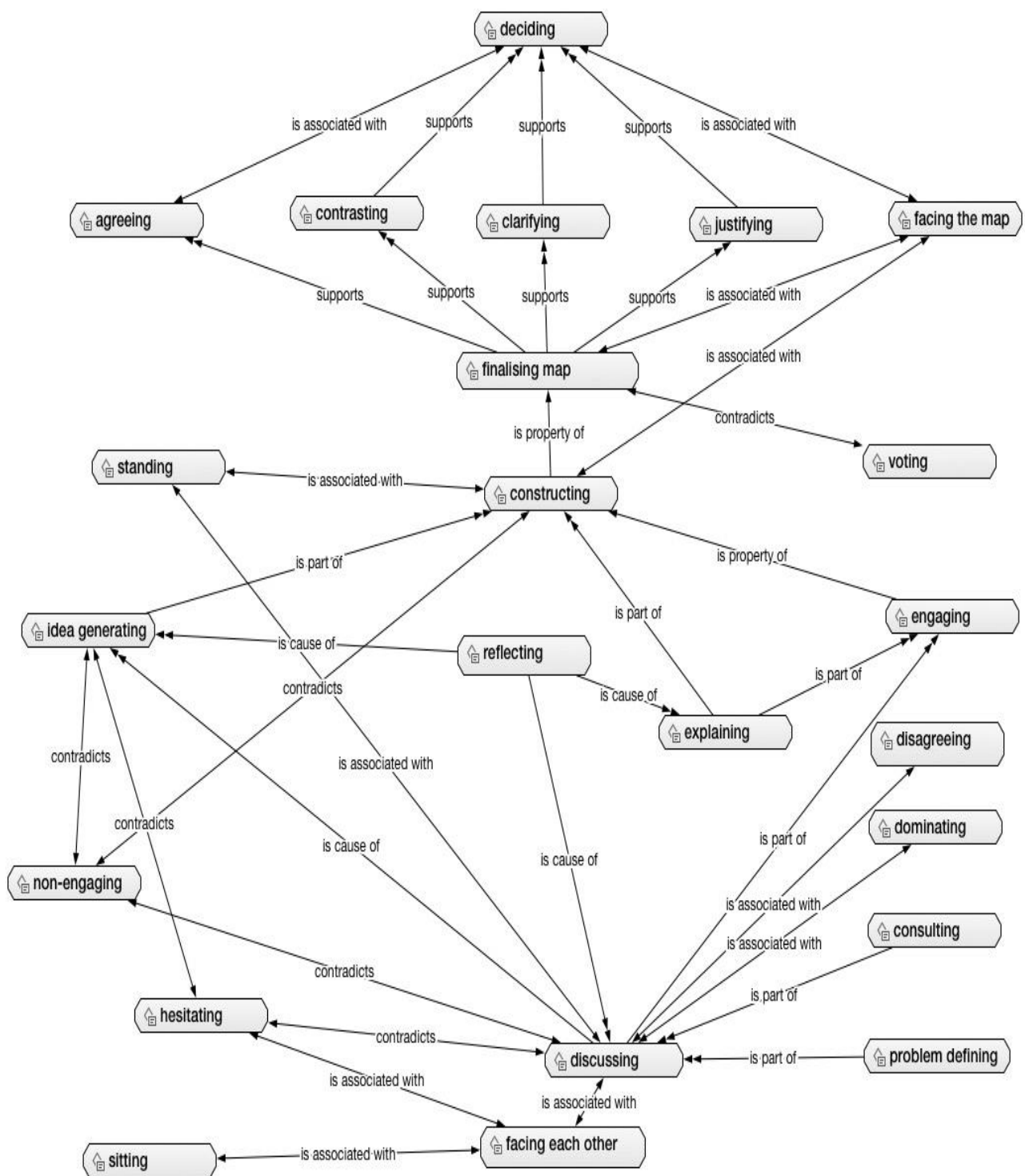
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