

CENTRE FOR INTERNATIONAL BUSINESS STUDIES

Epistemic objects in collective decision-making: a practice perspective on the use of causal maps as situated material artifacts.

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Paper Number 1-14
Research Working Papers

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Abstract

This paper makes a contribution to the gap in the strategy as practice literature on how epistemic objects are used in managerial strategy work. The paper explores how epistemic objects as material artifacts could be used to improve the quality of collective decision-making. Drawing on the literature on epistemic and boundary objects, causal mapping, and group decision-making the paper proposes a conceptual framework for practice-based research to explore how management groups enact, interpret, and apply epistemic objects such as causal maps to make sense and generate outcomes to strategic decision problems. The paper concludes with a number of propositions that have been generated from the theoretical model and presents directions for future research.

Introduction

Recent approaches to strategic decision-making have concentrated on how managers think, act, and interpret strategic decisions in practice. Such activity-based research has emerged from the critique that 'traditional' strategic decision-making theory may not be actionable in practice (Nutt and Wilson 2010). Therefore, researchers should concentrate on what managers actually 'do' when they engage in strategy work (Jarzabkowski and Wilson 2006).

The focus 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). Proponents of the practice theory lens to strategy research emphasize the importance of understanding the practice of 'strategy-making' as a situated, socially accomplished activity that is constructed through the interactions of multiple actors (Vaara and Whittington 2012; Jarzabkowski et al. 2007). Whittington et al. (2006) argue that in a world of accelerating change, approaching strategy and organization as interlinked and practical activities is "more effective than traditional static and detached approaches" (p. 615).

Discursive practices and modes of strategizing have been the main focus of a growing body of literature into strategy practices (Jarzabkowski and Spee 2009; Vaara and Whittington 2012). Empirical 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).

This paper contributes to the gap in the literature on the role of epistemic objects as material artifacts that managers use in "doing knowledge work" (Knorr-Cetina 1997, 2001; Jarzabkowski, Spee, Smets 2012). More specifically, the paper draws upon literature on epistemic and boundary objects, causal maps, and group decision-making to develop a conceptual framework for analyzing the efficacy of causal maps as material artifacts in a collective strategic decision-making context.

Literature review

Epistemic objects

The situated use of material artifacts, and the way they are enacted in strategizing, is informed by the literature on epistemic objects and knowledge work (Ewenstein and Whyte 2009; Knorr-Cetina 1997, 1999, 2011; Miettinen and Virkkunen 2005). A number of social theorists posit that modern sociality is increasingly mediated by objects and material artifacts (Knorr-Cetina 1997), and

epistemic objects and artifacts mediate human activity (Miettinen and Virkkunen, 2005).

The literature refutes the assumption that epistemic objects such as a molecule, a production system, a disease, or a social problem (Knorr-Cetina 1997) and artifacts, such as flipcharts, post-it notes, or symbolic artifacts such as 'cube', 'pledge walls' or Lego-based models, have stable properties that predetermine their use (Whittington et al. 2006). Instead, these artifacts are epistemic objects that gain meaning within the process that is being used in knowledge work by managers. 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. Therefore, 'strategy' artifacts do not have innate properties, but they become meaningful artifacts within the context of the strategy work within which they are used (Whittington et al. 2006). Thus, epistemic objects are not static, but they change continuously and acquire new properties during their use (Knorr-Cetina 2001).

Kaplan's (2011) inquiry into PowerPoint's role in strategy work suggested that an artifact should not be characterized simply in terms of it being an effective or ineffective tool. Instead, the study indicated that the use of PowerPoint enabled a collaborative effort by managers to negotiate meaning in an uncertain environment, and it created spaces for discussion that allowed ideas to evolve. The research showed how PowerPoint slides as an artifact were inter-related with discursive practices that shaped the outcomes of investment decisions in a telecommunications firm. Because PowerPoint functioned as both a medium and an outcome of discursive process, its use was essential to the firm's strategy-making process (Kaplan 2011).

Similarly, Vaara, Palli, and Sorsa (2010) illustrated how strategic plans, such as text documents, shaped and were 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 new kind of inspection practice and the creation and implementation of a new set of tools necessary for carrying it out. The research suggested that epistemic objects and artifacts mediate managerial activity and they can be instrumental as "generators of new conceptions and solutions and can be regarded as a central source of innovation and reorientation in societal practices" (Vaara, Palli, and Sorsa 2010, p. 438).

Jarzabkowski, Spee, and Smets (2012) assessed the impact of material artifacts on reinsurance agents' appraisal of underwriting deals offered to them for 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 deals offered to them by primary underwriters. The study demonstrated that strategy work is socially accomplished as a knowledgeable process within the situated use of material

artifacts. Moreover, the research found that the situated use of artifacts evolved with the unfolding use of subsequent artifacts. This implied that artifacts are linked to each other and each artifact builds on the knowledge and understanding embedded in the other. This finding seemed to confirm Whittington et al. (2006) research that showed how a cultural artifact encoded in the outcomes of a strategy workshop, including the cultural representation of the organization embodied in a cardboard 'cube' as an artifact evolved over time with the progression of the firm's strategic change initiative.

Related to the epistemic object literature is research on boundary objects. This literature explores how repositories, forms, sketches, drawings, workflow matrices, physical and IT objects such as PowerPoint, metaphors, and narratives "play an important role in coordinating and cross-disciplinary work" (Nicolini, Mengis, and Swan 2012, p. 616). Boundary objects, although they share similar properties with material and other epistemic artifacts, are seen predominately in the context of their function as translation devices, or boundary spanning tools, between professional boundaries and work communities.

The idea of boundary objects derives from the field of science studies, and it highlights the capacity of these artifacts to support collaboration and act as bridges across diverse groups of specialists (Carlile 2002, 2004; Carlile and Reberich 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 individuals or groups taking part in the cross-disciplinary effort. The difference in understanding, and the status that collaborating partners attribute to boundary objects, may make a difference between a successful and an unsuccessful cross-disciplinary endeavor. In order for boundary objects to provide support for a collaborative effort they should provide the motive and drive for collaboration to emerge. 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 should also possess the capacity to be experienced as epistemic objects that embody what one does not yet know. 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).

The above literature suggests that strategy work is increasingly mediated by epistemic objects and material artifacts. Kaplan (2011) and Jarzabkowski, Spee and Smets (2012) point out that strategy work is not only about the analysis of the industry structure, competitive positioning, or resources, as assumed in content-based strategy research, but it is also about how the production and use of epistemic objects shape managers' ideas in different contexts of strategy work.

Causal maps as epistemic objects

Research in cognitive science is predicated on the assumption that decision-makers construct a simplified representation of reality, or a 'mental model', that they use in an effort to navigate an uncertain and ambiguous world. This 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 for revealing decision-makers' subjective beliefs in a graphical form so that they can be examined (Eden 1992; Eden et al. 1992). A map is not a full representation of an individual's or a group's entire belief system, however 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 a 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 'sense making' underpin much of the theoretical development of causal mapping practice. 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 described how people make sense of the world in order to act on it. He saw people as problem solvers who make sense of the world through the use of a system of constructs that enables them to develop a definition of the situation they face. Kelly's 'repertory grid' technique is a type of a causal map in that it identifies how a stimulus that arises from a situation is mapped on a construct. 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 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, in a chaotic, anarchic world of organization, managers need abstractions to smooth over differences, and maps provide 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. According to Weick the important feature of a causal map is that it leads managers to anticipate some order ‘out there’. However, 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. 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). This 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.” Weick and Huff’s theorizing about casual maps as action oriented epistemic objects that may produce innovative solutions to problems is supported by Miettinen and Virkkunen (2005) who state that epistemic objects as situated material artifacts are objects of inquiry that “produce novel and alternative ways of acting” (p. 438).

Causal maps in collective decision-making

Group causal maps are of particular interest in strategy work as important decisions are often made collectively by the members of top management teams. An effective use of group maps can be considered important in strategy work as these visual artifacts can be shared by a decision-making group, 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 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 of group brainstorming sessions, 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 outcomes that become visually elaborated as a map. This process provides the means for the decision-makers 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 are critical in order for groups to achieve substantive decision outcomes. Therefore, to assess the efficacy 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.

Group decision-making process issues

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 managerial attribution biases, groupthink, and conflict that may hinder the quality of outcomes and the acceptance of decisions by group members. 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.

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 (Amason 1996). These two types of conflict can have different outcomes. Cognitive conflict has been shown to improve decision quality, while affective conflict has been demonstrated to have a negative impact on decision acceptance by group members (Amason 1996; 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 is considered to produce lower quality decisions (Schweiger, Sandberg, and Ragan 1986).

The accepted assumption in the literature is that cognitive conflict improves decision quality and mitigates groupthink. 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 recommendations and assumptions than the consensus approach to 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 acceptance of their groups' decisions than did the subjects 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 produce a better quality decision, 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 an inverse relationship between conflict and decision outcome and group performance (Parayitam and Dooley 2011). Affective conflict tends to be emotional and focuses on personal incompatibilities or disputes (Amason 1996). Hence, too much affective conflict may hinder overall group performance (De Dreu 2006; Van Dyne, et al. 2002; Parayitam and Dooley 2011). Therefore, too much, or conversely too little, cognitive conflict does not improve group effectiveness. Parayitam and Dooley's (2011) results indicate that too much cognitive conflict in a group breeds contempt; therefore, moderate levels of

cognitive conflict should be maintained to ensure desirable decision outcomes and maintain group cohesion.

Managerial attribution biases

Managerial biases pose another challenge for effective group decision-making. The growing recognition of the importance of cognitive biases in strategy process research has resulted in a proliferation of studies to ascertain how strategic thinking influences strategy development and implementation. However, according to Hodgkinson et al. (1999) there have been relatively few attempts to evaluate the effectiveness of causal mapping techniques to facilitate organizational actors' representations of strategic phenomena that would have practice value in applied settings. Hodgkinson et al. (1999) and Maule and Hodgkinson (2002) studies were an attempt to evaluate the efficacy of causal mapping to determine if this technique could decrease, or eliminate, the 'framing bias' in strategic decision-making.

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, the researchers 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 findings carried out with students, novice decision-makers, and managers, as experienced decision-makers, suggest that a causal mapping technique can help managers to overcome 'framing biases' of the sort identified by behavioral decision researchers, under controlled, experimental conditions. However, the findings are not fully conclusive as demonstrated by Wright and Goodwin (2002) who replicated Hodgkinson et al. (1999) research. Wright and Goodwin argued 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 has not been demonstrated or explained. In addition, these experiments were not administered to decision-making groups. Therefore, additional research is needed to ascertain the effectiveness of causal mapping as a tool to reduce cognitive biases in a collective decision-making context.

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 to create a balance between cognitive conflict and decision acceptance. 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 following intertwined characteristics:

Table 1 - Characteristics of effective group causal maps

Substantive Outcomes	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 are important for the group to address.
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 before a process of convergence beings.
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.
	Mapping provides and opportunity for the development of personal and professional relationships that enables continuing joint working.

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, 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 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 groupthink and other managerial biases. However, this 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.

Theoretical framework for epistemic objects in collective decision-making

Drawing on the above literature review, this section develops a conceptual framework for the role of epistemic objects in collective decision-making. The central contention of the model is that the social construction of an epistemic object, a group causal map, by managers when working collectively on a strategic decision problem, improves the quality of the decision-making process. The model proposes that the construction of the map facilitates managers to make sense of the problem situation, surface multiple decision perspectives, elaborate and build on emerging alternative claims, and create innovative, de-biased and shared outcomes to the problem (Huff 1990; Weick 1990; Fiol and Huff 1992; Nutt 2002; Hodgkinson and Sparrow 2002; Eden and Ackermann 2010).

Figure 1 depicts the model of epistemic objects in collective decision-making. A number of propositions are generated from the model to explore the efficacy of epistemic objects to improve the quality of the collective decision-making process.

Insert Figure 1 here

Proposition 1

The social construction of an epistemic object in a collective decision-making context increases cognitive conflict as managers seek to uncover how to use a group causal map to define the decision problem.

At the beginning of the mapping process managers are forced to agree how to commence the map construction in order to define the decision problem. Mapping is a complex task and it will take some time by managers to understand how to construct the map (Ambrosini 2001; Ambrosini and Bowman 2002, 2008). This creates an environment where conflicting views on how to begin the mapping process are debated. This preliminary stage will act as a team building exercise for the decision-making group to become an effective problem-solving 'team' for the purposes of a specific decision problem.

Proposition 2

The social construction of an epistemic object in a collective decision-making context increases cognitive conflict as multiple perspectives/claims are surfaced and discussed as the group causal map construction evolves.

Having agreed the best way to construct the map leads the managers need to consider how to define the decision problem. The mapping process engages the decision-makers to debate multiple perspectives/claims as the map is collectively constructed and new perspectives are added onto the map. Cognitive conflict increases as the construction of the map proceeds and the number of competing perspectives/claims on the map increases.

Proposition 3

The iterative process of map creation and the consideration of multiple perspectives/claims continue until the decision-makers have exhausted all alternative perspectives/claims hence increasing cognitive conflict and surfacing of multiple perspectives/claims.

This social construction of the map continues through a cycle of collective debate and reflection until the decision-makers agree that all alternative perspectives/claims have been exhausted and a decision-outcome has been agreed upon by all decision-makers.

Proposition 4

The social construction of an epistemic object in a collective decision-making context where managers' individual perspectives/claims are made visible on the map moderates the emergence of affective conflict.

The emergence of alternative perspectives/claims increases cognitive conflict that may spill into affective conflict. However, it is proposed that the mapping process moderates the emergence of affective conflict as the map construction is a group effort, and as managers' individual perspectives/claims are being made visible throughout the mapping process. The map and the mapping process become shock absorbers that allow group members to release anger, tension, and frustration (Eden and Ackermann 2010).

Proposition 5

The social construction of an epistemic object in a collective decision-making context where managers' individual perspectives/claims are made visible on the map increases decision acceptance.

As the mapping process moderates the emergence of affective conflict (Proposition 4), this in turn leads into a high acceptance of the decision outcome by all decision-makers. As Parayitam and Dooley's (2011) research indicates, too much cognitive conflict in a group breeds contempt. Therefore, the moderating effect of the mapping process creates and maintains cognitive conflict without it spilling into affective conflict.

Proposition 6

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

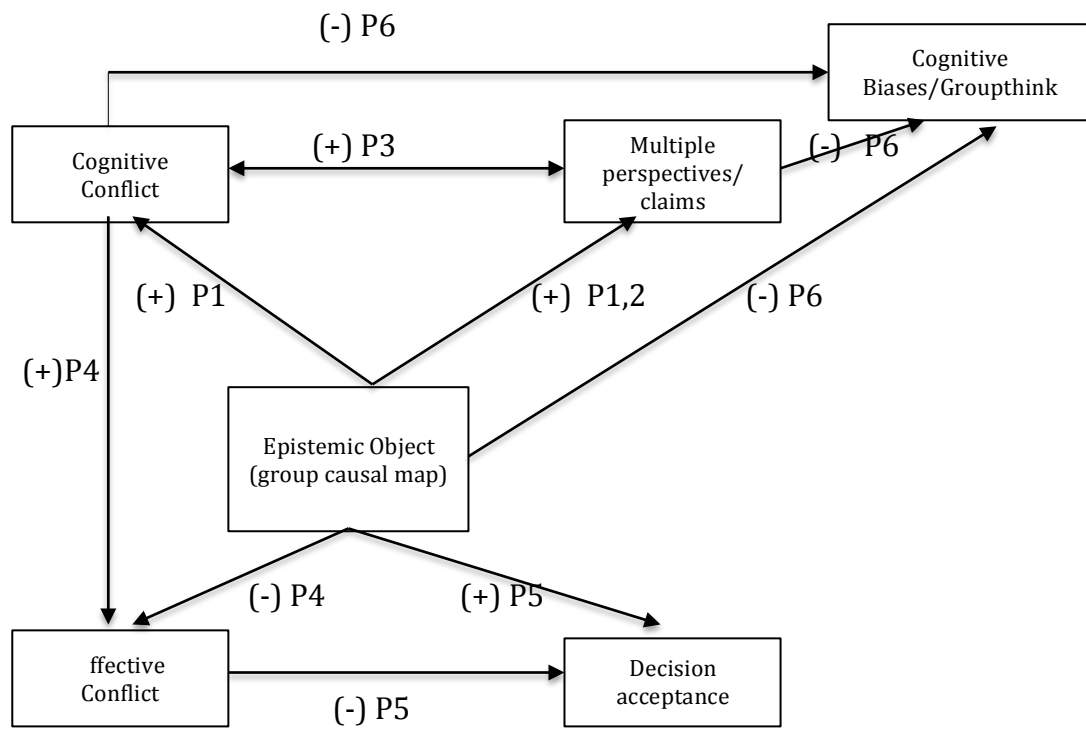
There is preliminary evidence that causal maps as epistemic objects reduce cognitive biases (Hodgkinson and Sparrow 2002). It is proposed that the mapping process that encourages surfacing and debate of alternative perspectives/claims act as a debiasing mechanism in a collective decision-making context. In addition, the moderating effect of the mapping process in the emergence of affective conflict encourages a robust debate of competing decision perspectives/claims. This creates a decision-making environment that reduces the emergence of the groupthink bias.

Conclusions and future research directions

This conceptual paper has tried to address the gap in the literature on how managers can use epistemic objects as material artifacts to improve the quality of the decision-making processes in a collective decision-making context. In particular, the paper has attempted to provide a basis for future research into the actual practice of what managers 'do' when they engage in strategy work (Jarzabkowski and Wilson 2006). Such research would make a contribution to the knowledge into material artifacts and how they are engaged in strategizing.

The first step in the research program would be to test the propositions put forward in the conceptual model presented here. One fruitful avenue of research would be to observe how managers make decisions in practice using epistemic objects such as group causal maps. Another area of research could be a comparative research undertaking to compare and contrast epistemic object-based decision-making processes with other decision-making interventions that motivate certain decision-making behaviors such as devil's advocacy and dialectical inquiry. Finally, a more specific area of research would be to replicate previous research undertaken by individual decision-makers on the efficacy of causal maps in eliminating cognitive biases in a group decision-making context.

Figure 1 – Model of epistemic objects in collective decision-making process



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