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The role of cognitive load in effective strategic issue management

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ABSTRACT

Firms have different ways of addressing issues emerging from outside their regular calendar-driven strategy processes. These practices tend to be unstructured, organization specific, and highly dependent on the characteristics of the strategic issues themselves. Building on three dimensions of cognitive load—intrinsic, germane, and extraneous cognitive load—we extend existing research on strategic issue management by showing how different team-level choices in strategic issue processing and organizational congestion interact in their effects on a firm's strategic issue management performance. Based on an in-depth analysis of all 92 strategic issue decisions in a large multinational firm during a three-year period, we find that organizational disturbances influence strategic issue initiation by top management, which in turn influences the quality of strategic issue management practices and subsequent performance outcomes. We conclude by providing recommendations for managers on how they can decrease the sensitivity of their companies' strategic issue systems to external disturbances.

Introduction

Many organizations experience sudden, unexpected changes in their business environments due to, for example, the emergence of new types of competitors, disruptive technologies, or economic crises. Developing a capability for strategic issue management has been proposed as a potential solution for anticipating and dealing with such changes (Ansoff, 1980; Dutton and Duncan, 1987; Dutton and Ottensmeyer, 1987).

While there is an extensive body of research on strategic issue management (Dutton and Duncan, 1987; Dutton and Jackson, 1987; Julian and Ofori-Dankwa, 2008) and the cognitive underpinnings of organizational responses to external changes (Barr and Huff, 1997; Barr et al., 1992; George et al., 2006; Gregoire et al., 2010), prior research has tended to focus on individual strategic issues and their characteristics, such as the salience of a strategic issue (Bundy et al., 2013) or whether the issue is perceived as an opportunity or threat (Dutton and Jackson, 1987).

We extend this research by examining what occurs when multiple simultaneously co-occurring strategic issues must be managed in parallel. We contribute to strategy research by introducing cognitive load theory (c.f., Kirschner et al., 2009a;

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Sweller, 1988; Sweller et al., 1990) as a novel theoretical lens to examine what occurs in organizations when management must address multiple parallel strategic issues. We extend the existing strategy literature by conceptualizing the strategic issue management process as a learning process instead of a process of information collection and analysis. We find that conceptualization corresponds well with reality because strategic issues tend to be learning episodes not only for the individuals involved but also for the organization as a whole.

Based on an analysis of strategic issue processing in a Global Fortune 500 firm during a three-year period, we find that the crowding or "congestion" of the firm's strategic issue management system has a major effect on the firm's ability to respond to strategic issues. Our notion of "organizational congestion" contributes to an improved understanding of the dynamics associated with strategic issue management by building on two streams of literature: (1) research on cognitive load theory, which has previously been predominantly used in educational research (e.g., de Jong, 2010; Kirschner et al., 2009a, 2011a; Renkl et al., 2009), and (2) research on the effects of multilevel information-processing structures in strategic issue management (e.g., Corner et al., 1994; Thomas and McDaniel, 1990; Thomas et al., 1994; Thomas and Trevino, 1993).

We will next provide an overview of cognitive load theory and its development over time, followed by a brief review of prior research on strategic issue management. We then put forward our hypotheses and describe the research setting, methods, and measures. We conclude with a discussion of our findings and implications for future research.

Theory and prior research

Cognitive load theory

The core premise of cognitive load theory is that the working memory of an individual is limited (Sweller and Chandler, 1994). If a learning task requires more capacity than can be accommodated by an individual's working memory, an individual can experience cognitive overload (e.g., de Jong, 2010; Yun et al., 2010).

While the limitations of human cognitive capacity have been known for several decades (e.g., Miller, 1956), cognitive load theory is commonly regarded to have originated from studies in the 1970s in educational psychology focused on the effectiveness of student problem solving (Sweller, 1976, 1980). Early tests involved attempts to improve learning through means-ends analysis, i.e., identifying the goal state, possible sub-goal states, and the current state. Identifying the goal state did not, however, improve learning. Instead, students performed better when they were presented with goal-free problems without consideration of the end goal (Sweller et al., 1982). The concept of cognitive load was formulated at the end of the 1980s in recognition of the limitations of the working memory capacity of individuals (Sweller, 1988; Sweller et al., 1990).

The understanding of cognitive load was refined in the 1990s with a finer-grained distinction between intrinsic, extraneous, and germane cognitive load. Intrinsic cognitive load is caused by the nature of the subject matter or the natural complexity of the information processed. Extraneous cognitive load refers to the extra effort imposed by the format of the instruction, e.g., irrelevant or extra cognitive activities related to the instructional format (Chandler and Sweller, 1992; Sweller and Chandler, 1994). Germane cognitive load is caused by the active processes involved in interpreting, exemplifying, classifying, inferring, differentiating, and organizing information that is required by effortful learning aimed at schema construction (Chandler and Sweller, 1992; Sweller and Chandler, 1994).

These three types of cognitive load were linked to the notion of the human cognitive architecture, which consists of practically limitless long-term memory, limited working memory, and the learning mechanisms of schema acquisition and automation (Sweller and Chandler, 1994; Sweller et al., 1998). Schemata are defined in cognitive load theory, consistent with schema theory (e.g., Bartlett, 1932), as cognitive constructs that organize information according to the manner in which it will be processed (e.g., Sweller and Chandler, 1994; Sweller et al., 1998). They are stored in longer-term memory and are instrumental in reducing working memory load. Because schemata are processed either consciously or non-consciously, automation is seen to play a major role in schema construction by helping alleviate the cognitive load of working memory.

Although cognitive load theory has, over time, informed a number of important findings related to individual-level cognitive learning processes, including the split attention effect, the redundancy effect, and the expertise reversal effect (e.g., Chandler and Sweller, 1992; Kalyuga et al., 2003; Sweller, 2004), studies of collaborative learning have emerged only recently in research on cognitive load theory (e.g., Kirschner et al., 2009a, 2009b, 2011a). Collaborative learning studies have typically focused on either the individual-level or group-level outcomes of the learning process.

Compared to the individual-level learning process, an important characteristic of the collaborative learning process is the additional cognitive load caused by the coordination required in the interaction patterns between individuals (Kirschner et al., 2011b). This coordination requirement is similar to the coordination requirements of transactive memory systems (Ren and Argote, 2011; Wegner et al., 1985), a concept used in organizational learning literature to refer to a collective system that individuals in close relationships use to encode, store, and retrieve knowledge that has also recently been integrated in group-level extensions of cognitive load theory (Fraidin, 2004; Janssen et al., 2010; Kirschner et al., 2011b). While the division of a learning task among multiple persons can be used to alleviate the limitations of cognitive load capacity and improve performance, collaborative learning results in a new type of cognitive load (Fraidin, 2004; Janssen et al., 2010; Kirschner et al., 2011b).

Collaborative learning trades off some of the intrinsic cognitive load (i.e., the difficulty of the problem) for extraneous cognitive load (i.e., the complexity of the process). In some situations, this trade-off might be particularly desirable, for example, if the intrinsic cognitive load of the task is significant and the team members are particularly trained in

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