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Organizational adaptation to disruptions in the natural environment: The case of climate change

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Summary Dynamic and intensified changes in the global ecosystem result in significant disruptions to the natural environment. One of the most prominent examples of this is climate change and the resulting natural disasters. As firms are embedded within the natural environment, they need to adapt to any environmental disruptions that transpire. Using Swiss and Austrian electric utilities as case studies, this paper empirically explores the underlying organizational capabilities necessary to enable adaptation to climate-related disruptions to a firm's resource supply, production processes, and product distribution. Through a case- and literature-based iterative process of analytical induction, three organizational capabilities are derived: climate knowledge absorption as an essential information generating and internalizing capability, climate-related operational flexibility as a short-term adjustment capability, and strategic climate integration as a long-term, innovation-focused capability.

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Introduction

The 4th assessment report of the Intergovernmental Panel on Climate Change (IPCC, 2007b) clearly states that the evidence for global climate change is 'unequivocal.' This requires both that civil society acknowledges a significant change in the global ecosystem, and that organizations embedded in the natural environment learn to cope with the consequences of this change. Recent natural disasters, such as the extensive flooding in the summer of 2002 and the extremely hot and dry summer of 2003 in Europe as well as the multiple hurricane landfalls in the US in 2005 and 2008, demonstrate three important features of this change in the natural environment: the change is very dynamic, it has

intensified in the recent past and is expected to further intensify in future, and it results in substantial disruptions of an organization's surrounding environment. As a result of this environmental change, firms need to adapt. Focusing on firms in the electrical power industry, this exploratory study empirically investigates the consequences of climate change on a firm and examines an organization's capabilities to adapt to this change.

Every organizational change is influenced by external and internal conditions (Ginsberg, 1988). The external conditions relating to disruptions in the natural environment are pre-determined by the changing ecological system (e.g., IPCC, 2007b). There is no direct cause–effect relationship between the individual behavior of an organization and the general magnitude of the (global) change in the ecological system and corresponding disruptions. However, it is important to note that organizations are embedded within the natural environment (Starik & Rands, 1995) and, as such, there is a causal relationship between the functionalities of the ecological system and the flourishing of organizations within this

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system. Therefore, with regard to internal conditions, organizations can develop strategies and mechanisms for reducing their exposure to such disruptions. Organizations have the ability to change their strategies in a proactive manner in order to prevent any potential negative impacts on the organizations' physical assets, facilities, and production processes. I base my arguments on this logic and draw on the resource-based view of the firm (Barney, 1991; Wernerfelt, 1984) and organizational capabilities (Amit & Schoemaker, 1993) as important organizational resources. More specifically, I refer to a literature stream in the domain of organizations and the natural environment, which analyses organizational capabilities and corporate proactive environmental strategies (e.g., Aragon-Correa & Sharma, 2003; Sharma & Vredenburg, 1998).

At the centre of this analysis is the following research question: what kind of capabilities do organizations require in order to adapt to disruptions in the natural environment? The analysis focuses on the organizations' exposure to climate change-related disruptions and the necessity of organizations to plan for and successfully navigate them. By analyzing electric utilities, I derive three organizational capabilities for adapting to climate change-related disruptions. I discuss these findings in light of the concept of absorptive capacity (Cohen & Levinthal, 1990), and provide insights for further inquiry into this area.

Theory

Organizational capabilities and the natural environment

The concept of organizational capabilities is rooted in the resource-based view of the firm. Based on the early work of Wernerfelt (1984), a variety of authors have contributed to the development of the resource-based view (e.g., Barney, 1991; Barney, Wright, & Ketchen, 2001; Foss, 1998; Helfat & Peteraf, 2003; Lavie, 2006; Makadok, 2001; Miller & Shamsie, 1996; Oliver, 1997; Peng, 2001; Peteraf, 1993; Prahalad & Hamel, 1990; Priem & Butler, 2001). By focusing on the tangible and intangible resources within organizations, the main question this theory seeks to address is why some firms outperform others (Barney & Clark, 2007). As an answer, it is suggested that organizations develop and deploy resources that are rare among competitors, imperfectly imitable, non-substitutable, and valuable in terms of exploiting opportunities and/or neutralizing threats (Barney, 1991). As such, the resource-based theory is centred on the issue of how a firm can achieve a competitive advantage. However, this is not a static consideration. Also discussed is the fact that according to resource-based logic firms have a sustained competitive advantage when the competitive advantage achieved is lasting (Barney & Clark, 2007). This notion becomes important when using arguments drawn from the resource-based view within the debate on organizations and their external surroundings: maintaining a sustained competitive advantage requires organizations to successfully adapt resources to a changing external environment.

Drawing on the resource-based view, some scholars have suggested that resources refer to the fundamental assets owned or controlled by the organization while capabilities,

by contrast, refer to the organization's capacity to deploy and exploit its resources (e.g., Amit & Schoemaker, 1993; Hill & Jones, 1992; Makadok, 2001; Teece, Pisano, & Shuen, 1997). Following this line of thought, capabilities are information-based assets since they are based on "developing, carrying, and exchanging information" (Amit & Schoemaker, 1993). As such, organizational strategies and the corresponding desired outcomes depend upon specific capabilities (Barney & Hansen, 1994; Felin & Foss, 2009). Organizational capabilities are essential for any required organizational modifications (Wernerfelt, 1984) in response to a changing external environment (Barnett, Greve, & Park, 1994; Helfat & Peteraf, 2003; Levinthal & Myatt, 1994). Based on Cohen and Levinthal's (1990) seminal paper, absorptive capacity has emerged as a key construct in this context. This can be defined as "a set of organizational routines and processes by which firms acquire, assimilate, transform, and exploit knowledge to produce a dynamic organizational capability" (Zahra & George, 2002). Based on a literature review reflecting the academic work in this domain since then, Volberda, Foss, and Lyles 2010 develop an integrative framework that identifies the dimensions, its antecedents and outcomes, and the contextual factors that can be related to absorptive capacity.

Transferring the resource-based view to the natural environment, Hart (1995) notes that companies require specific resources and capabilities in order to remain competitive under ecological constraints. Various more recent research identifies the organizational capabilities required for lowering companies' environmental impact and proactively responding to ecological challenges (e.g., Aragon-Correa, Hurtado-Torres, Sharma, & Garcia-Morales, 2008; Aragon-Correa & Sharma, 2003; Darnall & Edwards, 2006; Hall, 1993; Sharma & Aragon-Correa, 2005; Sharma & Vredenburg, 1998). A key conclusion drawn by this research is that it is sensible for organizations to develop and deploy capabilities in the natural environment context when the following two conditions are fulfilled: (1) there is a nexus between organizational behavior and issues related to the natural environment, meaning that firms can adapt to a changing natural environment and/or improve their environmental performance. (2) Managing these issues can generate a competitive benefit. This means that firms should implement proactive strategies that address the issues related to the natural environment.

Dynamic changes in the global ecosystem

Since organizations are embedded within the global ecosystem, they affect the natural environment and are in turn affected by changes in the natural environment (Winn & Kirchgeorg, 2005). The term 'carrying capacity' addresses the ability of the global ecosystem to absorb pollution discharges such as air emissions and it delimits the critical flows of these substances from the anthroposphere to the ecosphere. The carrying capacity of the natural environment is normally considered a stable business condition, i.e. organizations take a technocentric view and presume that the current status quo will remain stable within a given planning horizon (Gladwin, Kennelly, & Krause, 1995). However, recent dynamics in the global ecosystem constitute an increasingly salient driver of external change for organizations. The key question is whether these dynamics in the global ecosystem are substantively

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