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## **Understanding constraints and enablers of search and innovation in strategic environmental innovation**

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### **Abstract**

My dissertation covers the study organizational aspects of strategic environmental innovation. Using the cases of two Finnish companies in the oil industry, I intend to look deep into innovation processes and strategizing in order to understand the interplay between practitioners, practices and praxis and explain how this interplay creates constraints and enablers for innovation. Drawing upon practice theory, I follow the emergent perspective of strategy as practice, using Giddens' structuration theory as an interpretive framework to analyse processes of strategic environmental innovation. Theorizing from data analysis is mainly focused on narratives, supported by other sensemaking strategies as discussed by Langley. This research approach opens up macro and micro perspectives and allows us to penetrate on the "blackboxes" of prescriptive innovation frameworks and predictive strategy frameworks. Despite being useful, these are reductionist and prevent a comprehensive and deep understanding of the phenomena at stake. This dissertation aims to contribute to fill this gap in innovation research because it may bring about deeper insights which allow overcoming the barrier of looking at processes as solely temporal progressions. The conceptual paper presents a proposed theoretical framing and methodological choice for examining strategy and technology development processes in strategic environmental innovation driven by regulation shifts. It offers a grounding for discussion, just before the initial phase of collection and exploration of preliminary empirical data.

## 1. Research phenomena and research questions

In Europe, many green innovations have been driven by environmental regulations created within the European Commission and adopted in each member-country. As examples of such innovations, I highlight unleaded gasoline, catalytic converters for internal combustion engines, chlorine-free office paper, compact fluorescent light bulbs and biofuels. Thus, environmental regulation became a driving force of green innovation both in local companies and in multinational companies doing business in Europe. Moreover, regulation is usually tightly linked with policy and is used as an instrument to enforce shifts in companies in order to reduce the environmental impact of business. Such enforced changes have implications in the strategic, operational and technological domains.

Recently, oil companies operating in Europe have been confronted with regulation that forces them to include biofuel content in fuels commercialized for transport purposes. Faced with this need to change the product offering, those companies have followed different paths in terms of strategy and technology development, therefore creating different product offerings. The technology forcing caused by new regulatory requirements created a complex problem of exploration in organizations that usually focus in exploitation. I attempt to understand how these distinct courses of action came into being, by examining the interplay between regulation enforcement, strategizing and technology development.

In my dissertation work, I intend to understand how organizational aspects and the external institutional and social contexts play a role as constraints and enablers of innovation. Following this, my main research questions are:

- I. How do problem framing, managerial and organizational cognition, strategic motivations play a role as enablers and constraints in the activities of search for new strategies and offerings that require technology innovation?
- II. How do these enabling and constraining roles relate with the interplay between environmental regulation and policy, the company's strategy and technology development?

In this phase of the dissertation work, the main research questions have the purpose of being a guiding vector of research. Therefore, they are open enough to adapt to insights from the dialogue between the theoretical framework and the preliminary and exploratory analysis of empirical data.

## 2. Theoretical approach

This dissertation intends to study organizational aspects of strategic environmental innovation in organizations - that is, its phenomena of focus is innovation which reduces or aims to reduce the environmental impact of business. I adopt the notion of innovation search as a problem-solving activity (Nelson & Winter, 1982) and the notion of change process as a sequence of events that unfold in the phenomenon of change (Van de Ven & Poole, 1995). Research will set out by drawing upon existing work about the organizational dynamics of search processes (e.g., Katila & Ahuja, 2002; Ahuja & Katila, 2004) and about managers' focus of attention, cognition and framing (e.g., Ocasio, 1997; Eggers & Kaplan, 2008; Kaplan, 2008) in order to build a theoretical framework that supports the understanding of strategic renewal due to technological change and regulatory shifts.

Strategic environmental innovation may be initiated by internal or external drivers, whose nature is diverse (e.g., response to competitors, compliance with regulation, internal initiatives). The linkage between driving forces and outcomes of innovation is a recurrent theme in sustainability strategy literature, which makes of it a relevant research topic both for academia and for management practice. Yet, such relationship is problematic insofar as its complex nature cannot be fully understood through the existing frameworks. Only by looking deep into the practices of strategy and innovation it is possible to grasp the various elements which are weaved into that relationship.

I take the assumption that theories of process intend to understand and explain the unfolding of processes over time (Van de Ven, 1992). The strategy and technology changes that oil companies have been going through as a response to the need of compliance with recent environmental regulations can be regarded as processes. Nonetheless, process theories focus on sequences of change events and this emphasis on trajectories, directions and paths leaves out the actual strategic episodes that constitute bits and pieces that may gather to form the "whole" of strategy. For instance, research on processes may discard serendipity or indirect contributions of past episodes that resonate in a process happening in the present.

Moreover, I intend to study how the institutional and social contexts interplay with corporate strategic and technological development. Therefore, it makes sense to draw upon the stream of strategy-as-practice as a framework for attempting to understand the phenomenon in question. Notwithstanding the use of strategy-as-practice as a reference, I consider that theories of process may be extremely useful to define the research methodology and design. Langley (2007) contends that the strategy-as-practice perspective includes process thinking, but focuses on a micro-level that may not necessarily be part of process research. Process research offers to research in strategy a contribution for more detailed, rich and interpretive insights into strategizing, which "resonate with experience while incorporating theoretical insight" (Langley, 2007: p.277), in a similar way that practice-based research does.

Considering the need for an alternative perspective into this research topic, I intend to draw upon the emergent stream of strategy-as-practice to investigate the practices and social structures that play a role in this particular kind of innovation. The strategy-as-practice perspective arises from the lack of understanding about strategy work and strategizing and attempts to offer an alternative to process-based strategy research. (Lounsbury & Crumley, 2007). It is grounded on practice theory and regards strategy as "something people do" in organizations (Jarzabkowski, 2004: p.489), thus offering an alternative research point of view to the strategic management traditions. Essentially, this

theoretical and methodological perspective suggests a research on the practice of people who do strategy (Jarzabkowski & Whittington, 2008).

In recent years, increasing attention to social and environmental aspects of business contributed to an emerging body of management practice that draws upon sustainability strategies and the notion of innovation as a driver of sustainability (Nidumoulu et al., 2009). These strategizing processes are poorly studied. Nonetheless, they are extremely interesting due to the inherent sociological, cultural and political dimensions, and to the paradoxes that they create in organizations. By looking at these phenomena from the emergent perspective of strategy-as-practice (Jarzabkowski, 2004; Whittington, 2007; Kaplan, 2008), I attempt to provide a deeper understanding of how the processes of search for novel strategy directions unfold and how certain managerial and organizational aspects influence the direction of strategic renewal.

In particular, the phenomena I wish to look at from a strategy-as-practice perspective are the search activities which are part of the early stage of environmental strategic innovation. In the case of this dissertation topic, these are activities characterized by the strong driving forces of regulatory requirements and resource restrictions. A key question is: how do practices, social structures and individual action interplay to constitute constraints and enablers of strategic environmental innovation?

In order to frame organizational aspects within shifts in the external institutional context (e.g., changes in regulatory requirements), I will attempt to call upon social theories that address the relationship between agency and structure, namely structuration theory (Giddens, 1984) and practice theory (Bourdieu, 1990). Theories of practice can inform process theory by providing it with additional understanding of what actually happens within a sequence of events (Schatzki et al., 2001). This means looking at strategic innovation through sociological lenses as well, in order to grasp "connections, its embeddedness, its ironies, its problems and, finally, both its changes and its continuities" (Whittington, 2007: p. 1584).

The sociological theory of Giddens's (1984) - structuration theory - focuses on social practices ordered across space and time and the influences of structure and agency, in which structure is regarded as both a constraint and an enabler. Human action simultaneously reproduces and transforms social structures. Structuration theory is a theoretical lens through which I look at strategizing practices of environmental innovation, using it as a basis for theory-building from findings and in articulation with other theories. Giddens's work has been used before in practice-based research. Jarzabkowski (2008) used structuration theory as a framework of interpretation to understand and explain managerial strategizing behaviour.

Overall, the emerging strategy as practice approach is an alternative to mainstream takes on strategy research, since it conceptualizes strategy as occurring in various dimensions and levels within the organization, in interplay between practitioners of strategy, the strategic praxis and the broad strategy practice (Whittington, 2006: p. 619). In addition to finding this perspective a more insightful take on strategy, I consider that this approach is better suited to study the phenomena of constraints and enablers of innovation. It allows to investigate them in both macro and micro perspectives and to penetrate on the "black-boxes" of strategy frameworks which, despite being useful, are in many cases reductionist and prevent a comprehensive and deep understanding of the phenomenon at stake.

By all means, the interaction between organizational actors, day-to-day strategizing and shared meanings in the social external context is quite significant for strategic management itself, in the case of strategic environmental innovation. Nonetheless, strategy as

practice it is neither a theory nor a methodology. In fact, the strategy-as-practice stream is still in construction and its empirical work is pervaded by a multiplicity of assumptions and perspectives. Even so, it has set a challenging but very appealing ground for significant contribution from young and senior researchers.

### 3. Empirical approach and methodological choices

Starting from the problem of how framing, managerial cognition, search and strategizing are influenced by constraining and enabling organizational and social factors, I am focusing on a qualitative research approach that enables me to gain access to these processes and happenings at a micro level and to broader dynamics at the level of social structures and practices. Thus, the empirical research that I am conducting is mainly qualitative, supported in the analysis of interview material (semi-structured in-depth interviews) and documents.

I will develop case studies, which allow me to construct the processes of strategy and technology development episodes, emphasizing the role of managerial cognition and organizational (re)orientation along the search activities and in the strategic responses to technology change. My aim is to build a meaningful narrative, but the success of this effort will be strongly related to the existing public information and the nature of the information provided by the interviewees in the companies.

For the study of biofuels development in Finnish companies, a process that started around 2000 and continues in the present time, I have been planning to write case studies of two Finnish companies. One of them has given me permission to conduct interviews with key people and the other has welcomed a discussion for possible collaboration.

To make sense of empirical raw data from in-depth interviews, observation and documents, I will use a mix of qualitative analysis strategies that will mutually support each other: narratives, alternate templates, visual mapping and temporal bracketing (Langley, 1999). The purpose of this is to create grounding for a rich, coherent and insightful case study. An additional purpose of combining Langley's analysis strategies with case studies which focus on the interrelated processes of strategy and technology development is to provide a starting point for theorizing. Such a methodology enables me to bring about deeper insights about the phenomenon studied, which surpass the barrier of looking at those processes simply as temporal progressions (Van de Ven, 1992). Langley's (1999) sensemaking strategies for analyzing process data will support the approach to theorizing.

In addition to these analytical strategies - to be used with the broader set of data - I have started analyzing relevant documents with the methodology of critical discourse analysis (CDA). The discourse materials being currently analyzed are CEO reviews published in corporate annual reports. I draw upon Fairclough's (2003) critical discourse analysis as a methodological approach to investigate the shared social practices, dominant discourses and embedded meanings regarding innovation in biofuels in the oil industry. I consider that managerial practices and meanings can be accessed through language as constitutive of social identities and social relations, which will in turn make visible multiple social realities hidden or contested in discourse (Alvesson & Kärreman, 2000). In addition to this, I

analyse empirical data through the lens of structuration theory (Giddens, 1984), with focus on social practices ordered across space and time and the influences of structure and agency. I draw upon the notion that human action simultaneously reproduces and transforms social structures (Giddens, 1984).

Discourse analysis is an increasingly used methodological approach to understand management practice, mostly in cases marked by the interaction between organizational actors and the external business environment (e.g., Spicer & Fleming, 2007; Vaara & Tienari, 2008). Moreover, such analysis will be supporting the building of a narrative of events and interactions in the following phases of research.

#### **4. Potential contribution to academic work and to management practice**

Although the drivers that trigger strategic environmental innovation (e.g., response to competitors, compliance with regulation, internal initiatives) are widely studied, the linkage between driving forces and outcomes of innovation involves a complexity that cannot be fully understood through the existing frameworks. Only by looking deep into the practices of strategy and innovation it is possible to grasp the various elements which are weaved into that relationship. Thus, this empirical work drawn upon strategy-as-practice aims to be a contribution to the literature in strategic management, innovation and search by providing a deeper understanding of the interplay between managerial attention, framing and cognition and strategy and technology development. Moreover, I intend to contribute empirically, and perhaps theoretically, to the research stream of strategy-as-practice.

This dissertation work will contribute to existing literature in innovation, organizational search and strategic management. I will briefly describe the potential contributions for each topic.

Firstly, innovation research is characterized by prescriptive frameworks for the early stages of innovation (e.g., for the fuzzy front end, see Khurana & Rosenthal, 1997; 1998). In alternative, Van de Ven (1986) describes the interplay between new ideas, people, transactions and institutional context, in an attempt to understand the relationship of these key aspects with managing attention and problem framing. Yet, the alternatives to prescriptive studies have been mostly descriptive. Innovation literature lacks groundwork for theory-building that focuses on sensemaking, framing and cognition as elements of innovation strategy and its integration with corporate strategy. For instance, there is lack of understanding about how unintended events, unpredictability, serendipity and social interactions play a role in adopting dominant solutions or searching continuously for diverse alternatives to innovation problems, despite existing anecdotal evidence. This research project aims to create an empirical ground for the development of theory, while also advancing with theorizing from its findings.

Secondly, this research topic's take on organizational search follows the view of search as problem-solving efforts (Katila & Ahuja, 2002). Organizational search can follow

a few different directions. These directions may be influenced by the context of the regulatory requirements, the strategic intent of the organization and the framing of the environmental impacts of business, among other aspects, but also unpredictable events or unnoticed knowledge interactions between practitioners.

An approach to organizational search which researches the role of social, political and cultural dimensions of search may produce a valuable contribution for this field. It matters to distinguish between a direct motivation from the organization to reduce the environmental impact of business and the organization's need to act within a socio-political context that is constitutive of a specific framing of the "state-of-the-world". Socio-political aspects influence the framing of the problem to be solved, thereby potentially constraining search and, in consequence, the resulting innovation.

Finally, attention is intimately related to the search activity. Organizational attention is "the socially structured pattern of attention" (Ocasio, 1997; p. 188) which is attributed to decision-makers in an organization. However, I contend that the significant patterns of attention not only those of decision-makers or top managers, but also of other relevant individuals, such as product developers and middle-managers, which is consistent with the strategy as practice approach. Furthermore, other social actors and practices exert influence over the focus of attention, such as political actors, think tanks and regulators. In addition to this, attention comprises activities of "noticing, encoding, interpreting, and focusing of time and effort by organizational decision-makers" (Ocasio, 1997; p. 189) on categories of environmental stimuli (issues) and possible lines of action (answers).

As discussed by Ocasio (1997), the focus of attention is contextual and the subsequent action depends on the regulation and control exerted by rules, resources and social relationships in the organization. In this seminal work, a model of situated attention is used to explain firm behaviour and adaptation, through the theoretical elaboration on mechanisms that link the pool of issues and answers to organizational action. Building upon this model, I intend to contribute to it by providing an alternative understanding of the elements and relationship in the focus of attention and in situated attention, supported in practice theory. Particularly, I wish to understand how organizational factors and external context play a role in forming the focus of attention and how this focus of attention translates into organizational practices or reproduces broader social structures and practices.

In terms of management practice, this dissertation may provide valuable outputs for the management of innovation in organizations, especially of those developed within a strong institutional context such as biofuels. Firstly, in-depth case studies provide a company with a novel and insightful understanding of its innovation processes and with knowledge of the interactions between strategy and technology development. Such research outcomes are useful for future improvement of corporate development. Secondly, in the context of regulation shifts in Europe driving the development of refining technology for biofuels, European companies have pursued different strategies to comply with the new requirements. The research work will provide an account of the developments in competing firms and attempt to understand these different courses of action from the point of view of strategic motivations and company capabilities.

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