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Customer Co-Creation and Exploration of Emerging Technologies: The Mediating Role of Managerial Attention and Initiatives

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Prior research has emphasized the importance of organizational focus on exploratory behavior in response to the emergence of a revolutionary core technology and the associated uncertainties. The question of why some organizations are more successful than others at realizing and reacting to such a need has not yet been fully addressed. In particular, empirical evidence on the effects of customer orientation on the effectiveness of organizational responses to major technological changes is somewhat mixed. We develop and test a theoretical argument in which we emphasize an indirect link between customer involvement in innovation processes and exploratory behavior in emerging technology fields. In so doing, first we illustrate the part played by two managerial factors — attention to the technology and the introduction of non-routine organizational adaptations — in enabling exploratory activities such as experimentation and search for unfamiliar knowledge in a new technology field. Second, we discuss how customer co-creation contributes to both of these managerial factors and, consequently, indirectly stimulates exploratory behavior in these conditions. We provide empirical support for our related theoretical framework by means of six case studies and a survey among 131 companies that were adopting a similar emerging technology; i.e., Cloud computing.

Introduction

To compete and survive, organizations need to engage not only in activities that are orientated towards efficiency, but also in behavior that is exploratory, such as experimentation, variation and searching for new knowledge (Benner and Tushman, 2003; March, 1991). This requirement is even greater when the business environment becomes more uncertain (Jansen et al., 2006; Kim and Rhee, 2009; Sidhu et al., 2004), and particularly when exogenous shocks or revolutionary transformations such as major technological changes render organizations' core technologies and sources of competitive advantage obsolete (Romanelli and Tushman, 1994; Tushman and Anderson, 1986). Exploratory behavior concerns the discovery of new products, services and markets through enactment and interpretations, rather than planned improvements in performance, and such behavior is known to be crucial for established organizations dealing with a technological change that makes their existing knowledge less useful (McGrath, 2001). Despite the importance of looking for new options in such circumstances, not all organizations overcome the constraints imposed by their existing technological knowledge and expertise. In fact, some organizations attempt, often unwisely, to use the new technology to incrementally improve their existing offerings and thereby salvage their prior investments (Lavie et al., 2010). Existing research has not yet fully revealed the conditions under which organizations opt to focus on exploratory behavior and innovations when reacting to a fundamental change in technology and the associated uncertainties. In order to address this gap, we examine what may be achieved by involving customers throughout the innovation process, often referred to as "customer co-creation". This has been speculated to be an important influence on the search behavior of organizations when facing technological change (Bogers et al., 2010; Rosenkopf and Nerkar, 2001).

The impact of involving customers in the innovation and development processes, particularly when dealing with high degree of uncertainty brought by the emergence of a revolutionary new technology, is controversial and the findings provide a far from clear conclusion. Some scholars have been critical of intensive interaction and reliance on customers' input during innovation process, arguing that it contributes only to incremental and trivial product development activities (Bennett and Cooper, 1979) and myopic R&D programs (Frosch, 1996); they say that it therefore puts organizations at risk of being held "captive by their customers" and of failing to cope with technological change (Christensen, 1997, 8). Verganti (2009) goes so far as to assert that companies need to forget customer-centered innovation if they wish to achieve breakthroughs because

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radical innovations assume different contexts and user approaches than those with which customers are familiar. Others (e.g., Danneels, 2003; Stanley and Narver, 1998) have contested such inferences and argued that being very closely connected to its customers may improve an organization's responsiveness to external triggers. Some empirical research contends that co-creation as a whole contributes positively to exploration and helps organizations to tackle uncertainties (Carbonell et al., 2009) because it allows them to access customer knowledge (Bogers et al., 2010; Hienerth, 2006; Lüthje et al., 2005; Nambisan and Baron, 2010) that may lead to radical innovations (Lüthje and Herstatt, 2004; Lynn et al., 1996; Sánchez-González et al., 2009). Other studies, however, discuss how customer co-creation may undermine effective exploration in conditions of uncertainty because scarce organizational resources are allocated to intensive relationships and knowledge exchange with external parties that do not necessarily share the same long-term goals (Almirall and Casadesus-Masanell, 2010; Laursen and Salter, 2006). In this contested research landscape, we seek to provide more clarity by examining whether customer co-creation gives rise to a focus on exploratory behavior in organizations when they are responding to a revolutionary technology change and, if so, what the underlying mechanisms are.

In order to address our research questions, we focus on the important role played by senior managers in enabling their often-unprepared organizations to make an effective response to external forces (Eggers and Kaplan, 2009). Existing research on the drivers of exploration has focused largely on conditions of change which imply a certain degree of predictability, rather than abrupt and highly unpredictable revolutionary transformations such as those that follow the emergence of a new core technology (Lavie et al., 2010). As a consequence, a number of persistent and relatively stable senior management related variables such as risk aversion (Lewin et al., 1999) and entrepreneurial style (Covin and Slevin, 1989), the design and composition of management teams (Smith and Tushman, 2005), and demographics and leadership skills (Jansen et al., 2009; Vera and Crossan, 2004) have been put forward as antecedents of exploratory behavior. Based on the argument that responding to a technological change requires an organization to embrace a challenging and often painful process of reorientation (Eggers and Kaplan, 2009), we develop a conceptual framework in which there is an emphasis on the role played by senior managers' cognition and initiatives in enabling exploration in such conditions. We would suggest that these managerial roles are being directly influenced by organizations' customer co-creation strategies and the involvement of customers in innovation processes.

The main contribution of this paper is to the discussions on the antecedents of exploration orientation; in particular, we seek to address the research gap on the drivers of exploratory behavior in response to major technological changes (Lavie et al., 2010). We investigate the unique role of senior managers in the exploratory orientation of organizations facing major technological changes and we examine what effect the co-creation of value has in enabling them to perform such roles. This enables us to address the call for further research on the managerial capabilities that underlie effective organizational response to external change (Helfat and Peteraf, 2014) in the specific context of emerging technologies. We also contribute to the discussions on the role of customer co-creation strategies — and customer orientation in general — in company competitiveness and performance. This relationship has long been a matter of debate and many questions remain unaddressed. We address the little-understood effect of customer-centric innovation on firms' behavior in the early stages of technology and industry lifecycles (Bogers et al., 2010). We provide evidence that customer co-creation strategies influence managers' cognition and behavior and hence make organizations both more inclined to undertake exploration under conditions of uncertainty and more able to do so.

The context of this study is a revolutionary emerging technology, Cloud computing, which is at the top of the list of revolutionary forces in a wide range of industries. We scrutinize how customer co-creation strategy may influence whether companies are able to respond effectively to this wave of change. We discuss two common strategies for embracing Cloud: using it either to make minor improvements in existing offerings or to radically renew their products and services (exploratory innovation). The latter approach enables organizations to redefine the architecture of their solutions and to make better use of the full potential of Cloud. Looking at how companies have responded to Cloud gives us an ideal basis for understanding the reasons why organizations differ in their focus on exploration.

In this paper, we first use the existing literature to identify those drivers of exploratory behavior that are connected to value co-creation and that are currently less well understood in the kind of conditions we have described. We then develop a theoretical framework on the possible relationship between value co-creation and exploration in emerging technology fields, and on the mechanisms that drive such a relationship. To examine and elaborate on our related set of hypotheses, we analyze both qualitative and quantitative data. Using qualitative data is intended to enrich and further clarify the complicated relationship central to this study by providing details and examples. Our quantitative analysis provides statistical evidence concerning the hypothesized relationships. The paper ends with a discussion of the findings and some concluding remarks.

Customer co-creation and innovative behavior by organizations

Value co-creation can influence the innovative performance of an organization by providing access to product usage data, speeding up the innovation process, improving the quality of the offerings, and enhancing the reputation of a company and the image of its products (Carbonell et al., 2009; Gupta and Wilemon, 1990; Joshi and Sharma, 2004; Lengnick-Hall, 1996; Sawhney et al., 2005; Utterback, 1994). It also helps companies to recognize opportunities for making continuous improvements in their existing products (Grewal et al., 2006; von Hippel, 1988; Xie et al., 2008). Co-creation is suggested to be a precursor of firms' knowledge exchange and combination capacity (Kogut and Zander, 1992; Nahapiet and Ghoshal, 1998;

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