



## Linking dynamic-capability portfolios and innovation outcomes

Hanna-Kaisa Ellonen<sup>a,\*</sup>, Patrik Wikström<sup>b</sup>, Ari Jantunen<sup>a</sup>

<sup>a</sup> School of Business, Lappeenranta University of Technology, P.O. Box 20, 53851 Lappeenranta, Finland

<sup>b</sup> Jönköping International Business School, Media Management and Transformation Centre, Box 1026, SE-55111, Jönköping, Sweden

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### ABSTRACT

The objective of this paper is to explore the relationship between dynamic capabilities and different types of online innovations. Building on qualitative data from the publishing industry, our analysis revealed that companies that had relatively strong dynamic capabilities in all three areas (sensing, seizing and reconfiguration) seem to produce innovations that combine their existing capabilities on either the market or the technology dimension with new capabilities on the other dimension thus resulting in niche creation and revolutionary type innovations. Correspondingly, companies with a weaker or more one-sided set of dynamic capabilities seem to produce more radical innovations requiring both new market and technological capabilities. The study therefore provides an empirical contribution to the emerging work on dynamic capabilities through its in-depth investigation of the capabilities of the four case firms, and by mapping the patterns between the firm's portfolio of dynamic capabilities and innovation outcomes.

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### 1. Introduction

The firm's ability to continuously generate innovations is one of its most critical capabilities in today's business environment (e.g., Alegre and Chiva, 2008). Several studies have noted that the ability to innovate is idiosyncratic, even among firms operating under exactly the same environmental conditions. First of all, they may differ in the sense that one firm is able to generate significantly more innovations than another. Second, those that do generate a comparable number may produce different kinds of innovations. For instance, some firms tend to come up with innovations that make their extant knowledge and resources obsolete, while others for the most part generate the type that enhance rather than disrupt their existing resources. Third, the innovations may be equally radical, but differ in terms of what kind of resources or knowledge they disrupt, for instance, whether it is market-related or technology-related knowledge (e.g., Abernathy and Clark, 1985; Montoya-Weiss and Calantone, 1994).

Attempts have been made in a number of studies to explain this heterogeneity through exploration of the relationships between firms' organizational features and the characteristics of the innovations they produce (e.g., Benner and Tushman, 2002; Christensen, 1997; Danneels, 2002; Moorman and Miner, 1997; Sainio and Puumalainen, 2007; Tushman and O'Reilly, 1996). Some of these studies have relied on the work carried out by Teece et al. (1997) on dynamic capabilities, defined as "the firm's ability

to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" (p.516). This body of research argues that it is the differences in firms' dynamic capabilities that primarily explain the differences in innovative performance.

While these studies recognize the importance of dynamic capabilities in innovation on a conceptual level, current research has still failed to empirically identify their role related to different types of innovations. The objective of this paper is to address this knowledge gap and to explore the relationships between dynamic capabilities and different types of innovative output. We are interested in investigating what kind of capability-innovation combinations are to be found, and in whether differences in dynamic capabilities explain the types of innovation outputs. Such knowledge has considerable relevance to business practitioners since it may be able to indicate what kind of capabilities should be fostered in order to generate a desirable innovative output.

Wang and Ahmed (2007) proposed that research effort should focus on finding out the commonalities in dynamic capabilities between firms. Therefore, and given the scant number of prior studies on the subject, our project is structured as a comparative case study (e.g., Eisenhardt, 1989). Our research includes four cases from the publishing industry. The publishing industry is an industry which currently is highly dynamic and characterized by rapid technological change, which thereby makes it appropriate for studies into firms' dynamic capabilities. Building on a triangulated data set of interviews, observation and secondary data, we link their online product innovations with their dynamic capabilities.

\* Corresponding author. Tel.: +358 5 621 7251; fax: +358 5 621 7299.  
E-mail address: [hanna-kaisa.ellonen@lut.fi](mailto:hanna-kaisa.ellonen@lut.fi) (H.-K. Ellonen).

The paper is structured as follows. First we describe the theoretical background of our study and discuss different types of innovations, market and technological capabilities, and dynamic capabilities. Thereafter, we present our research strategy, methods and data. Then we give the findings of our empirical study, and conclude with a case comparison and a discussion of the theoretical and practical implications.

## 2. Theoretical background

### 2.1. Different types of innovations

Product innovations require an understanding of both customers and technologies (e.g., Danneels, 2002; Dougherty, 1992), and thus of both market and technological capabilities. Market capabilities are a combination of the market-related resources, processes and knowledge needed to serve current and potential future markets, while technological capabilities are a combination of tangible and intangible technically related resources, processes and knowledge, such as engineering know-how and quality-control procedures (Danneels, 2002, 2007; Day, 1994; Figueiredo, 2002).

Abernathy and Clark (1985) analyzed the role of innovation in competition, and suggested that its significance depended on its capacity to influence the firm's existing resources, knowledge and skills. The transilience map (Abernathy and Clark, 1985; Clark, 1987) is an analytical framework that combines the market dimension with the technology dimension. Innovations could thus be categorized based on their influence on existing market and technological capabilities in the four quadrants of the matrix. This map has been widely used in the categorization of innovations (see, e.g., Lagace and Bourgault, 2003; Maine et al., 2005; Spencer and Kirchhoff, 2006). The competence-based typology of new products proposed by Danneels (2002) also adopts the same basic principle, as innovations are categorized based on whether the required capabilities already exist in the firm, or are new to it.

The four types of innovation (see Fig. 1) are: (1) an “architectural innovation”, when radical technology is applied to new markets; (2) “niche creation”, which is also aimed at opening up new market opportunities, but through the use of existing technology; (3) a “revolutionary innovation”, which is applied to existing markets yet requires new technical and production capabilities; and (4) a “regular innovation”, which involves change that builds on established technical and production capabilities and is applied to existing markets and customers (Abernathy and Clark, 1985; Clark, 1987). Regular innovations are thus the most incremental type and rely on existing capabilities. Danneels (2002) refers to this type as “pure exploitation”. On the other hand, architectural innovations are the most radical form and are built on new capabilities. In Danneels's (2002) terminology, architectural innovations represent “pure exploration”.

In sum, innovations can be classified based on their relationship with the existing market and the technological capabilities of the firm. Four different types of innovation (architectural, niche creation, revolutionary and regular) can be distinguished on the basis of whether the required market and technological capabilities already exist in the firm, or whether they are new to it and/or disrupt existing capabilities.

### 2.2. Dynamic capabilities

Prior literature has shown that the firm's ability to succeed with its new product innovations is influenced by its existing technological and market capabilities (e.g., Cooper and Kleinschmidt, 1995; Ritter and Gemünden, 2004). Nerkar and Roberts (2004) argue that the success of new products is connected to the firm's accumulated market expertise, its technological expertise, and the interaction between the two, and that this effect is a result of its ability to combine different types of knowledge, i.e. its combinative capabilities (Kogut and Zander, 1992). Furthermore, according to the findings of Henderson and Cockburn (1994), Verona and Ravasi (2003) and Protogerou et al. (2008), for instance, the firm's ability to combine and effectively use different types of

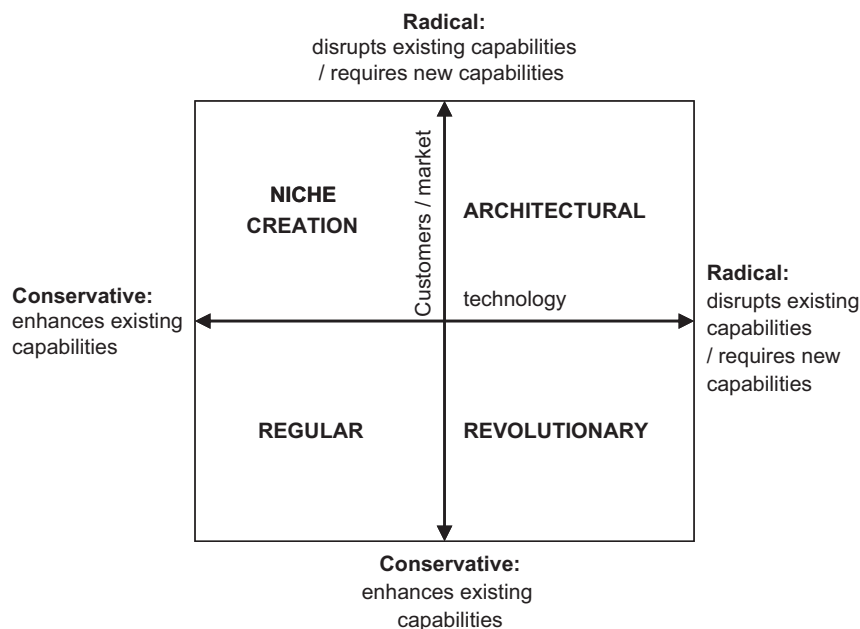


Fig. 1. The transilience map (adapted from Abernathy and Clark, 1985, p.8).

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