



Ex-ante evaluation of disruptive susceptibility in established value networks—When are markets ready for disruptive innovations?

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ABSTRACT

In this paper, we examine a markets' readiness for potential disruptive innovations based on past and current conditions. For this purpose, we developed a theoretical framework to evaluate the "disruptive susceptibility" of value networks. Using the construct of disruptive susceptibility, we assess the potential market entry of new companies as sources of disruptive innovations and the market utilization of these innovations. We derived theoretical propositions from existing literature in the field of disruptive innovations with a focus on an ex ante analysis. Furthermore, we applied this preliminary theoretical framework using an in-depth and longitudinal case-study of the amateur photo camera market in Germany to analyze the propositions for disruptive susceptibility on a past disruptive innovation for consistency. Based on the insights of the case study, we refined our theoretical framework. Finally, the refined framework was used from an ex ante perspective to analyze the German electric car market. The results of both case studies indicate that the disruptive susceptibility of established value networks is closely related to the market and organizational maturity. Furthermore, we propose that the overshooting factor of customers might be a conditional but not an imperative factor influencing disruptive susceptibility. Our modified framework would indicate that if the overshooting of customers and other special market conditions are present simultaneously, then the disruptive susceptibility can reach a critical level, and potential disruptive innovations can be successfully introduced into an established value network. Moreover, in our framework, a high degree of disruptive susceptibility would suggest that a low-end market must be present before a disruptive innovation can successfully enter a market. Finally, we propose that the introduction of radical-sustaining innovations by the incumbents in an established value network is a good indicator for a high degree of disruptive susceptibility.

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1. Introduction

The failure of established companies to successfully introduce innovations is not a new phenomenon in the academic literature. Schumpeter (1950) identified innovation as a source of creative destruction. Other researchers went even further by exploring the impact of innovation with regard to the failure of established companies. For example, Foster (1986), Tushman and Anderson (1986), and Henderson and Clark (1990) identified a missing flexibility on the part of established companies in terms of technological change as the main reason for failure, while Christensen (1997) focused on

changing market conditions due to shifting performance characteristics and the failure of incumbent firms to react to these changes accordingly as the main source of failure. This phenomenon of "disruptive innovation" identified by Christensen (1997) has been the subject of extensive academic research as well as managerial interest over the last few years (Adner and Zemsky, 2001; Adner, 2002; Danneels, 2004, 2006).

Disruptive innovations introduce a new technology or service with initially lower quality than that provided by existing products or services. Because of the lower quality, established companies do not see the new offerings as a serious competitive threat and ignore market changes. Over time, new companies often improve the quality, move up market, and gain market share from established companies. By the time the established companies recognize disruptive innovation as serious competition, it is usually too late, and new companies have successfully established their market positions (Christensen, 1997).

The popularity of Christensen's concept led to an increasing number of disruptive innovations being identified. As Christensen

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only loosely defined the term disruptive innovation, it became subject to interpretation, and, as a result, different types of innovations have been defined as disruptive (Weisenbach Keller, 2005).

While a number of ex post identified disruptive innovations have been analyzed by Christensen and others (e.g., Christensen and Raynor, 2003), the problem of identifying disruptive innovations ex ante has not been sufficiently addressed in the academic literature. Tellis (2006) and Danneels (2004) question the sample of industries used by Christensen to test his theory. Tellis (2006) also asks what predictive value the concept of disruptive innovations has if one must wait until the disruption has occurred (Tellis, 2006, p. 35).

Although some authors have addressed the problem of identifying disruptive innovations ex ante (Christensen et al., 2004; Rafii and Kampas, 2002; Hüsigg et al., 2005; Keller and Hüsigg, 2009), we still think that more research is needed to identify under which conditions disruptive innovations will likely become a threat for established companies. While most authors have focused on identifying the disruptive potential of new technologies (Hüsigg et al., 2005; Keller and Hüsigg, 2009) or the separation of disruptive innovations from other forms of innovations (Rafii and Kampas, 2002), we developed the new construct of “disruptive susceptibility” to analyze the readiness of established value networks for a successful market entry of disruptive innovations. Based on a two-step approach, we developed a theoretical framework to identify market structures with regard to readiness for disruptive innovation. The intention of the framework is to assess disruptive susceptibility before disruptive innovations enter the market. This approach is useful as a forecasting and assessment tool, or early warning system for established firms.

The paper is organized as follows: In the next section, we discuss the theoretical background of disruptive innovations. Next, we describe our research methodology, and then we define the new construct and build a preliminary theoretical framework based on a literature review and modify it using an ex post, in-depth, longitudinal case study of the digital cameras in the German amateur photo camera market. To further test the applicability of the framework, we apply the framework ex ante to the car market in Germany. The final section summarizes the findings, theoretical implications, and the limitations of our methodology, and shows the need for further research.

2. Literature review on the concept of disruptive innovation

2.1. The theory of disruptive innovation

Before defining the construct of disruptive susceptibility, it is essential to understand the key concept of disruptive innovation and existing critiques. Christensen (1997) describes the development of products and the successful market entry of disruptive innovations using demand and supply trajectories. The supply trajectory describes the improvement in the quality of products over time, while the demand trajectory traces the increasing demand of customers for increased performance. Over time, companies often improve product quality faster than customers can take full advantage of, especially customers in the low-end segment of established value networks. Christensen defines this factor as “overshooting.” When overshooting occurs, disruptive innovations can successfully enter the market from the low-end (Hwang and Christensen, 2008).

Disruptive innovations bring to the market a different performance set than that typically offered by established companies but underperform established products in the dimensions that are most important to mainstream customers (Adner, 2002). However, disruptive innovations possess better value along one (or more)

dimensions that are orthogonal to those of existing products and, hence, are desired by some niche customers. These usually consist of either current non-consumers of established products or consumers at the low-end segment of the market. Both groups are unattractive and not valued by established companies (Christensen et al., 2004). This unattractiveness leads established companies to not view disruptive innovations as new competition. Disruptive innovations are typically cheaper, simpler, smaller and, frequently, more convenient to use (Christensen, 1997).

Established companies typically focus their resources on meeting the needs of high-end customers since this customer group is typically the most profitable. This internal resource allocation leads to a concentration on improving existing products. Innovations that improve existing products are described as “sustaining.” Sustaining innovations are usually introduced by established companies focusing on the needs of their most important and lucrative consumers (Kirchhoff and Walsh, 2000). Sustaining innovations usually focus on performance dimensions that have been valued historically in the value network.

The unattractiveness of disruptive innovations for established companies gives entrants the opportunity to fulfill the needs of current non-users or low-end users and further improve the quality of products through sustaining innovations (Christensen and Bower, 1996). Over time, the quality of the disruptive innovation along the dimension associated with existing products has the potential, with sufficient R&D and sales volume, to improve and, eventually, exceed that of the existing products. New companies have by then built a competitive advantage in the new market segment with cost advantages. Established companies react, but with a time delay and a cost disadvantage. They need to cannibalize existing revenues of their known customers since they find it difficult to adapt the cost structures to the emerging value network (Hüsigg et al., 2005).

2.2. Critique of Christensen's theory

The theory of disruptive innovation has gained much attention in management research literature as well as in managerial practice. However, criticism has also grown in the literature. The strong ex post perspective on disruptive innovations, the choice of cases as well as the insufficient definition of the theoretical construct are the main critiques in the literature (Danneels, 2004; Tellis, 2006; Govindarajan and Kopalle, 2006b; Hüsigg et al., 2005). The missing ex ante perspective has been discussed by different authors and different forecasting approaches have been developed. Existing ex ante approaches can be grouped into three main categories:

- (1) Scoring and analysis models (Rafii and Kampas, 2002; Christensen et al., 2004; Hüsigg et al., 2005; Govindarajan and Kopalle, 2006a, 2006b; Sainio and Puumalainen, 2007; Ganguly et al., 2008; Keller and Hüsigg, 2009; Hang et al., 2011),
- (2) Economic models (Adner and Zemsky, 2001; Adner, 2002; Schmidt, 2008), and
- (3) Scenario and situation analysis (Kostoff, 2004; Paap and Katz, 2004; Vojak and Chambers, 2004).

Scoring-models focus on the analysis of the disruptive potential of new innovations and the classification of disruptive innovations in comparison to other forms of innovation. Economic models attempt to simulate the potential entry and diffusion of disruptive innovations in existing markets from an economic perspective. Scenario and situation analysis uses different scenario methods to identify and analyze disruptive innovations.

Although there are already a number of ex ante approaches, we still believe that these fail to focus on the analysis of the market factors from the perspective of a potential threat of disruptive

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