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Antecedents and implications of disruptive innovation: Evidence from China

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ABSTRACT

A growing recognition of the importance of disruptive innovation has led researchers to examine the question of how disruptive innovation comes about and to what extent it reflects “discovery” versus “creation” of opportunities. Earlier research has focused on the organisational preconditions for disruptive innovation to arise. Much less attention has been paid to the role of innovation processes, including their goals and design, in promoting disruptive innovation. In this paper we aim to begin to fill this gap by better understanding how new innovation processes can act as antecedents for disruptive innovation.

We adopt an inductive theory-building methodology using a set of case studies of Chinese firms to develop propositions about how novel R&D and production processes can foster disruptive innovation. We find that in the case of China the adoption of new innovation processes that re-define the focus of innovation and re-engineer traditional R&D processes in ways that allow the novel deployment of Chinese cost advantages can create offerings that incorporate the key elements of disruptive innovation in the sense that they challenge incumbents' established business models. Realising disruptive innovation opportunities requires proactive initiatives. We conclude by discussing the managerial implications and possible responses as well as directions for future research.

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1. Introduction

Disruptive innovation theory has long been studied in the innovation management literature (Abernathy and Clark, 1985; Adner, 2002, 2006; Calia et al., 2007; Christensen, 2006; Christensen and Bower, 1996; Christensen and Raynor, 2003; Danneels, 2004; Govindarajan and Kopalle, 2006; Hall et al., 2014; Kassicieh et al., 2002; Linton, 2002, 2004, 2009). The concept goes back at least to the seminal work by Abernathy and Clark (1985), who suggested that disruptive innovations often destroyed the value of existing technical competencies. This idea was elaborated by Christensen (1997), again with a focus on technological innovation. Over years, the concept of disruptive innovation widened to include not only technologies but also products and business models (Christensen, 2006; Christensen and Raynor, 2003; Markides, 2006, 2012). For example, Christensen and Raynor (2003) suggest that disruptive innovations

include discount department stores; low-price, point-to-point airlines; cheap, mass-market products such as power tools, copiers, and motorcycles; and online businesses such as bookselling, education, brokerage, and travel agents.

The growing recognition of disruptive innovation as an important phenomenon in competitive strategy has led researchers to examine the question of how disruptive innovation comes about. A substantial body of literature has explored the conditions under which disruptive innovation is likely to arise from an organisation, including its resource allocation processes (Chao and Kavadias, 2007; Hogan, 2005; Nelson and Winter, 1982); its organisational structure (Cohen and Klepper, 1996; Lee and Chen, 2009; Tsai and Wang, 2005); and its organisational culture (Henderson, 2006; Tushman and O'Reilly, 2002). Despite the progress, the nature of the innovation processes that enable disruptive innovation deserves further examination (Yu and Hang, 2010). In particular, our understanding of what kinds of R&D and opportunity discovery and creation processes are likely to give rise to disruptive innovation is limited.

At the same time, a growing body of evidence suggests that emerging economies are becoming an important source of disruptive innovation (Hart and Christensen, 2002; Li, 2013). Emerging market environments can stimulate disruptive innovation

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because changes to product design and business models that drastically lower costs and improve value for money are often a prerequisite for unlocking mass-market segments of customers with limited disposable income in these economies. Large numbers of first-time consumers with less established preferences and expectations, less regulation, and fewer legacy assets may also mean it is possible to launch, test and improve disruptive innovations more rapidly and cheaply than in developed markets (Williamson et al., 2013). These conditions have given rise to successful disruptive innovations such as the India company Bharti Airtel's disruptive business model for mobile telecommunications incorporating innovative marketing, pricing and billing systems specially adapted to appeal to low-income consumers that allowed the company to revolutionise market in 20 countries across Africa and Asia. Likewise Brazil has been a leading source of disruptive innovation in sustainable biofuels using flexible-fuel vehicles that now accounts for some 35% of the total Brazilian transport fuel market and has begun to be applied in Africa and Asia (Angelo, 2012).

Arguably the predominate source of disruptive innovations among emerging markets, however, has been China where examples span a wide variety of industries from medical diagnostic equipment and lithium-ion batteries through to innovative business models for e-commerce and social media portals (Williamson and Yin, 2013). With the aim of better understanding how new R&D and production process innovations can act as antecedents for disruptive innovation in this paper, therefore, we have chosen to analyse a set of case studies of Chinese firms pursuing potentially disruptive innovation and then to explore some of the implications of these innovations for incumbent competitors from the developed markets.

This analysis bears on one of the main themes of this Special Issue: the sources of innovation opportunities; in particular, the debate on whether opportunities are discovered or created by entrepreneurs (Alvarez and Barney, 2007; Sarasvathy, 2001; Shane and Venkataraman, 2000), especially in the area of disruptive innovation. It has been argued that opportunities for innovation are often created by changes in technology, demographics, and geographic distribution of markets for innovations (Hang and Garnsey, 2011). Emerging economies can provide a particularly conducive environment for innovation opportunities to arise because they often act as a crucible where new customers with fluid needs and behaviours, a growing number of competitors, a flexible business and institutional context and newly introduced technologies come together. In the context of this debate we certainly find that China's fast-changing environment throws up many opportunities for disruptive innovation. But while emerging economies such as China provide a fertile environment for opportunity discovery, we also find that realising these opportunities requires very proactive initiatives by entrepreneurs. This is at variance with Alvarez and Barney's (2007) characterisation of discovery opportunities as arising independently of the actions of those discovering them. Instead, we observe that many disruptive innovations in China have their antecedents in the actions of entrepreneurs who re-engineer traditional R&D and innovation processes to deliver disruptive innovations. In this sense, entrepreneurs are proactively creating much of the disruptive innovation in China.

The paper is structured as follows. We begin by examining the existing literature on theories of disruptive innovation. This leads us to identify a gap in our existing understanding about how changing innovation processes might give rise to disruptive innovation and some broad conjectures about what kinds of R&D and innovation processes might promote disruptive innovation. The next section on methods and data explains the case study methodology we deploy to explore these issues and conjectures

and how data were collected and analysed to develop a set of propositions about the antecedents of disruptive innovation. We then report findings from the case studies of Chinese firms, and followed by a discussion of the implications for the changing nature of global competition. We conclude by outlining the possible contributions of the present study to existing theory and practice and suggestions for further research.

2. Theoretical background

The theory of disruptive innovation provides the context for interpreting the empirical results and theoretical contributions of this study. In this section we first review the disruptive innovation theory. We then examine new approaches of disruptive innovations that Chinese firms have developed. This leads us to identify a gap in the literature which gives rise to the research question addressed in the remainder of this paper: What are the antecedents of disruptive innovation currently emerging in China?

2.1. Theoretical insights into disruptive innovation

Christensen (1997) first comprehensively examined the concept of disruptive innovation in his seminal book titled *The Innovator's Dilemma*. According to Christensen, disruptive technologies are technologies that provide different sources of value from mainstream technologies and are initially inferior to mainstream technologies along the dimensions of performance that are most important to mainstream customers. In its early development stage, each product based on a certain disruptive technology could only serve niche segments that value its non-standard performance attributes. Subsequently, further development could improve the performance of the disruptive technology to a level sufficient to satisfy mainstream customers by focusing solely on key attributes. This was often possible because the performance of the mainstream technology may have already exceeded the demand of mainstream customers, resulting in 'performance overshoot' with over-served customers. Market disruption then occurs when, despite its inferior performance on focal attributes valued by existing customers, the new product displaces the mainstream product in the mainstream market. According to Christensen (1997) there are two preconditions for such a market disruption to occur: there is performance overshoot on the mainstream attributes of the existing product, and there are asymmetric incentives between an existing healthy business model and the potentially disruptive business model. Christensen documented these processes in numerous contexts including hard disk drives, earth-moving equipment and motor controls.

In *The Innovator's Solution* (Christensen and Raynor, 2003) the authors proposed that the innovator's dilemma could be resolved by well-managed incumbent firms if they developed their own disruptive technologies within their sustaining competitive paradigms. By adopting this strategy they could avoid their own dethronement. Interestingly for our current purpose, however, in this second book the authors replaced the term "disruptive technology" with a new term "disruptive innovation", suggesting the application of the theory could be broadened to include not only technological products, but also services and business model innovations, such as discount department stores, low-price, point-to-point airlines and online businesses education. Christensen (2006) admitted that he had been mistaken to equate the phenomenon of disruptive innovation with a disruptive technology in *The Innovator's Dilemma*. Disruptive innovation does not only arise from new technologies that surpass the performance of the existing technologies dominant in a market. Disruptive innovation may also arise from changes in the business model or underlying processes that enable superior or novel value to be delivered to consumers.

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