



Contents lists available at ScienceDirect

## Technological Forecasting &amp; Social Change

journal homepage: [www.elsevier.com/locate/techfore](http://www.elsevier.com/locate/techfore)

## Disruptive innovation and dynamic capabilities in emerging economies: Evidence from the Indian automotive sector

Deepak Pandit<sup>a,c</sup>, Maheshkumar P. Joshi<sup>b,\*</sup>, Arun Sahay<sup>c</sup>, Rajen K. Gupta<sup>d</sup>

<sup>a</sup> Fortune Institute of International Business, New Delhi, India

<sup>b</sup> George Mason University, Fairfax, VA, USA

<sup>c</sup> Birla Institute of Management Technology, Greater Noida, Uttar Pradesh, India

<sup>d</sup> Management Development Institute, Gurgaon, Haryana, India

### ARTICLE INFO

#### Keywords:

Emerging economies  
Disruptive innovation  
Dynamic capabilities  
Reva Mahindra  
Electric vehicles  
India

### ABSTRACT

The phenomenon of frugal and reverse innovation has brought emerging economies into focus. However, disruptive innovation (DI) is rarely observed in this context. This study outlines the evolution of DI in the Indian automotive sector through an instrumental case study. Our study reinterprets the phenomenon in the context of emerging economies by investigating how dynamic capabilities (DCs) at the firm level actuate DI manifestation, and offers a set of takeaways that focus on the dimensions of DCs required for such manifestation. In addition, we identify any additional constructs that may play a role in catalysing DI in emerging economies. While not hypothesised, we do find that larger firms actuate DI in emerging economies actively, and a turbulent or VUCA environment enables the identification of disruptive opportunities. Further, managerial implications include the importance of managing innovation policy in a turbulent environment and the necessity of different dimensions of DC as an overlay on the operational capabilities of a firm in achieving DI.

### 1. Introduction

The term VUCA (an acronym for ‘Volatility Uncertainty Complexity Ambiguity’) describes the dynamic and turbulent environment. Volatility relates to speed, magnitude and dynamics of change; Uncertainty is the lack of predictability of events and issues; confounding issues faced by an organisation (military or otherwise) lead to Complexity; and Ambiguity is the lack of clarity about conditions faced by the organisation (Horney et al., 2010). In the global automobile industry, researchers have found that after a long stretch of stability, the current environment exhibits all the components of VUCA as “the industry has been experiencing significant turbulence due primarily to changes in markets, regulatory requirements, and technologies” (Schulze et al., 2015:605) driven by the process of globalization, changes in government policies, and convergence among many distinct technologies that can now be used in running an automobile.

Johansen and Euchner (2013) suggest that Disruptive Innovation (DI) assists a manager in navigating the VUCA environment. Recently, researchers have started examining emerging economies in the context of DI (Hang et al., 2015). When focusing on emerging economies, authors have recognised that DI – as defined by Christensen (1997) and intended for advanced economies – ‘...needs to be adapted and

reinterpreted to be useful in analysing new business that originates from emerging economies’ (Corsi and Di Minin, 2011:7). As the VUCA environment plays a role in DI manifestation (Johansen and Euchner, 2013), we wish to contribute to the extant DI literature by conducting a grounded case study on DI in an emerging economy to address our primary question: How do dynamic capabilities (DCs) at the firm level help actuate DI manifestation? In addition, we also explore a) Which DC dimensions play a role in DI manifestation? b) Are there additional factors helping firms in emerging economies in the identification of disruptive opportunities or new markets?

We use India as a representative sample of emerging markets because the VUCA environment is further exaggerated in the context of the Indian automobile industry. Besides global trends, additional trends add to complexity and volatility, such as economic liberalization, which was initiated in 1991 and has continually impacted the competition, market structure and customer preferences in the auto industry (D’Costa, 2004; Joshi, 2016; Pandit et al., 2017). Additionally, government policies prompted the reduction in automobile emission levels to better preserve historic monuments such as the Taj Mahal (Burke, 2010).

This research explores how DI manifestation is influenced by the capability for DI at the firm level, with Mahindra Reva of India as a

\* Corresponding author.

E-mail addresses: [Deepak@iseed-edu.in](mailto:Deepak@iseed-edu.in), [deepak@practicingstrategists.com](mailto:deepak@practicingstrategists.com) (D. Pandit), [mpjoshi@gmu.edu](mailto:mpjoshi@gmu.edu) (M.P. Joshi), [arun.sahay@bimtech.ac.in](mailto:arun.sahay@bimtech.ac.in) (A. Sahay), [rajenkgupta@gmail.com](mailto:rajenkgupta@gmail.com) (R.K. Gupta).

<http://dx.doi.org/10.1016/j.techfore.2017.09.035>

Received 22 November 2016; Accepted 17 September 2017

0040-1625/ © 2017 Elsevier Inc. All rights reserved.

case. Mahindra Reva produces electric vehicles (EVs). The Reva Electric Car Company (RECC), the predecessor of Mahindra Reva, was a world leader in EV technologies, with new features, including a new breed of 'connected' cars. Further, Mahindra Reva was ranked 22nd (jointly with Tesla) in the prestigious *Fast Company* magazine listing of the Top 50 Most Innovative Global Companies of 2013. It is our contention that EV as a DI should be studied because: "(E)lectric vehicles have the smell of disruptive technology. They can't be used in mainstream markets; they offer a set of attributes that is orthogonal to those that command attention in the gasoline-powered value network; and the technology is moving ahead at a faster rate than the market's trajectory of need. ... Because electric vehicles are not sustaining innovations, however, mainstream automakers naturally doubt that there is a market for them – another symptom of a disruptive innovation" (Christensen, 1997:189). Besides DI, concepts such as bottom of the pyramid and reverse innovation have taken hold in recent academic literature when focusing on the Indian context, and therefore, studying DI with respect to EV in this context may provide additional learning in accordance with Govindarajan and Euchner (2012:13) who state that: "reverse innovation is not about the bottom of the pyramid. It is about innovation outside of the top 10 percent of the economic pyramid. ... The rest of the population requires innovation. Reverse innovation is for the middle of the pyramid, and of course, it includes the bottom of the pyramid, too." Owing to such interpretations, EV in the Indian context does not have to play the same role as in a developed country when viewed as a DI. Just like many of the medical devices innovated for the Indian markets have now found their way into US markets as a result of GE's efforts (Agnihotri, 2015), its low cost advantages might make Mahindra Reva an example of reverse innovation and compete with the likes of Tesla.

Through a case study, it is concluded that in emerging economies, a) DCs are important to leverage potentially disruptive technology and DCs act through operational capabilities for actuating DI manifestation; b) a well-developed reconfiguration dimension of DCs is required for DI manifestation; c) large domestic firms are key actors for DI manifestation; d) new market segments, not existing elsewhere, are ripe for exploitation; and e) a VUCA environment helps identify disruptive opportunities.

## 2. Theoretical framework

Researchers have broadened Christensen's (1997) original definition of DI to fit cheaper, simpler, and inferior-performing products (Govindarajan and Kopalle, 2006a), competitive dynamics (Adner and Zemsky, 2005), or ways to determine the degree of disruptiveness (Govindarajan and Kopalle, 2006b). The literature suggests that: a) DI requires a fresh array of performance attributes, including price, as features; b) DI caters to a niche segment; c) Owing to incompatibility with their resources/processes/values, incumbents do not engage in DI; and d) new entrants improvise the product until it meets the expectations of the existing/potential consumers.

While the extant literature on DI has started to examine the responses of managers, measurable instances of DI in emerging economies are not easily available. Hence, this study draws on strategic management literature based on DCs and builds on the idea that to achieve any breakthrough innovation, organisations must focus on developing DCs (Michailova and Zhan, 2015), as they involve a firm's ability to acquire, absorb, and apply knowledge effectively from the external environment to develop competitive advantage (Ellonen et al., 2009; Joshi et al., 2015). Researchers have concluded that a lack of organisational capability, and therefore, a lack of DCs inhibit the adoption of DI (Yu and Hang, 2010).

## 3. Methodology

DCs are embedded in a firm's organisational routines (Eisenhardt

and Martin, 2000) and are likely difficult to identify through quantitative research. Hence, this study uses a case (qualitative) method (Eisenhardt, 1989). The concept of DI is equally relevant to developed and emerging economies with a different impact in each context, and therefore the use of an instrumental case study (Yin, 2009) is appropriate because it offers insights into the phenomenon of interest while building on the prior theory.

The Indian auto sector consists of original equipment manufacturers (OEMs) and component manufacturers, represented by the Society for Indian Automobile Manufacturers (SIAM) and Automobile Components Manufacturers Association (ACMA), respectively. As the design, research and development activities are primarily controlled by members of the SIAM, 23 firms were approached based on R & D intensity, new product development launches, and number of Indians on the management board. One organisation was chosen for this case study, the identification of the case involved purposive sampling based on items derived from the ex-post operationalization of DI by Govindarajan and Kopalle (2006a).

Four main sources of evidence - interviews, informal conversations, direct observations, and secondary data - were used in the study. Primary data were collected through semi-structured interviews; five interviews were conducted within the Mahindra Reva and two within its parent, Mahindra & Mahindra (M & M). Triangulation across data sources, including the lead authors' observations and interactions during site visits, were also used for making inferences. This complemented the interview data and secondary sources (annual reports, press releases, newspaper articles, information on the Internet, and published case studies). The various data sources are presented in Table 1. Further discussion on methodology related to data analysis takes place in Section 5 Analysis and Findings.

## 4. Descriptive case: Mahindra Reva

### 4.1. History and background

Reva Electric Car Company (RECC) was established in 1994 as a joint venture between the Maini Group and AEV LLC, USA. The founder, Chetan Maini, believed that EVs were the future of mobility. By 1999, RECC had an estimated project cost of Indian Rupees 800 million (US \$19.5 million), an operating break-even point of about 150 cars per month, and payback period of about 3.5 years. The initial foray into the Indian market in 2001 was not successful due to various reasons (e.g., lack of government subsidies), and RECC entered into Europe and achieved success in its niche markets. Fig. 1 shows the milestones in RECC's history, from 1994 until the launch of its new generation of EVs in 2013. (See Table 2.)

**Table 1**  
Sources of Data.

Data	Details
Interviews	Seven (five from Mahindra Reva, two from M & M) from 30–50 min; across marketing, technology, strategy, and manufacturing
Articles Websites	Trade magazines/online periodicals (1993–2015) Product brochures, customer communication, press releases, annual reports, industry consulting firms reports (2010–2015); (Mahindra Reva, M & M, SIAM, and ACMA)
Cases	RECC case study at the Indian Institute of Management, Bangalore; Vodafone case on telematics
Author observations	At facilities in Chennai, Bangalore, and Mumbai

Notes: RECC = REVA Electric Car Company; M & M = Mahindra & Mahindra; SIAM = Society for Indian Automobile Manufacturers; ACMA = Automobile Components Manufacturers Association.

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات