



## Resource configurations, product development capability, and competitive advantage: An empirical analysis of their evolution



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### ABSTRACT

We draw on prior work in the strategy domain and provide empirical evidence of how interactions of resources (or resource configurations) underlying an important capability (i.e., product development capability) lead to differential levels of competitive advantage in a unique emerging economy setting. Our work provides a nuanced understanding of how the efficacy of a specific capability varies depending on changes in the product market environment, such that certain resource configurations facilitate competitive advantage during particular periods of time, while others do not. The study uses rich qualitative and quantitative data gathered through primary and secondary sources to test the conjectures. Our work also demonstrates that while interactions of resources matter significantly in providing competitive advantage, in isolation, these resources do not matter.

### 1. Introduction

According to Resource Based Theory (RBT), firms that possess valuable, rare, imperfectly imitable, and non-substitutable resources gain competitive advantage, owing to firm heterogeneity in the distribution of these resources and their imperfect mobility across firms (Barney, 1991). However, along with resources, firms also need to possess organizational capabilities to coordinate and exploit these resources and therefore Barney in his subsequent work stressed the importance of organizational capability to exploit the resources a firm possesses in order to attain and sustain competitive advantage (Barney, 1997). These resources and capabilities constitute bundles of tangible and intangible assets that include management skills, organizational processes, information and knowledge that the firm controls (Barney, 2001).

In addition to the emphasis on resources and capabilities, which represents an important element in understanding competitive advantage, there was an increasingly felt need to probe the evolution of capabilities and their underlying linkages closely. In line with this belief, some prior work (e.g. Black & Boal, 1994) has argued that the interactions (or linkages) between various tangible and intangible resources<sup>1</sup> enable firms to develop higher level routines leading to sustainable competitive advantage. Winter (2000) considers these higher level routines to be analogous to organizational capabilities.<sup>2</sup> Black and

Boal (1994) argue that strategic resources that are part of a complex network can enhance, compensate, detract or substitute for each other, such that the combination of resources is important to gain competitive advantage that is sustainable in the long run. Therefore, understanding how the *interactions* of these resources take place and enable evolution of capabilities (or higher level routines), potentially provides an important perspective towards unpacking the drivers that lead to competitive advantage in firms.

Concurrent to the development of the theoretical building blocks pertaining to RBT, there have been several empirical studies that have focused on measuring the attributes of resources and capabilities and examining their implications on competitive advantage. (e.g., Barney, 2001; Henderson & Cockburn, 1994). In addition, studies have also engaged with issues pertaining to how capabilities change over time and the implications of these capability related changes on competitive advantage (e.g., Barney, 2001; Levinthal & Myatt, 1994). However, despite the importance of the phenomena, relatively scarce evidence exists of studies that empirically establish the linkages between resources and capabilities and their evolution. There are even fewer studies in the context of emerging markets where firms engage with each other based primarily on previous relations and trust, rather than presence of formal organizational processes, routines and structures (Kumaraswamy, Mudambi, Saranga, & Tripathy, 2012).

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<sup>1</sup> Black and Boal (1994) use the term 'resource factor' whereas we stick to 'resource(s)' throughout the paper.

<sup>2</sup> Based on Winter (2000), we use higher level routines and capabilities interchangeably throughout the paper.

Therefore, in the current study, we first theorize on unique paths associated with the *interactions* of resources which lead to the development of a specific capability (i.e., product development capability), which eventually result in competitive advantage; and secondly empirically establish that specific resource configurations lead to differential levels of competitive advantage, represented by value-added performance. In addition, our empirical findings indicate that the efficacy of specific capabilities varies depending on the extent and nature of market dynamism (Eisenhardt & Martin, 2000), which results in certain resource configurations delivering a competitive advantage at specific periods of time.

We use the Indian auto component industry to investigate the linkages between resources and capabilities that were developed by the auto component firms in the context of product development, in an era that was characterized by substantially more market-based competition (Kumaraswamy et al., 2012). The automotive industry deals with integrated technologies and requires advanced technological and innovative skills from their component suppliers. This context enables us to examine how firm-level resources and capabilities emerge at a micro-level and their associated interlinkages, in a unique, natural laboratory setting where an emerging market is evolving from a protected and relation-based era to a market-based competitive setting (Kumaraswamy et al., 2012). Moreover, during this era, the Indian auto component firms had already matured through substantial upgrades of quality and technological capabilities (Iyer, Saranga, & Seshadri, 2013)<sup>3</sup> such that the resources and their interlinkages underlying the evolution of product development capability in creating competitive advantages are likely to be prominently discernable. Further note that, our setting includes an exogenous market shift due to global recession, which allows us to examine how the ideal resource configuration shifts because of external shocks.

To test our theoretical conjectures, we collected rich and unique primary data from practitioners in the field to (i) determine the measurement items that constitute the resources, (ii) identify the resources that underlie organizational capabilities and (iii) examine the interactions among resources and the paths to differential competitive advantage. Specifically, we examine the influence of the interactions of the constituent resources such as innovation process structure (IPS), R&D, past experience in product and process development (PEPPD), and tooling development and manufacturing (TDM) in creating firm level innovative capabilities and associated linkages to competitive advantage, as represented by value-added performance in the Indian auto component industry. The empirical results largely support our conjectures. We believe this study to be a pioneering attempt at unpacking the underlying resources and the constituent interactions leading to product development capability.

To summarize, our attempt in this paper has been to strive for a twofold contribution. Firstly, we draw on prior work in the strategy domain and in particular the Black and Boal (1994) framework owing to its analytical tractability to theorize how product development capability paths evolve through the interactions of the various resources (IPS, R&D, PEPPD and TDM) which eventually lead to differential levels of competitive advantage. In our work, we hypothesize that two of these product development capability paths lead to sustainable competitive advantage while the remaining two do not provide sustainable competitive advantages. In addition, we also draw on the dynamic capabilities literature [e.g., Teece, Pisano, & Shuen, 1997 and Eisenhardt & Martin, 2000] to link the evolution of these product development capability paths to changes in the external product market environment. Our attempt at building a bridge between the two approaches reflects a nuanced understanding of how the efficacy of a specific capability (i.e., product development capability) varies depending on changes in the product market environment, such that

<sup>3</sup> These empirical studies demonstrated that unlike many Latin American and CIS economies, the slow pace of liberalization in India allowed the Indian auto component firms to survive the initial phases of liberalization by upgrading quality and technological capabilities.

certain resource configurations facilitate competitive advantage during particular periods of time, while others do not. Our contention is that by overlaying the dynamic capabilities approach over the Black and Boal (1994) framework, we are able to provide a granular (or micro foundational) depiction of these resource factor interactions, product development capability paths and how their efficacy varies over time. The combination of being able to chart out the evolution of the resources and capabilities (exemplified in the resource factor interactions and the capability development paths) from a micro foundations level in the organization to changes in the product market environment, we believe, is where we are able to demonstrate the dynamic re-configuration of resources in response to the external market. By doing so, our submission is that we provide a contribution beyond either Black and Boal (1994) or Eisenhardt and Martin (2000) taken in isolation and are able to build on their important contributions.

Secondly, our work is set in a unique context. The automotive industry in India has been evolving from a protected regulated environment to a more market based regime. This has significantly influenced the resource base possessed by a key supplier to this industry (i.e., the automotive component manufactures). This gives us a unique opportunity to examine, using rich qualitative and quantitative data gathered through primary and secondary sources, how product development capability paths evolve through the interactions of the various resources (IPS, R&D, PEPPD and TDM) eventually leading to differential levels of competitive advantage owing to the shift in market dynamism. There is a paucity of work which provides such a granular analysis across multiple levels and which ties it with shifts in the external market environment in an important emerging economy. The automotive component industry with its use of integrated technologies is particularly well suited to this investigation.

We therefore believe that the combination of the above two contributions make our work novel and further the literature in this domain. We also believe that our work is quite timely as it has practitioner utility with regard to informing managers about how the efficacy of a specific capability varies depending on changes in the product market environment and provides them with a perspective to assess and understand this. In the sections that follow, we develop the context, build the hypothesis, introduce the data, methods and analysis and finally conclude.

## 2. Context, theory and hypotheses development

In this study, we investigate the product development capabilities developed by the Indian auto component firms during an advanced phase of liberalized era (post 2002). During the early phase of liberalization (1991–2002), the technology licensing agreements and/or technology joint ventures (JVs) with foreign tier-1 suppliers provided the indigenous suppliers access to new products and technologies, while the vendor development activities by foreign automakers, such as Suzuki helped the indigenous suppliers to build quality and productivity-related competencies (Kumaraswamy et al., 2012). However, as the foreign suppliers saw growth opportunities and began entering the market (following further deregulation) by establishing production facilities in India, indigenous suppliers began to lose access to new products through the licensing and JV route. Firms had to therefore choose between either continuing as suppliers of low value-added components or invest in in-house R&D and develop new product development (NPD) capabilities to climb up the value chain.

By the time all the restrictions on imports and FDI investments were lifted and a “New Auto Policy”<sup>4</sup> was adopted in 2002 (Kumaraswamy

<sup>4</sup> The government of India came up with the ‘New auto policy’ in 2002 to develop India as a global hub for small cars and an Asian hub for auto components. 100 percent MNC ownership was allowed and local content, export, minimum investment obligations were removed. As a result, MNC automakers and components firms increased their ownership stakes in JVs. <http://www.siamindia.com/cpage.aspx?mpgid=16&pgid1=17&pgidtrail=79>

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