Leveraging power of learning capability upon manufacturing operations

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A B S T R A C T

Learning capability (LC) is a special dynamic capability that a firm purposefully builds to develop a cognitive focus, so as to enable the configuration and improvement of other capabilities (both dynamic and operational) to create and respond to market changes. Empirical evidence regarding the essential role of LC in leveraging operational manufacturing capabilities is, however, limited in the literature. This study takes a routine-based approach to understand capability, and focuses on demonstrating leveraging power of LC upon two essential operational capabilities within the manufacturing context, i.e., operational new product development capability (ONPDC), and operational supplier integration capability (OSIC). A mixed-methods research framework was used, which combines sources of evidence derived from a survey study and a multiple case study. This study identified high-level routines of LC that can be designed and controlled by managers and practitioners, to reconfigure underlying routines of ONPDC and OSIC to achieve superior performance in a turbulent environment. Hence, the study advances the notion of knowledge-based dynamic capabilities, such as LC, as routine bundles. It also provides an impetus for managing manufacturing operations from a capability-based perspective in the fast changing knowledge era.

1. Introduction

In strategic management literature, organizational routines have been perceived as the foundation of capabilities (Eisenhart and Martin, 2000; Nelson and Winter, 1982; Teece, 2007). These routines are broadly defined as regular and predictable patterns of behaviors, or the way work is done (Teece et al., 1997), and have a wide range of variations. Some are constantly changing, while others are relatively static, which indicates the underlying phenomena and dynamics (Pentland and Feldman, 2005). Static operational capabilities are created by a collection of operating routines that execute procedures for the purpose of generating current revenue and profit (Nelson and Winter, 1982; Zollo and Winter, 2002). Dynamic capabilities are created by a collection of search routines that bring about desirable changes in the existing set of operating routines or the development of new ones, in order to sustain competitive advantage in a rapidly changing environment (Helfat et al., 2007; Kyläheiko et al., 2002). In other words, operational or ‘zero-level’ capabilities are those that permit a firm to generate revenue and profit, in the short term, while dynamic capabilities are ‘higher-level’ capabilities that operate to extend, modify or create operational capabilities for the purpose of enhancing profit in the future (Winter, 2003; Zollo and Winter, 2002).

It has been asserted that deliberate organizational learning is responsible for modifying and renewing both dynamic and operational capabilities, over time (Kyläheiko et al., 2002; Zollo and Winter, 2002). Accordingly, knowledge-based learning capability (LC) is perceived as a highly intelligent dynamic capability that enables both knowledge exploration and exploitation (Azadegan and Wagner, 2011; March, 1991). The process facilitates the modification and configuration of capabilities, in particular, the operational capabilities (Nooteboom, 2009). The strategic importance of LC hence lies in its ability to create cognitive mechanisms that can innovatively respond to market changes.

The advent of rapidly advancing information technologies and fierce global competition has changed the traditional business models of manufacturing firms. Innovative new product development (NPD) and supplier integration have become underlying routines of essential operational manufacturing capabilities to effect performance outcomes (Marsh and Stock, 2006; Terpend et al., 2008). The degree to which operational capabilities produce superior performance appears to be affected by a certain collection of underlying routines of LC (e.g., Allred et al., 2011; da Silva Gonçalves Zangiski et al., 2013; Hull and Covin, 2010;...
2. Theory and hypotheses

2.1. Leveraging power of learning capability

The evolution of the research studies in the areas of knowledge management (e.g. Nonaka, 1994), absorptive capacity (e.g. Cohen and Levitenthall, 1990) and dynamic capabilities (e.g. Zollo and Winter, 2002) have gradually led to an integrative conceptualization of a knowledge-based dynamic capability, which incorporates both internal and external learning routines (Lewin et al., 2011; Lichtenthaler and Lichtenthaler, 2009). The capability is purposely developed by a firm to reconfigure and realign learning routines which explore, retain and exploit both internal (intra-firm) and external (inter-firm) knowledge for achieving superior performance (Lewin et al., 2011; Lichtenthaler and Lichtenthaler, 2009).

The influential concept of absorptive capacity was initially proposed by Cohen and Levitenthall (1990) as a firm's ability to recognize, assimilate and apply new knowledge from an external environment for sustaining competitive advantage through innovation. The later concept rectification conceptualizes absorptive capacity as a dynamic capability that is imbedded in higher-order learning routines, thereby recognizing its capacity to influence the reconfiguration of other capabilities and routines in the firm (Lewin et al., 2006; Zahra and George, 2002). Recently Lewin et al. (2011) perceive absorptive capacity as a knowledge-based dynamic capability that integrates both internal and external learning routines. Internal learning facilitates new idea generation, enables internal knowledge dissemination and combination, and updates old routines through knowledge application (Nelson and Winter, 1992; Nonaka, 1994; Zollo and Winter, 2002). External learning identifies, acquires, assimilates, transforms, and exploits knowledge from external sources for the purpose of creating new commercial output (Lewin et al., 2011). Lewin et al. (2011) argue that external learning routines are only useful if the acquired knowledge can be transferred back into the firm, and further integrated with internal learning routines for knowledge generation.

The conceptualization of the knowledge-based dynamic capability also reflects exploratory and exploitative learning (Lewin et al., 2011; Lichtenthaler and Lichtenthaler, 2009). Knowledge exploration is carried out by both external learning routines, that recognize and assimilate valuable external new knowledge, and internal learning routines, that create and select new knowledge within firm boundaries (Lewin et al., 2011; March, 1991). Exploratory learning allows firms to experiment with new alternatives, and generate technological change that is necessary for managing challenge in a turbulent environment (Lane et al., 2006; Zollo and Winter, 2002). In contrast, knowledge exploitation is carried out by routines that apply both externally acquired and internally generated knowledge to reconfigure operating routines (Lane et al., 2006; Zollo and Winter, 2002). In line with March (1991), the conceptualization also highlights the necessity of reaching a balance between exploratory and exploitative learning (Lewin et al., 2011; Lichtenthaler and Lichtenthaler, 2009). The cognitive view of firm (Nooteboom, 2009) explains how such a balance can be achieved across different contexts.

According to Nooteboom (2009), ‘cognitive distance’ exists between individuals to the extent that they have developed different interpretation and understanding of the world along different life paths and in different environments. The primary purpose of a firm is to serve as a cognitive “focusing device” (Nooteboom, 2007, p. 31) that configures the cognitive distance between its members. An optimal cognitive distance is large enough to enable exploratory learning that generates innovative ideas through novel combination of complementary resources, whilst not so distant to preclude necessary mutual understanding needed for exploitative learning to increase efficiency in adaptive process (Nooteboom, 2007). Following this rationale, the essence of the knowledge-based dynamic capability lies in its capacity...
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