Journal of Operations Management 27 (2009) 444–461

Contents lists available at ScienceDirect

Journal of Operations Management

journal homepage: www.elsevier.com/locate/jom

Dynamic capabilities through continuous improvement infrastructure

Gopesh Anand [a,*], Peter T. Ward [b], Mohan V. Tatikonda [c], David A. Schilling [b]

[a] College of Business, University of Illinois at Urbana-Champaign, Champaign, IL 61820, United States
[b] Fisher College of Business, The Ohio State University, Columbus, OH 43210, United States
[c] The Kelley School of Business, Indiana University, Indianapolis, IN 46202, United States

ARTICLE INFO

Article history:
Received 11 February 2008
Received in revised form 19 February 2009
Accepted 25 February 2009
Available online 9 March 2009

Keywords:
Continuous improvement
Dynamic capabilities
Lean management
Operations strategy
Organizational learning
Six Sigma
Total quality management

ABSTRACT

We examine the content of continuous improvement strategies and identify infrastructure decision areas that are important for continuous improvement initiatives. We present a framework of infrastructure based on the idea that continuous improvement can serve as a dynamic capability when it includes a comprehensive organizational context. Further, we study continuous improvement initiatives in five companies to investigate the practices used by them in each of the decision areas of our framework. This research adds to the conceptual understanding of continuous improvement and results in grounded propositions about critical areas of infrastructure for continuous improvement.

1. Introduction

Continuous improvement initiatives such as lean production and Six Sigma have proliferated among manufacturing and service organizations worldwide (Voss, 2005). Due to an increasing pace and complexity of business environments, organizations no longer compete on processes but the ability to continually improve processes (Teece, 2007). At the same time numerous organizations that have deployed continuous improvement initiatives have not been successful in getting what they set out to achieve. Results of a 2007 survey of US manufacturers showed that while 70% of plants had deployed lean manufacturing techniques, 74% of these were disappointed with the progress they were making with lean (Pay, 2008). An earlier study found that only 11% of companies considered their continuous improvement initiatives to be successful (Mendelbaum, 2006). Although operations management executives realize the importance of continually improving processes, they have found that managing continuous improvement is a challenging task (Kiernan, 1996; Pullin, 2005). The challenge lies in creating an infrastructure to coordinate continuous improvement projects (Choo et al., 2007; Wruck and Jensen, 1998). This paper seeks to identify the elements of such infrastructure. We present a framework of continuous improvement infrastructure derived from the dynamic capabilities perspective and its underlying theory of organizational learning (Zollo and Winter, 2002). Further, we offer preliminary empirical evidence in support of our framework based on case studies of continuous improvement initiatives in five companies. Thus, we propose a grounded theory framework by combining logical arguments from existing literature with cross-case empirical insights from companies that have deployed continuous improvement initiatives.

Continuous improvement is defined as a systematic effort to seek out and apply new ways of doing work i.e. actively and repeatedly making process improvements. We define processes as designed sequences of tasks aimed

* Corresponding author.
E-mail addresses: gopesh@illinois.edu (G. Anand), ward.1@osu.edu (P.T. Ward), tatikond@iu.edu (M.V. Tatikonda), schilling.1@osu.edu (D.A. Schilling).

0272-6963/$ – see front matter © 2009 Elsevier B.V. All rights reserved.
doi:10.1016/j.jom.2009.02.002

at creating value-adding transformations of inputs – material and information – to achieve intended outputs (Upton, 1996). For example, raw materials such as wood and iron fixtures go through several operational processes to manufacture a chair; information about the customer and aggregate risk-related data are processed to produce an automobile insurance policy. Process improvements are defined as enhancements in operational processes; e.g. improving a chair manufacturing process so that less raw material is consumed, or reducing the cycle time from proposal to delivery of an insurance policy.

Our premise is that continuous improvement can be a dynamic capability when it includes a comprehensive organizational context. Dynamic capability is defined as "a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness." (Zollo and Winter, 2002, p. 340). The implementation of dynamic capabilities involves repeated cycles of organizational learning (Cyert and March, 1963; Mahoney, 1995; Schön, 1975). Similarly, process improvement involves organizational learning to make changes in operating routines. As described earlier, the ability to consistently improve current processes and learn new ones is termed continuous improvement capability (Ittner and Larcker, 1997).

Organizations aim to achieve continuous improvement capability through the deployment of continuous improvement initiatives such as lean management and Six Sigma (Voss, 2005). A continuous improvement initiative implies bundles of practices, such as prescribed sequences of steps for carrying out projects, and sets of tools and techniques commonly used to execute these projects (Handel and Gittleman, 2004; Pil and MacDuffie, 1996). Continuous improvement thus fits into Helfat et al.'s (2007, p. 5) notion of dynamic capability as patterned activity, in contrast to "a one-time idiosyncratic change to the resource base of an organization." When appropriately implemented, continuous improvement initiatives help to integrate operations processes and enhance the organization's ability to make cohesive and quick process changes to improve performance. In this way, continuous improvement initiatives can serve as dynamic capabilities for the organization (Fig. 1 presents a schematic representing the parallels drawn between continuous improvement and dynamic capabilities). For continuous improvement to create and support dynamically changing operational capabilities it is critical that it include a coherent infrastructure (Eisenhardt and Martin, 2000; Garvin, 1993b).

Thus, our proposed framework of infrastructure elements is based on the idea that continuous improvement is meant to be a dynamic capability. Following the development of this theoretical framework, we study continuous improvement initiatives in five companies and gain insight into the practices for each of the elements of their continuous improvement infrastructure. The theoretical importance of the elements that constitute our framework and the preliminary empirical support for the validity of this framework provided by the case studies leads to the proposition that continuous improvement deployments that do not institute practices in each of the areas of continuous improvement infrastructure will be less effective.

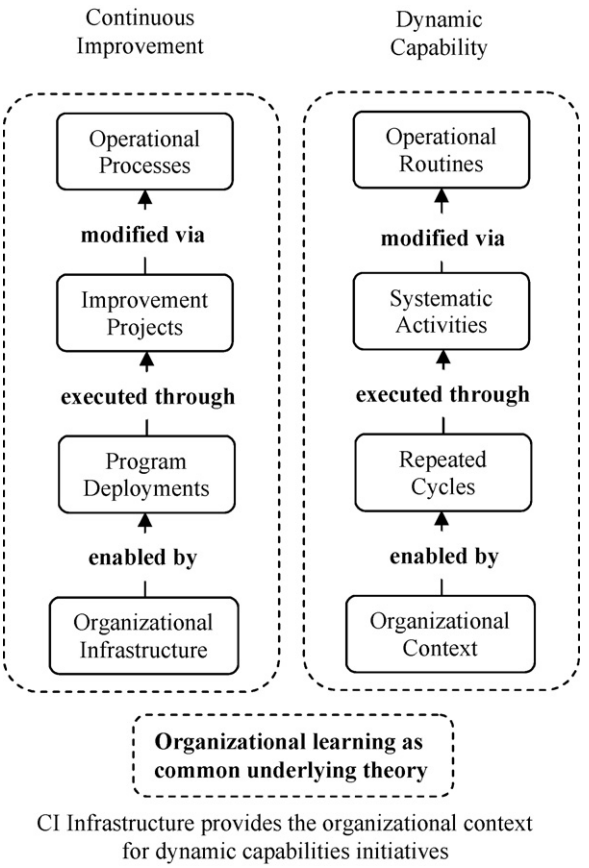

Fig. 1. Continuous improvement as dynamic capability.

The remainder of the paper is organized as follows. In Section 2 we relate the organizational context for dynamic capabilities to continuous improvement infrastructure. While this section broadly describes the underlying theory on which our framework is based, conceptual development of each of the elements of the framework is done in Section 4. Section 3 describes our method for developing the framework and for applying it to empirically study its application through five case studies of continuous improvement deployments. In Section 4 we develop a framework of infrastructure decision areas for continuous improvement. As we present each of the elements of this framework and discuss their theoretical origins we also present our observations from the case studies. Section 5 consists of an analysis of our framework. We highlight the limitations of the proposed framework revealed by inconsistencies with some of our empirical observations and discuss the complexities of certain infrastructure decisions for companies. This analysis leads to 10 research questions that we believe are important for further theoretical development in the area of continuous improvement. Section 6 identifies key recommendations for practice, points out some limitations of our empirical study and concludes the paper.