© Academy of Management Review
2003, Vol. 28, No. 2, 238–256.

EXPLOITATION, EXPLORATION, AND PROCESS MANAGEMENT: THE PRODUCTIVITY DILEMMA REVISITED

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We develop a contingency view of process management's influence on both technological innovation and organizational adaptation. We argue that while process management activities are beneficial for organizations in stable contexts, they are fundamentally inconsistent with all but incremental innovation and change. But dynamic capabilities are rooted in both exploitative and exploratory activities. We argue that process management activities must be buffered from exploratory activities and that ambidextrous organizational forms provide the complex contexts for these inconsistent activities to coexist.

Twenty-five years ago, Abernathy (1978) suggested that a firm's focus on productivity gains inhibited its flexibility and ability to innovate. Abernathy observed that, in the automobile industry, a firm's economic decline was directly related to its efficiency and productivity efforts. He suggested that a firm's ability to compete over time was rooted not only in its ability to increase efficiency but also in its ability to be efficient and innovative simultaneously (Abernathy, 1978: 173; Hayes & Abernathy, 1980). Strategy and organization theorists have similarly observed that dynamic capabilities are anchored in a firm's ability to both exploit and explore (Ghemawat & Costa, 1993; March, 1991; Weick, 1969). A firm's ability to compete over time may lie in its ability both to integrate and build upon its current competencies while simultaneously developing fundamentally new capabilities (Teece, Pisano, & Shuen, 1997).

Twenty-five years after Abernathy's observations, the pressures for organizations to meet multiple, often inconsistent, contextual demands have escalated (e.g., Christensen, 1998; Tushman & O'Reilly, 1997). The notion of balance between exploitation and exploration, or between incremental and radical organizational change, has been a consistent theme across several approaches to research in organizational adaptation (e.g., Brown & Eisenhardt, 1998; Burgelman, 1994; Gavetti & Levinthal, 2000; Levinthal & March, 1993; March, 1991; Tushman & Romanelli, 1985). Yet this need for dual organizational capabilities arises in the context of a wave of managerial activity and institutional pressures focusing on process management and control (e.g., Adler, 1993; Cole, 1998; Hackman & Wageman, 1995; Hammer & Stanton, 1999; Winter, 1994).

Process management, based on a view of an organization as a system of interlinked processes, involves concerted efforts to map, improve, and adhere to organizational processes. Initially based on the seminal work of Ishikawa (1985), Deming (1986), and Juran (1989), process management practices became popular as a central element of total quality management (TQM) programs in the 1980s (Hackman & Wageman, 1995). Since then, these practices have continued to spread as a core element of a continuing progression of quality-related initiatives, including the Malcolm Baldrige National Quality Award, the International Organization for Standardization's Series 9000 program (ISO 9000), business process reengineering, and, more recently, Six Sigma programs. By 1992

We thank Diane Burton, Don Hambrick, Andy Henderson, Monica Higgins, Lee Fleming, David Garvin, Giovanni Gavetti, Peter Kolesar, Nitin Nohria, Nelson Repenning, Sandra Sucher, Ruth Wageman, former associate editor Dev Jennings, and three anonymous reviewers for comments on earlier drafts of this article.

every Fortune 100 firm had adopted TQM practices (Nohria, 1996).

While some suggest that interest in TQM had waned by the 1990s (Powell, 1995), thousands of organizations were subsequently certified in the ISO 9000 process management program (*Quality Digest*, 1999), and many companies, including highly visible ones like GE, Honeywell, 3M, Amazon.com, Toshiba, and Ford have recently embraced Six Sigma (e.g., Feyder, 2001; Gabor, 2001; Honeywell, 1998). Process management practices have been institutionally mandated as government agencies or powerful buying organizations require adoption by their suppliers (e.g., Harrington & Mathers, 1997; Westphal, Gulati, & Shortell, 1997).

Process management's contribution to improving manufacturing efficiency has led to its migration beyond operations to other parts of organizations—for instance, to adjacent processes for selecting and developing technological innovations (Brown & Duguid, 2000; Sitkin & Stickel, 1996). As the variation-decreasing and efficiency-oriented focus of process management spreads to centers of innovation, or variation creation activity in organizations, it increasingly affects an organization's dynamic capabilities. Yet there has been a lack of research about how these institutionally mandated and pervasive practices affect technological innovation or adaptation.

Much existing literature is prescriptive and aimed at educating managers on implementing process management practices. Process management's proponents have promoted process improvement practices as universally beneficial for organizations, spurring continuous innovation that results in efficiency improvements, cost reductions, improved customer satisfaction, and, ultimately, higher profits (Hammer & Stanton, 1999; Harry & Schroeder, 2000; ISO, 1999). Reflecting these assumptions, empirical research on process management's effects has been limited to assessing the financial performance implications from process management adoption (e.g., Ittner & Larcker, 1997; Powell, 1995; Samson & Terziovski, 1999).[1] The results of these studies have been equivocal. Research aimed at resolving the debate suggests that differential outcomes from TQM adoption arise because organizations implement different practices under the TQM umbrella (Westphal et al., 1997; Zbaracki, 1998). Similarly, Sitkin, Sutcliffe, and Schroeder (1994) argue for an alternative set of TQM practices when task environments are highly uncertain.

Although these studies provide insight into possible contingencies, their focus is specifically on TQM programs. Similarly, much of the organizational literature on the topic of process management has been focused on TQM (e.g., Easton & Jarrell, 1998; Hackman & Wageman, 1995; see also the July 1994 Total Quality special issue of *AMR* and Cole & Scott, 2000). Researchers have made no attempt to build theory that links this TQM literature to broader concepts of process management or with more recent research on dynamic capabilities (e.g., Eisenhardt & Martin, 2000; Teece et al., 1997).

We extend the process management literature by developing a model and testable propositions about how process management activities affect both technological innovation and organizational adaptation. We explore how both technological and organizational contexts moderate the relations between process-focused activities and organizational adaptation (e.g., Sitkin et al., 1994), arguing that process management techniques stabilize and rationalize organizational routines while establishing a focus on easily available efficiency and customer satisfaction measures. Although increased efficiency results from these dynamics in the short run, they also trigger internal biases for certainty and predictable results and ensure process management's progression to more activities throughout the firm. This diffusion of process management techniques favors exploitative innovation at the expense of exploratory innovation. We argue that while exploitation and inertia may be functional for organizations within a given techno-

[1] In other empirical research scholars explore implications of more broadly defined TQM programs. While process improvement practices may be included in an organization's adoption of TQM, this is not necessarily the case (Westphal et al., 1997, Zbaracki, 1998). Further, since it is not clear from most research on TQM whether and to what extent the organizations involved undertook process-focused practices, interpreting or comparing existing research is hampered by heterogeneity in the bundle of TQM practices adopted. The three studies cited break out process-focused activities from other practices within TQM and, thus, are particularly relevant to our topic. We also review the larger body of existing research on process management and TQM later in this paper.