

A Theory of Change in Turbulent Environments: The Sequencing of Dynamic Capabilities Following Industry Deregulation

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Abstract

The dynamics of change and the path-dependent evolution of resources and capabilities are central concerns of contemporary strategic management. This paper integrates the resource-based and dynamic capabilities literatures to explain why development of dynamic capabilities is especially important for firms that transition from regulated to deregulated environments. We develop a theoretical model and specific propositions concerning the pattern and sequencing of dynamic capability development within environments experiencing substantial change, specifically in newly deregulated industries. We discuss implications of the proposed theoretical model for both research and managerial practice.

Introduction

The resource-based view of the firm provides a useful perspective for explaining firm growth and sustainable competitive advantage (Mahoney and Pandian 1992, Penrose 1959, Peteraf 1993). Recently, the resource-based approach has begun to consider dynamic routines and processes, which are linked to the dynamic capabilities research literature (e.g., Eisenhardt and Martin 2000, Helfat and Peteraf 2003, Teece, Pisano and Shuen 1997). The current paper emphasizes an additional component concerning the sequencing of dynamic capabilities during periods of substantial environmental change brought about by deregulation (Pettus 2003). This component can enhance our understanding of how firms match their dynamic capabilities to changing environments (Wang and Barney 2006).

While it is frequently observed that resources are developed in complex path dependent processes (Dierickx and Cool 1989, Kraatz and Zajac 2001, Rumelt 1984), little is known about the *sequencing* of dynamic capability development activities (Pettigrew, Woodman, and Cameron 2001, Van de Ven 1992). The current paper considers the sequencing of dynamic capabilities in environments of substantial change, and specifically in deregulated environments where competition-restraining regulations are relaxed (Mahon and Murray 1981). This change to deregulation often involves a recognizable *pattern* of strategic change (Zajac and Shortell 1989).

The resource-based view of the firm while accurate is incomplete for understanding environments experiencing substantial change. The primary focus of the resource-based view, as described by Teece, Pisano and Shuen (1997), is on leveraging current capabilities for gaining and sustaining competitive advantage. However, this leveraging approach to competitive advantage is not as beneficial in turbulent markets (Eisenhardt and Martin 2000). To ascertain how capabilities evolve in environments of substantial change, the resource-based view is

usefully complemented by the dynamic capabilities research literature on dynamic processes (Augier and Teece 2006, Mosakowski 1993).

The current paper proceeds as follows. First, the relevant research literature concerning resources and dynamic capabilities is reviewed. Next, utilizing fundamental insights from the resource-based view and the dynamic capabilities approach, a theoretical foundation is developed to explain why development of dynamic capabilities is especially important for firms that transition from a regulated to deregulated environment. We then present our theoretical model and provide specific propositions about the pattern and sequencing of dynamic capability development in deregulated environments. The final section discusses implications of the proposed theoretical model for both research and managerial practice.

Theoretical Background

Resource-based View and Dynamic Capabilities

Within the resource-based view, resources are the basic units of analysis. A firm's resources are often classified as financial, human, intangible, organizational, physical, and technological (Bogner, Mahoney, and Thomas 1998), and further "... subdivision of resources may proceed as far as is useful ... for the problems at hand" (Penrose 1959: 75). Resources are the stocks of available productive factors owned or controlled by the firm (Madhok 1996). Often what makes resources economically valuable is the way in which these resources are deployed and developed (Kor and Leblebici 2005). For resources to be utilized in production and to provide a firm's distinctive productive services (Penrose 1959: 25), certain organizational processes must be developed.

Capabilities represent the organizational processes by which resources are assimilated and productively deployed. These information-based organizational processes tend to be firm

specific and are developed over substantial time periods through complex interactions among the firm's resources (Amit and Schoemaker 1993). Capabilities are high-level routines that provide an organization's management a set of decision options for producing an array of outputs (Nelson and Winter 1982). They are also typically substantial in scale, representing a large number of activities that produce outputs that increase the likelihood of the firm's survival and prosperity (Winter 2000).

Further, *dynamic capabilities* involve the organizational processes by which resources are utilized to *create growth and adaptation within changing environments* (Eisenhardt and Martin 2000, Lado, Boyd, Wright and Kroll 2006; Teece, Pisano and Shuen 1997). Dynamic capabilities pertain to the organization's competencies to integrate, build, and reconfigure resource positions in rapidly changing environments. They also reflect organizational competencies to achieve new and innovative forms of competitive advantage despite constraints of path dependencies and previous market positions (Arthur 1994, Gruca and Nath 1994, Leonard-Barton 1992). Dynamic capabilities result from complicated organizational and strategic routines (Zollo and Winter 2002) through which managers reconfigure and renew a firm's resource base to generate economically value-creating strategies (Foss 1996, Pisano 1994). Thus, these capabilities are the fundamental drivers of the creation, evolution, and recombination of other resources to provide new sources of growth (Henderson 1994, Henderson and Cockburn 1994, Zander and Kogut 1995).

Dynamic capabilities evolve in important ways that we have only begun to explain. Following Helfat and Peteraf (2003), the current paper's analysis describes the pattern of capability development using the resource-based view (Penrose 1959, Wernerfelt 1984) and the dynamic capabilities approach (Eisenhardt and Martin 2000, Teece, Pisano, and Shuen 1997).

This paper gives central attention to the dynamic capabilities of managerial capabilities (Adner and Helfat 2003, Mahoney 1995), organizational learning (Cohen and Levinthal 1990, Helfat and Raubitschek 2000), and strategic flexibility (Grant 1996, Sanchez 1995), since these dynamic capabilities are critical to fundamental processes of organizational adaptation (Levinthal 1991, Miller 2003) and dynamic strategic fit (Itami and Roehl 1987). While the underlying processes of these capabilities may overlap, they serve unique and complementary roles to boost the likelihood of operating successfully in environments of significant change, such as deregulated industries. We define and discuss the relevance of these capabilities before developing our theoretical model on the sequential development of such capabilities in deregulated industries.

Managerial Capabilities. Managers play crucial roles in developing and maintaining processes shaping the development of organizational capabilities (Kim and Mahoney 2006a). Managers often serve as the basis upon which firms grow, renew, and differentiate themselves (Barney 1991, Penrose 1959). With unique (subjective) perceptions and knowledge of the firm's resources and its business environment, including its customer base and competitive challenges (Kor, Mahoney and Michael 2007), managers drive development of firm-specific resources, envision the productive services the resources can offer, and determine the specific opportunities a firm should pursue (Penrose 1959).

Managerial capabilities are *dynamic* drivers for achieving congruence between the firms' competencies for renewal of resource positions and changing environmental conditions (Teece, Pisano and Shuen 1997). They play a key role in setting the growth and opportunity boundaries of a firm (Penrose 1959) by identifying new product applications in firm's existing and new markets where the firm can productively deploy its resources and knowledge (Tripsas 1997). It is "plasticity," rather than the price elasticity of demand that defines a firm's capacity to grow.

Plasticity refers to a re-molding of demand as a result of managerial initiatives such as offering superior new products and services and making them conveniently available to customers. Creative managerial initiatives help to sustain entrepreneurial growth despite unfavorable demand conditions (Penrose 1959).

Frequently, firms differ in the quality and versatility of entrepreneurial services provided by their management teams (Kor 2003). Regarding the heterogeneity of managerial capabilities in firms, Penrose states that in the process of growth: “the imaginative effort, the sense of timing, and the instinctive recognition of what will catch on or how to make it catch on become of overwhelming importance. *These services are not likely to be equally available to all firms.* For those who have them, however, a wider range of investment opportunities lies open than to firms with a less versatile type of enterprise” (1959: 37, emphasis added). Managers often play an important role in enacting change (e.g., Rosenbloom 2000, Tripsas and Gavetti 2000). For example, managers utilize environment scanning to identify new technologies and develop the integrative ability to combine new insights with the firm’s existing capabilities which has been shown to be instrumental for success in product sequencing (Helfat and Raubitschek 2000, Iansiti and Clark 1994). Thus, managerial capabilities are likely to be essential for competitive (re)positioning in environments of significant change.

Organizational Learning. While resources constitute a firm’s asset stocks, which tend to be static until put into productive uses, organizational learning serves as a dynamic capability that continuously generates economic value through development of new ideas and renewal of existing capabilities (Kogut and Zander 1992). Organizational learning influences the interactions among a firm’s various resources (e.g., human and material resources) resulting in enhanced productive capacity for individual resources (Zollo and Winter 2002). New resource

combinations produce a new set of productive services that were previously unavailable to the firm (Penrose 1959). This systematic occurrence of learning at a resource-based level contributes to learning at the organizational level (Spender 1992). Through organizational learning, the firm's capabilities evolve to meet dynamic market conditions.

Without organizational learning capability, the firm can neither fully utilize the productive capacities of its resources (Kor and Mahoney 2000) nor promote a continuum of firm-level capability accumulation, deployment, and renewal that fuels innovation and growth (Mathews 2003). Firms utilize learning to reconfigure existing resources into co-specialized assets, which can be applied to core and related markets (Teece 1986). This integration and reconfiguration of resources and capabilities provide scale and scope economies that facilitate the growth process (Chandler 1990). When organizational learning is absent or insufficient, the firm loses substantial opportunities for collaboration and resource sharing across functions, products, divisions, regions, and firms that are at the heart of entrepreneurial firm growth and strategic adaptation (Kim and Mahoney 2006b, Zollo, Reuer and Singh 2002).

Strategic Flexibility. While there are many ways in which a firm can grow, growth in dynamic markets requires strategic flexibility (Sanchez 1995). Because direction of growth is not known *ex ante*, firms need flexibility in developing new and existing resources and capabilities to meet changing conditions in the environment (Smith and Grimm 1987). Environmental adaptation requires that firms not only effectively manage their current resource bases but also develop flexibly to change their resource positions to respond to dynamic market conditions. Strategic flexibility requires organizational routines to reconfigure a firm's resources to respond to specific environmental changes (Zollo and Winter 2002). Viewed as the building blocks of dynamic capabilities (Teece, Rumelt, Dosi, and Winter 1994), these routines involve systematic

and company-wide scanning of the external environment across various dimensions including customer preferences, competitive threats, and changes in regulations and technologies (Helfat and Raubitschek 2000).

Equally important, firms need to scan the internal environment to create new or modified uses for the existing resources and to identify new resource acquisition possibilities (Ranft and Lord 2002). Firm-specific organizational routines that facilitate this simultaneous internal and external scanning can be an invisible asset and thus a difficult to imitate source of competitive advantage (Itami and Roehl 1987, Teece 1990). In addition, strategically flexible firms not only must possess routines to facilitate and develop new resource deployment insights, but must also possess the routines to *mobilize* these insights by transforming them into strategic decisions and actions (Helfat 1998, Teece and Pisano 1994).

All three dynamic capabilities discussed here (managerial capabilities, organizational learning, and strategic flexibility) neither exists uniformly in all firms, nor matter equally in all industries (Delmas, Russo and Montes-Sancho 2007, Winter 2003). To understand the evolution of these dynamic capabilities, the current paper begins at the point at which an industry is deregulated since dramatic changes in environmental opportunities are presented at this time to managers within the industry.

Theory and Propositions

Dynamic Capabilities within Deregulated Industries

While sometimes necessary to mitigate market imperfections and negative externalities, regulations often place extensive restrictions on firms (Kahn 1971, Spulber 1989) and perpetuate inefficient practices (MacAvoy 1979, Viscusi, Vernon and Harrington 1992). For example, entry restrictions may prevent efficient firms from replacing inefficient firms, while exit restrictions

can keep inefficient firms producing (Jayaratne and Strahan 1998, Mahon and Murray 1981). When regulatory agencies control the scale and scope of firms (Hambrick and Finkelstein 1987), firms may be constrained from enhancing efficiencies from their resource base. For example, Johnson, Sambharya and Bobko (1989) showed that prior to the deregulation of the U.S. airline industry, airlines often failed to pursue strategies that would enhance their efficiencies. Further, Jayaratne and Strahan (1998) found that U.S. banks' operating costs and loan losses decreased sharply after States permitted statewide branching.¹

In a regulated environment, firms typically focus on the regulatory agency and upon regulatory compliance. As Mahon and Murray explain, "since many of the traditional market and competitive forces are weakened in a regulated environment, and because of the influence and impact of the regulatory agency, the [managerial and strategic] focus shifts from the consumers to the regulatory body itself" (1981: 255). In a regulated environment, industry conditions are largely shaped by the regulatory agency, which acts as a buffer between firms and competitive market forces (Spulber 1989; Stigler 1971). Thus, firms are often insulated from major shifts in environmental conditions, which reduce the need or pressure for organizational change.

Deregulation provides a type of "Schumpeterian shock" that confronts firms with a drastically different environment, which may require new business models (Meyer 1980, Silverman, Nickerson and Freeman 1997). Having lost their insulation from competitive market forces, firms need to develop dynamic capabilities to survive and adapt to deregulated environmental conditions. When the regulatory body no longer dictates industry conditions, dynamic capabilities through which firms "integrate, build, and reconfigure internal and external

¹ As in these examples, the current paper focuses on competition-constraining regulations (e.g., entry and exit restrictions) rather than social regulations (e.g., environmental and safety regulations) (Mahon and Murray 1981, Reger, Duhaime, and Stimpert 1992).

competencies to address rapidly changing environments” (Teece, Pisano and Shuen 1997: 516) become the new source of competitive advantage. Deregulation typically involves elimination of specific regulatory controls such as market entry- and exit- restrictions, and scale and scope constraints (Reger, Duhaime and Stimpert 1992). Elimination of these restrictions creates the need for developing dynamic capabilities to cope with the drastically changed competitive environment.

Elimination of Market Entry and Exit Restrictions. Deregulation of competition-restraining regulations often involves the elimination of market entry and exit restrictions enforced by the regulatory agency (Mahon and Murray 1981). For example, railroad companies began to acquire trucking firms after both the rail and trucking industries were deregulated in 1980. Since a rail network is limited based upon placement of tracks, rail carriers entered the trucking industry to gain greater access to markets by utilizing existing highway infrastructure and expanding scale and scope of operations (Pettus 2003).

In a deregulated environment where entry and exit restrictions are lifted, firms need to develop the capability to monitor and anticipate entry and exit of firms, and assess strengths and weaknesses of existing and new competitors. This capability involves a set of organizational routines and activities to regularly scan the external environmental. External scanning serves as a prerequisite for strategic flexibility and effective adaptation in changing environments. Through external scanning, a firm can make sense of new industry dynamics (Garg, Walters, and Priem 2003, Hambrick 1981). For instance, following elimination of price and profitability controls due to deregulation, firms can utilize external environmental scanning to develop an understanding of the new strategic industry factors that influence economic profitability (Thornhill and Amit 2003, Vasconcellos and Hambrick 1989).

With free market entry and exit, it is also important for firms to develop a set of routines for internal firm scanning to evaluate their bundle of resources and capabilities. In regulated environments, a firm's internal scanning routines are concerned with the assessment and development of the firm's capability to satisfy the regulatory agency. After deregulation, such routines are no longer relevant. Rather than trying to comply with a detailed set of rules and regulations, firms face the challenge of competing in an environment where the rules are tacit, frequently changing, and typically unpredictable (Nonaka 1994). This new and dynamic environment requires a different set of internal scanning routines that continuously assess a firm's capability to appeal to customers.

Further, the external scanning and internal scanning routines must work both concurrently and coherently so that a firm can effectively assess its needs for modifying its resource bases through new resource combinations, resource acquisitions, and new capability development initiatives (Capron and Mitchell 1998). External developments in the deregulated market guide managers about the strategic importance of current resources. External developments in the market need to be interpreted through the lenses of the firm, where the knowledge of the firm's unique bundle of resources, prior commitments, and weaknesses helps to assess the relative importance and meaning of an external event for the firm. Thus, in addition to internal and external scanning routines, a firm would need to integrate routines to coordinate, connect, and concurrently utilize the insights and knowledge collected through internal and external scanning (Helfat and Raubitschek 2000). These intertwined external and internal scanning capabilities are fundamental requirements of strategic flexibility as a dynamic capability. Strategic flexibility enables a firm to achieve and maintain an alignment between internal capabilities and changing environmental conditions (Thornhill and Amit 2003).

Elimination of Constraints on Scale and Scope. Deregulation also involves elimination of restrictions on the scale and scope of firms' operations (Mahon and Murray 1981). For example, prior to 1980, trucking firms could only service specific geographic markets in the United States, but after deregulation, these firms were allowed to service the entire country. Similarly, after the deregulation of the financial services in United Kingdom in late 1970s, commercial banks were allowed to produce and market a wide range of financial services including insurance, investment, travel and property-related services (Ingham and Thompson 1994). Once these restrictions are lifted, firms can more fully leverage their existing resource base to achieve greater economies of scale and scope (Chandler 1990, Teece 1982, Winter and Szulanski 2001). Such growth and efficient resource utilization becomes of vital importance in a deregulated environment with increased competition in both resource and product markets.

Elimination of Regulatory Controls on Market Share. Deregulation releases constraints on market share (Mahon and Murray 1981). In the railroad industry, there were forty Class I railroads in the United States prior to 1980 (date of railroad deregulation). Class I carriers were firms that exceeded a specific tonnage of freight moved per year. These carriers had approximately the same market share during the regulated period. Post deregulation, as of 2005, only *seven* Class I railroad companies remain with an increased concentration of market share relative to the pre-deregulation period. Maintaining the status quo strategy and ignoring competitive actions almost guarantee the loss of market share in a deregulated market. Protecting and growing market share in order to achieve economies of scale and scope requires developing an organizational learning capability that embeds routines to encourage innovation and to build synergistic resource configurations (Collis and Montgomery 1995). Once these learning routines

become established and programmatic (Cyert and March 1963, Nelson and Winter 1982), a firm can successfully cope with changes in the environment.

Developing economies of scope in related markets requires firms to learn and discover new applications of existing resources and capabilities. This process of creating new resource combinations makes resources more versatile for productive uses. A firm's learning efforts lead to reconfiguration of the existing resources into new complementary and co-specialized assets (Teece 1987), which can serve the basis of competitiveness in related product and service markets (Chang and Singh 1999). For example, post-deregulation in the air freight and trucking industries witnessed development of both upgraded and new capabilities concerning electronic data interchange, logistic services, multi-modal services and global coverage (Pettus 2001).

In sum, deregulation virtually requires that firms utilize their resource base differently to achieve scale and scope economies (Bailey and Williams 1988). While during regulatory times firms learn how to work with the regulatory agency, this knowledge has significantly less economic value after deregulation. Instead, firms must learn how to develop and deploy resources productively to maintain and improve their market positions. Building economic value-creating strategies that provide a cost and/or a differentiation advantage over competitors (Peteraf and Barney 2003) is essential in deregulated industries.

Sequencing Dynamic Capabilities within Deregulated Environments

As illustrated in Figure 1, the development of specific dynamic capabilities is likely to follow a particular pattern and sequence.

Insert Figure 1 about here

New Managerial Mental Models. Because of their central role in developing new resource capabilities and combinations, managers serve as a major source of heterogeneity among firms (Adner and Helfat 2003). When the regulatory agency ceases to control industry conditions, managerial decision-making takes on much greater importance. Managerial capabilities play a particularly important role in strategic reorganizations of firms in response to changing conditions in the external environment (Tushman and Rosenkopf 1996, Virany, Tushman, and Romanelli 1992).

Firm-specific managerial knowledge can be uniquely valuable for firm growth and renewal. As managers gain experience utilizing specific resources, the management team's knowledge of the firm's resources and the potential productive uses of these resources becomes the creative engine for entrepreneurial firm growth. Firm-specific managerial foresight guides a firm's search for new ways of using its resources and capabilities to achieve better resource utilization (Kor and Mahoney 2000). Thus, a firm's endowment of firm-specific managerial capability can be valuable for identifying and pursuing productive opportunities that develop and renew existing resources and capabilities (Chandler 1962, 1977). Typically, incumbent managers also possess in-depth knowledge of the industry, which continues to be useful even after deregulation. While deregulation may generate "creative destruction," incumbents can survive because their managers use their firm- and industry-specific experience to compete successfully in the market, despite rapid technological and market change (King and Tucci 2002).

Further, managerial capabilities shape strategic decisions including responses to external environments. Specifically, cognition of the top management team members can play a critical role in shaping firm-level responses to discontinuities (Kaplan, Murray and Henderson 2003)

such as deregulation in the context of the current paper. While firm-specific managerial resources have internal knowledge advantages, a firm can benefit significantly from recruiting experienced managers who have successfully grown firms in newly deregulated environments. In response to deregulation, operational and strategic issues may broaden in scope and complexity, and the range of possible business models may expand. As a result, managerial skills developed in firms that have successfully transitioned from a regulated environment to a deregulated environment can be highly valuable. Because managerial discretion increases sharply after deregulation, managers experienced with relevant knowledge and skills can enable a firm to develop new business models for adaptation and survival (Pettus 2003).

Therefore, new growth opportunities can effectively be created for the firm when firm-specific managerial knowledge in regulated industries is *integrated with the knowledge of managers* who have successfully managed the transition from regulation to deregulation. This integration creates *new managerial mental models*. Deregulated environments require new managerial mental models for redirecting a firm's path of resource accumulation (Barr, Stimpert and Huff 1992, Castanias and Helfat 2001). Combining tacit knowledge of the firm's resources and capabilities with new managerial skills to cope with the changed competitive environment, results in a management team that is internally knowledgeable and externally alert and adept. These newly formed mental models facilitate development of dynamic capabilities and enable the firm to address and implement a wider variety of strategies that may not have been otherwise possible.

P1: When existing managerial capabilities in regulated industries are combined with new managerial capabilities from deregulated industries, new managerial mental models are created, and subsequently a greater variety of strategic behaviors are likely to be observed.

Managerial Learning. As new mental models are created, the role of learning becomes increasingly important within deregulated environments. Interactions between new and existing managers provide the basis for new learning (Barr, Stimpert, and Huff 1992). New managers can gain insights from existing managers who have (tacit) knowledge of the firm's unique bundle of resources and capabilities. Managerial knowledge of a firm's unique history, resource commitments, and the intricacies of its business model and technologies continue to be economically valuable in a deregulated market. Without such knowledge, managers cannot properly envision what strategic direction a firm can and should take. During collaborative interactions with existing managers, new managers learn to appreciate the firm's history and make decisions and initiate changes in a more informed way.

Likewise, existing managers can learn from new managers' different perspectives and skills for scanning, assessing, and enacting changes in the environment. Through productive interactions, new and existing managers combine their *complementary* managerial capabilities. With the new managerial mental model, the management team not only can make better sense of the new environment but also can engage in interactive learning to identify needs for new capability development efforts and changes in the firm's strategic direction.

P2: The creation of new mental models in deregulated environments increases the likelihood of managerial learning through interactions between existing and new managers.

External Environmental Scanning. External factors in the business environment can exert great influence on the firm (Daft, Sormunen, and Parks 1988). While a firm may have little control over these factors at a certain point in time, it can develop better competitive strategies with intimate and current knowledge of external conditions and demands (Ginsburg 1988).

Therefore, if firms are to be successful within deregulated environments, it is paramount that these firms develop sophisticated environmental scanning capabilities. As a prerequisite to strategic flexibility and dynamic strategic fit (Eisenhardt and Martin 2000, Itami and Roehl 1987), external scanning enables managers to perceive external events and trends and to identify the capabilities necessary for effective adaptation in dynamic markets (Castanias and Helfat 2001). Indeed, external scanning is considered as the first link in the chain of managerial perceptions and actions that enables an organization to achieve environmental adaptation (Hambrick 1982). Through environmental scanning, managers can better identify external changes, which then become inputs for strategic decisions about new resource needs and capability development efforts to address these changes. As new firms enter the industry and the heterogeneity of strategies and practices increase (Walker, Madsen and Carini 2002), incumbent firms must learn to be alert to these changes. Systematic external scanning as a planned learning activity involves dedication of time and attention to external monitoring (Winter 2000). By tracking new business practices and competitive moves within the industry, managers can evaluate markets and competitors and initiate resource-capability reconfigurations and transformations ahead of the other incumbent competitors (Teece, Pisano, and Shuen 1997).

It is also important to note that, while managers can scan and observe the environment, they also benefit from insights and information created and gathered collectively by employees who work in close proximity to customers, suppliers, distributors and other industry players. For example, a feedback system that collects information about customers' concerns can alert managers about both product/service problems and shifts in customer preferences (Helfat and Raubitschek 2000). Also, careful scanning of the industry players along the value chain may help to identify new collaboration partners, with whom the firm may better take advantage of the

previously unavailable scale and scope economies (Ingham and Thompson 1994). This scanning could also help identify capability acquisition opportunities through which the firm can replace an existing obsolete capability with a new one (i.e., capability substitution), or add a complementary capability to its portfolio of capabilities (Lavie 2006). Therefore, following deregulation, it is important that firms create new routines for engaging not only managers but also employees in scanning critical developments and opportunities in the environment and for enabling efficient transmission of collected information and insights to relevant decision makers. An effective external scanning capability involves routines that train employees to become habitually alert to environmental changes and to develop an efficient information channel to quickly mobilize the information gathered at the firm's vital external contact points. Scanning as a collective learning activity (Zollo and Winter 2002) can be far superior to scanning as a sole managerial activity and responsibility.

P3: Following deregulation, firms learn to develop increasingly effective external environmental scanning capabilities and routines to more precisely identify how the deregulated environment differs from the previously regulated environment.

Strategic Industry Factors. In regulated industries, strategic choices such as market entry and exit, customer selection, and competitive actions and reactions are controlled by regulatory agencies (Smith and Grimm 1987). As a result, firms do not suffer the consequences for failing to be competitive. However, upon deregulation, market factors are no longer dictated by the regulatory agency. In deregulated markets, competitive conditions determine the strategic industry factors that shape firm behavior and success. Strategic industry factors are determined at the market level through interactions between the firm and its customers, competitors, regulators, investment banks and other firm stakeholders (Amit and Shoemaker 1993). The new entrants to

the industry, in particular, can exert strong influence on strategic industry factors through introduction of innovative practices that reduce costs and improve product and service quality (Walker, Madsen, and Carini 2002). As strategic industry factors change and evolve over time, firms and their capabilities must also change especially if the new environment involves rapid shifts and developments in technology (Miles and Snow 1978). Therefore, effective environmental adaptation via strategic change and renewal requires firms to regularly perform external environmental scanning to continuously identify changes in strategic industry factors (Garg, Walters, and Priem 2003).

P4: External environmental scanning is increasingly emphasized in deregulated markets to identify changes in strategic industry factors over time.

Internal Firm Scanning. External scanning is a necessary but not sufficient condition for successful environmental adaptation. While environmental scanning is crucial for identifying changing trends within the environment, systematic internal scanning is also required before firm adaptation can occur. The resource-based view has emphasized the importance of analyzing a firm's internal strengths and weaknesses during the strategy-making process (Barney 1991). In regulated environments, the regulatory agency requires compliance in terms of internal processes such as R&D, process improvements, and improvements in infrastructure (Mahon and Murray 1981). For a firm to compete effectively in a deregulated environment, these processes need to be redeveloped and aimed towards identifying current weaknesses (e.g., inefficient and non-competitive practices) and needs for renewal of the resource and capability bundle (Helfat 1994, Walker, Madsen, and Carini 2002). By identifying and evaluating its knowledge bases and unique capabilities, a firm will have a greater likelihood of developing new resource configurations and market positions that capitalizes on its unique strengths.

P5: Firms learn to implement increased internal firm scanning capabilities to assess and adapt to the environmental change brought about by deregulation.

Dynamic Capability Routines and New Resource Combinations. In regulatory environments, firms possess routines to help satisfy the regulatory agency. Assuming that the regulatory requirements are relatively stable, organizational routines maintain the status quo and promote stability. Thus, routines that contribute to organizational change, learning, innovation and entrepreneurship tend to be under-developed, unsystematic, and sporadic in their functioning, either individually or as a system. Therefore, firms in deregulated industries must develop new routines to cultivate change, learning, innovation, and entrepreneurship activities in a systematic manner.

Routines can play a crucial role in creating new resources and new capabilities (Grant 1996). Routines enable a firm to create value by altering the resource base to create, integrate, recombine, and release resources (Eisenhardt and Martin 2000). Certain routines enable the firm to reconfigure its resource base to adapt to changing market conditions (Zahra and George 2002). These routines are rightfully considered dynamic capability routines because they can enable the firm to maintain and renew its resource and capability bundles by creating new operative (functional) routines that deliver superior resource applications and services. Organizational capability routines also serve the process of “creative destruction” as some existing routines that are no longer economically valuable, in the presence of changes in the environment, must be discarded. Deregulation requires that the firm unlearn some of the existing routines that hinder growth and strategic adaptation and be replaced by new routines. Following deregulation, dynamic capability routines must be present within the firm so that employees at various levels and business functions can continuously learn, unlearn, and develop new (operative) routines that

deliver superior value and resource productivity. This continuous rebuilding through semi-planned, semi-emergent unlearning and learning efforts enables an established firm to become strategically flexible.

P6: Dynamic capability routines that systematically create new resource application routines to replace the currently established routines contribute to increased organization-wide learning and unlearning, which serve as precursors for strategic flexibility.

In the process of achieving adaptation, external and internal scanning provides valuable inputs to managers and other employees on which specific capabilities need to be renewed and refined. A central proposition of the resource-based view is to maintain a fit between a firm's resources and capabilities and environmental conditions over time (Barney 1991, Wernerfelt 1984). Given the idiosyncratic nature of the portfolio or bundle of capabilities possessed by each firm, capability enhancement or destruction should be evaluated at the firm or business level (Gatignon, Tushman, Anderson and Smith 2002, Lavie 2006), nevertheless in the light of current and anticipated competitive, technological, and other external developments that are assessed systematically through external scanning. Thus, external and internal scanning capabilities need to be deployed concurrently and coherently in order for the firm to respond effectively and to perhaps capitalize on technological and competitive changes. In deregulated markets, environmental scanning helps to identify which operative routines are enabling or hindering a firm to keep pace with the increased competition. As shown in Figure 1, when this external knowledge is infused with internal knowledge of how a group of firm-specific routines functions as a complex system, the firm can then mobilize its dynamic capability routines to renew, reconfigure, or abandon certain internally developed capabilities to broaden opportunities for

growth (Eisenhardt and Martin 2000) and to achieve an alignment with the environment (Teece, Rumelt, Dosi and Winter 1994).

P7: Coherently intertwined external and internal scanning capabilities increase the firm's ability to identify its specific needs for creating new routines and for discarding old routines.

New Resource Combinations. As a result of search and experimentation at managerial and other levels in the organization, a firm develops new resource combinations that yield new productive services (Moran and Ghoshal 1999, Penrose 1959). By enhancing the productivity of a given set of resources, new resource combinations contribute to learning at both resource and organizational levels (Mosakowski 1997). This learning can be characterized as *emergent learning* because it involves innovation through creative juxtaposition of personal knowledge of the resources with subjective perceptions of opportunities for new resource applications. By recombining resources and capabilities in novel ways, firms can obtain new opportunities and new sources of economic value (Galunic and Rodan 1998, Langlois 1992).

P8: By developing new resource combinations and new ways of utilizing resources, firms engage in emergent learning through which opportunities and sources of economic value are more likely to be obtained.

Strategic Flexibility and Environmental Adaptation. As illustrated in Figure 1, following deregulation, a firm's dynamic capability sequence involves development of systems of learning at three levels: (1) interactive managerial learning, (2) analytical, planned learning via external environmental scanning and internal scanning, and (3) emergent creative learning through dynamic capability routines that produce new resource combinations and strategic positions. *These three systems of learning, with their co-evolution and inter-links, constitute the*

core of a firm's set of dynamic capabilities. Essentially, learning systems define “the ability of organizations to innovate and adapt to changes in technology and markets, including the ability to learn from mistakes” (Helfat and Raubitschek 2000: 975). As Figure 1 shows, these systems of learning soon after deregulation may initially follow a somewhat linear pattern, where the development of dynamic capabilities begins through the formation of new managerial mental models, followed by development of external and internal scanning capabilities. In this sequence, after the management team initiates dynamic capability routines, a firm can develop new operative routines and rebuild existing routines to adapt to the post-deregulation dynamic environment. Once these systems of learning are in place, they are likely to function in a non-linear fashion with inter-linkages that can result in co-evolutionary, synergistic changes. For example, managers can learn from the changes initiated by the dynamic capability routines throughout the firm (e.g., from new resource combinations and elimination of specific operative routines), just as managers can interject new ideas and insights into these systems of learning at any point in time.

These three fundamental systems of learning, i.e., (1) continuous development and renewal of managerial capabilities via managerial mental models; (2) analytical, planned learning via internal and external scanning; and (3) emergent, creative learning through dynamic capability routines, enable a firm to become strategically flexible. With a strategic flexibility capability, a firm can adapt its resource base to environmental change within deregulated industries. Flexibility is critically important, because the firm capability to transform itself is essential for sustained firm growth and economic profitability in an environment of competence-based competition (Sanchez and Mahoney 1996).

P9: By developing a strategic flexibility capability to respond to substantial changes, a firm increases the likelihood of effectively adapting in a deregulated environment.

Dynamic Strategic Fit. Sustaining strategic flexibility enables a dynamic strategic fit between the environment and a firm's resources and capabilities (Itami and Roehl 1987; Zajac, Kraatz and Bresser 2000). Continuous alignment of the firm's resource base to the environment provides the firm with a dynamic capability for generating new bases of competitive advantage and sustained long-term growth (Baird and Meshoulan 1988, Hall 1993, Powell 1992).

P10: Sustaining strategic flexibility and adaptation enables a firm to increase the likelihood of achieving a dynamic strategic fit.

Influencing Environmental Conditions. Creating successful resource combinations and resource positions systematically and continuously may result in a firm-level capability to affect environmental change (Penrose 1995). As a firm sustains its strategic fit through unique strategic positions and creative resource combinations (Peteraf and Barney 2003), it may be able to influence environmental conditions. Some firms are especially capable in identifying, interpreting, and acting upon early signals from their internal and external environment, and so position themselves to take advantage of these opportunities well in advance of others (Cockburn, Henderson and Stern 2000).

P11: Achieving dynamic strategic fit through new strategic positions and new resource combinations increases the likelihood that the firm can influence environmental conditions.

Growth Trajectory Development. In dynamic markets, firm growth results from a series of advantages generated through dynamic capabilities that enabled creation, integration, and recombination of resources. These capabilities enable firms to build and sustain competitive

advantage. A resulting successful growth trajectory is likely to be unique because of history and commitments that have happened along the path of the firm's resource accumulation (Collis and Montgomery 1995). Therefore, it may be difficult for competitors to achieve this growth trajectory that is built over time in ways that are non-imitable and non-substitutable.

P12: By influencing environmental conditions, the firm increases the likelihood of developing difficult to imitate growth trajectories.

New Learning. These growth trajectories become a source of further organizational learning. If the firm makes irreversible investments, its trajectory will "lock in" certain paths (Ghemawat 1991). These trajectories may still involve a rich set of real options upon which to base future decisions (Li, James, Madhavan and Mahoney 2007). Over time, firms will evolve based upon the learning that has been accumulated along the trajectory the firm has selected (Argyres 1996, Eisenhardt and Martin 2000). In addition, a firm also stretches its tangible resources in anticipation of learning more about new technologies and international markets (Knott, Bryce and Posen 2003, Tan and Mahoney 2006). Indeed, a firm needs to balance the utilization of current resources and an exploration for new resources and their uses (March 1991, Wernerfelt 1984). Therefore, a firm's strategy of leveraging and stretching lead to organizational learning:

P13: A firm's growth trajectory of both leveraging and stretching increases organizational learning.

Discussion

This paper creates a juxtaposition of the resource approach (Penrose 1959) and the dynamic capabilities approach (e.g., Helfat and Raubitschek 2000, Teece, Pisano and Shuen 1997) to produce a theoretical model and a pragmatic road map for achieving competitiveness in deregulated environments. Resources *per se* do not generate firm-level growth. Instead, how resources are deployed, developed, combined, and reconfigured influence the growth opportunities a firm can identify and act upon (Penrose 1959). Growth requires managerial and organizational processes to envision and develop both existing and future needs. When these processes are developed and implemented within environments of significant change, a firm can generate competitive resource configurations (Eisenhardt and Martin 2000). Development of processes that support dynamic capabilities provides a basis for long-term growth in environments of significant change (Farjoun 1994, Wang and Barney 2006). Similar to Schumpeter's "gales of creative destruction," the processes underlying dynamic capabilities --- albeit at the firm level --- "incessantly revolutionizes the economic structure *from within*, incessantly destroying the old one, incessantly creating a new one" (1942: 83 italics in original).

Because this process of firm renewal and growth is entrepreneurially driven, the role of managerial capabilities has central importance. The current paper emphasizes that managerial knowledge and skills necessary to develop and nurture dynamic capabilities may not exist in firms that operate in a regulated environment. Therefore, in deregulated environments, managers --- as a team --- must be engaged in systematic and emergent learning and must develop dynamic capabilities to systematically create and redefine competitive strategic positions within a more turbulent and competitive environment. This renewal process requires environmental scanning routines to identify key strategic industry factors within the newly deregulated environment,

along with internal scanning processes to identify and assess the firm's current strategic fit. Also, because the direction of change in strategic industry factors is not typically known *ex ante*, firms must develop dynamic capability routines to discard outdated, inefficient routines and to create new operative routines to respond flexibly to changing environmental conditions. Through strategic flexibility, a firm can create a unique and potentially non-imitable growth trajectory and may influence environmental conditions. These growth trajectories also serve as a basis for continuous learning for the firm.

Following Wernerfelt (1984), the current paper offers a "stepping-stone" approach in the research literature for other scholars to build upon in order to explain how the evolution of dynamic capabilities unfolds within deregulated environments. Theory development concerning the sequence and pattern of unfolding dynamic capabilities in a deregulated market serves as a road map for firms that face the challenge of transitioning from regulated to deregulated markets. Among others, the air freight, railroad, and trucking industries provide strong empirical evidence supporting the current paper's claim that firms need to learn quickly new routines and capabilities to survive, especially in the turbulent early years of transition from a regulated to a deregulated competitive environment, where entry, exit, and business scope restrictions are relaxed (Levinthal 1992, Pettus 2003).

In the United States, several businesses continue to be regulated with respect to entry and exit, such as liquor distribution and retailing, land development, local and regional utility industries, and local transportation services like taxis. Also, a significant number of businesses remain regulated in overseas- industrialized nations and especially developing countries (e.g., many European and Latin American markets), although many of these countries are going through major market reforms and deregulation efforts (e.g., new European Union members and

candidates) that bring about significantly higher levels of competition and uncertainty. The knowledge of dynamic capability development can be particularly useful for local firms operating in such markets and also for global firms (including U.S. firms) that have investments and partnerships in these newly or progressively deregulated business environments.

Further, it seems highly warranted to believe that lessons learned by observing competition during these periods of deregulation can provide insights to managers in other industry contexts who may be facing dramatic shifts and changes for reasons other than deregulation. Changes of this nature elevate the levels of competition and make the industry dramatically more uncertain or unstable. Unforeseen changes and shocks due to technological breakthroughs, shifts in distribution channels, changes in availability or access to critical input factors, and other changes caused by global, political, and economic instabilities are likely to require that firms develop dynamic capabilities. Knowledge of the sequence and pattern of the development of dynamic capabilities observed by firms in deregulated environments may provide powerful insights for managers in many types of dynamic environments that require rapid responses. Likewise, these insights can be useful for companies that are stuck in a specific business model and mindset, and need to go through a major turnaround to survive. Such companies exist in all industries. Thus, the current paper's model can potentially be fruitfully applied to different corporate change contexts in dynamic environments that go beyond the context of deregulation. Furthermore, the knowledge of dynamic capability development potentially contributes to multiple literatures including research on organizational adaptation in deregulated markets, turnarounds, and strategic change in uncertain and turbulent environments.

It should be noted that this paper offers only a beginning for explaining the evolution of dynamic capabilities in deregulated environments. For example, the theory developed here treats

deregulation as a uniform environmental shock even though deregulation across industries may differ in the magnitude, scope, and speed of changes. If deregulation happens gradually over time (Ingham and Thompson 1994), then firms can develop new capabilities more incrementally relative to deregulated firms in turbulent environments (Reger, Duhaime, and Stimpert 1992).

Also, incremental deregulation may allow more time for new managerial mental models to develop. With more time to interact and learn about each other's strengths, weaknesses, and habits, the incumbent and new managers can more successfully combine their complementary skills. In contrast, when deregulation has wide scope and fast implementation rates such as the deregulation of airline and trucking industries (Kim and Prescott 2005), incumbent and new managers may not have sufficient time to learn to function as a team and to sort out various group process issues (Eisenhardt and Schoonhoven 1990). In such cases, firms may have to rely more heavily on new managers for a fast transformation of the firm, even at the expense of having minimal input from managers with firm-specific knowledge.

Thus, the required level of commitment to overt learning and capability renewal efforts (Winter 2003) in a deregulated environment must be determined with the knowledge of the tradeoffs (i.e., relative costs and benefits of such efforts) given the specific circumstances. Post-deregulatory environments may not always justify the costs of radical rebuilding of a firm's capability set in short time intervals (Amis, Slack, and Hinings 2004). Given specific industry circumstances and idiosyncratic firm attributes, firms may be better off with incremental changes and lower-order capabilities supplemented by ad hoc problem solving (Winter 2003).

The next generation of scholars in the evolving science of organization will likely undertake to build and empirically test the development of dynamic capabilities in a variety of turbulent environments. One aspect of such an undertaking that may be a general principle to

offer here is that the level of commitment to building such dynamic capabilities will be highly influenced by the economic costs and benefits tradeoffs within specific circumstances (Lavie 2006, Rumelt, Schendel and Teece 1991).

Some firms will be better prepared than other firms in the process of transitioning from regulated into deregulated markets. This fundamental premise of firm-level heterogeneity can be attributed to differences in managerial mindsets (Penrose 1959), and to the nature of competitive threats imposed on the industry by firms from other industries. In certain markets, firms may have had to develop and maintain capabilities because these firms face fierce competition from substitute products that exist in other industries (Peteraf and Bergen 2003). For that matter, some firms do not have to start from scratch after deregulation, as there may be a distribution of dynamic capabilities across firms, as these firms enter an era of turbulence (Winter 2003). Thus, subsequent research is needed to incorporate the (endogenously generated) firm-level heterogeneity (e.g., complexity of strategy, governance structure, top management attributes, and organizational politics) and industry-specific contingencies (e.g., scope and speed of deregulation), into the general theoretical model provided in the current paper (Kim and Prescott 2005, Reger, Duhaime, and Stimpert 1992), as direct or moderating factors that influence dynamic capability development processes and outcomes in recently deregulated environments. In carrying out this research, longitudinal field research studies would be beneficial (Van de Ven and Huber 1990).

Concerning extensions of the current paper, an additional theoretical perspective and three research designs are briefly considered. For further theory building, one cannot fully understand the economic strategies of recently deregulated firms unless one takes into account related political strategies. As has been emphasized throughout the current paper, the firms

under study have generally gone through a long time period of regulation and of relationship building with government authorities and these relationships are a crucial part of these firms' activities (Bonardi 2004). Therefore, while the current paper emphasizes theory building that focuses on the market-based dynamic capabilities that such firms must develop following deregulation, an important theoretical extension would help to explain and predict how market-based and non-market-based (e.g., political) firm-level strategies interact.

In terms of research designs for future empirical inquiry concerning the study of deregulation, one research design suggested here considers the *antecedents* of regulatory reform. For example, event history analysis (Yamaguchi 1991) can be used to explain and predict the likelihood of regulatory reform (Teske 2004). A second research design considers the *consequences* of regulatory reform. Event-study methodology (Brown and Warner 1985) can be utilized to usefully examine the economic impact of regulation, such as in the airline industry (Beneish 1991). These two types of research designs, while few, have been done (see Bhagat and Romano 2002 for a review of the extant research literature). A third research design, which is the focus here, would be to undertake a longitudinal research design (Pettigrew 1990) to investigate empirically the *sequencing* of the development of firm-level dynamic capabilities following deregulation (as outlined in Figure 1), which tests the propositions developed in the current paper.

In conclusion, the current paper proposes that the development of dynamic capabilities, in particular, managerial capabilities, organizational learning, and strategic flexibility, is crucial to survival and prosperity of firms that transition from regulated to deregulated environments. The evolutionary processes of dynamic capability development involve creating new managerial mental models, company-wide systems of external and internal scanning, and dynamic capability

routines to discard/replenish operative routines. These managerial and organizational systems serve as the engine for multiple forms of learning in the organization, such as interactive managerial learning, systematic analytical learning, and emergent, creative learning. Through multiple forms of learning, a firm can develop strategic flexibility to continuously create new resource configurations and to (re)define its market positions. The processes underlying dynamic capabilities define and fuel a firm's long-term growth trajectory as a continuum of initiatives for leveraging and stretching a firm's resource bundle. Thus, dynamic capabilities and a firm's long-term learning and growth trajectory are inextricably intertwined. Appreciation of this strong link would be most rewarding to firms that transition into a deregulated environment or environments of increased change.

References

- Adner, R., C. Helfat. 2003. Corporate effects and dynamic managerial capabilities. *Strategic Management Journal*, **24**(10): 1011-1025.
- Amis, J., Slack, T., C. Hinings. 2004. The pace, sequence, and linearity of radical change. *Academy of Management Journal*, **47**: 15-39.
- Amit, R., P. Schoemaker. 1993. Strategic assets and organizational rent. *Strategic Management Journal*, **14**: 33-46.
- Argyres, N. 1996. Evidence on the role of firm capabilities in vertical integration decisions. *Strategic Management Journal*, **17**: 395-410.
- Arthur, W. B. 1994. *Increasing Returns and Path Dependency in the Economy*. Ann Arbor, MI: University of Michigan Press.
- Augier, M., D. J. Teece. 2006. Understanding complex organization: The role of know-how, internal structure and human behavior in the evolutions of capabilities. *Industrial and Corporate Change*, **15** (2): 395-416.
- Bailey, E., J. Williams. 1988. Sources of economic rent in the deregulated airline industry. *Journal of Law and Economics*, **31**: 173-202.
- Baird, L., I. Meshoulam. 1988. Managing two fits of strategic human resource management. *Academy of Management Review*, **13**: 116-128.
- Barney, J. 1991. Firm resources and sustained competitive advantage. *Journal of Management Studies*, **17**: 99-120.
- Barr, F., Stimpert, J., A. Huff. 1992. Cognitive change, strategic action and organizational renewal. *Strategic Management Journal*, **13** (Summer): 15-36.
- Beneish, M. D. 1991. The effect of regulatory changes in the airline industry on shareholder wealth. *Journal of Law and Economics*, **35**: 395-419.
- Bhagat, S., R. Romano. 2002. Event studies and the law. *American Law and Economic Review*, **4** (2): 380-423.
- Bogner, W. C., Mahoney, J. T., H. Thomas. 1998. Paradigm shift: Parallels in the origin, evolution and function of the strategic group concept and the resource-based theory of the firm. *Advances in Strategic Management*, **14**: 63-102.
- Bonardi, J. P. 2004. Global and political strategies in deregulated industries: The asymmetric behaviors of former monopolies. *Strategic Management Journal*, **25**: 101-120.

- Brown, S. J., J. B. Warner. 1985. Using daily stock returns: The case of event studies. *Journal of Financial Economics*, **14** (1): 3-31.
- Capron, L., W. Mitchell. 1998. Bilateral resource redeployment and capabilities improvement following horizontal acquisition. *Industrial and Corporate Change*, **7** (3): 453-484.
- Castanias, R., C. Helfat. 2001. The managerial rents model: theory and empirical analysis. *Journal of Management*, **27**: 661-678.
- Chandler, A. 1962. *Strategy and Structure: History of American Industrial Enterprise*. Cambridge, MA: MIT Press.
- Chandler, A. 1977. *The Visible Hand: The Managerial Revolution in American Business*. Cambridge, MA: Harvard University Press.
- Chandler, A. 1990. *Scale and Scope: The Dynamics of Industrial Capitalism*. Cambridge, MA: Harvard University Press.
- Chang, S., H. Singh. 1999. The impact of modes of entry and resources fit on modes of exit by multi-business firms. *Strategic Management Journal*, **20**: 1019-1035.
- Cockburn, I., Henderson, R., S. Stern. 2000. Untangling the origins of competitive advantage. *Strategic Management Journal*, **21**: 1123-1145.
- Cohen, W., D. Levinthal. 1990. Absorptive capacity: a new perspective on learning and innovation. *Admin. Science Quarterly*, **35**: 128-152.
- Collis, D., C. Montgomery. 1995. Competing on resources: strategy in the 1990's. *Harvard Business Review*, July-August: 118-128.
- Cyert, R., J. March. 1963. *A Behavioral Theory of the Firm*. Englewood Cliffs, NJ: Prentice-Hall.
- Daft, R., Sormunen, J., D. Parks. 1988. Chief executive scanning, environmental characteristics, and company performance: an empirical study. *Strategic Management Journal*, **9**: 123-139.
- Delmas, M. Russo, M. L., M. J. Montes-Sancho. 2007. Deregulation and environmental differentiation in the electric utility industry. *Strategic Management Journal*. **28** (2): 189-209.
- Dierickx, I., K. Cool. 1989. Asset stock accumulation and sustainability of competitive advantage. *Management Sic*. **35**: 1504-1529.
- Eisenhardt, K., J. Martin. 2000. Dynamic capabilities. *Strategic Management Journal*, **21**: 1105-1121.

- Eisenhardt, K. M., C. B. Schoonhoven. 1990. Organizational growth: Linking founding team, strategy, and growth among U.S. semi-conductor ventures, 1978-1988. *Admin. Science Quarterly*, **35**: 504-529.
- Farjoun, M. 1994. Beyond industry boundaries: Human expertise, diversification and resource-related strategic groups. *Organization Science*, **5** (2): 185-199.
- Foss, N. J. 1996. Knowledge-based approach to the theory of the firm: Some critical comments. *Organization Science*, **7** (5): 470-476.
- Galunic, D., S. Rodan. 1998. Resource re-combinations in the firm: knowledge structures and the potential for Schumpeterian innovation. *Strategic Management Journal*, **19**(12): 1193-1201.
- Garg, V., Walters, B., R. Priem. 2003. Chief executive scanning emphases, environmental dynamism and manufacturing firm performance. *Strategic Management Journal*, **24**: 725-744.
- Gatignon, H., Tushman, M. L., Anderson, P., W. Smith. 2002. A structural approach to assessing innovation: Construct development of innovation locus, types and characteristics. *Management Science*, **48**: 1103-1122.
- Ghemawat, P. 1991. *Commitment*. New York, NY: The Free Press.
- Ginsberg, A. 1988. Measuring and modeling changes in strategy: Theoretical foundations and empirical directions. *Strategic Management Journal*, **9**: 559-575.
- Grant, R. M. 1996. Prospering in dynamically competitive environments: Organizational capability as knowledge integration. *Organization Science*, **7** (4): 375-387.
- Gruca, T., D. Nath. 1994. Regulatory change, constraints on adaptation and organizational failure: an empirical analysis of acute care hospitals. *Strategic Management Journal*, **15**: 345-363.
- Hall, R. 1993. A framework linking intangible resources and capabilities to sustainable competitive advantage. *Strategic Management Journal*, **14**: 607-618.
- Hambrick, D. 1981. Specialization of environmental scanning activities among upper level executives. *J. Management Studies*, **18**: 299-320.
- Hambrick D. 1982. Environmental scanning and organizational strategy. *Strategic Management Journal*, **3**: 159-174.
- Hambrick, D., S. Finkelstein. 1987. Managerial discretion: a bridge between polar views of organizational outcomes. *Research in Organizational Behavior*, **9**: 369-406.
- Helfat, C. 1994. Firm-specificity in corporate applied R&D. *Organization Science* **5** (2): 173-184.

- Helfat, C. 1998. Simple indicators of adaptation versus rigidity in history-dependent firm activities and decision rules. *Industrial and Corporate Change*, **7** (1): 49-75.
- Helfat, C., M. Peteraf. 2003. The dynamic RBV: capability lifecycles. *Strategic Management Journal*, **24**: 999-1010.
- Helfat, C., R. Raubitschek. 2000. Product sequencing: co-evolution of knowledge, capabilities and products. *Strategic Management Journal*, **21**: 961-979.
- Henderson, R. 1994. The evolution of integrative capability and innovation in cardiovascular drug discovery. *Industrial and Corporate Change*, **3** (3): 607-630.
- Henderson, R., I. Cockburn. 1994. Measuring competence? Exploring firm effects in pharmaceutical research. *Strategic Management Journal*, **15**: 63-84.
- Iansiti, M., K. B. Clark. 1994. Integration and Dynamic Capability: Evidence from Development in Automobiles and Mainframe Computers. *Industrial and Corporate Change*, **3** (3): 557-605.
- Ingham H., S. Thompson. 1994. Wholly-owned vs. collaborative ventures for diversifying financial services. *Strategic Management Journal*, **15**: 325-334.
- Itami, H., T. Roehl. 1987. *Mobilizing Invisible Assets*. Cambridge, MA: Harvard University Press.
- Jayarathne, J., P. E. Strahan. 1998. Entry restrictions, industry evolution, and dynamic efficiency: Evidence from commercial banking. *Journal of Law and Economics*, Vol. XLI: 239-273.
- Johnson, N., Sambharya, R., P. Bobko. 1989. Deregulation, business strategy, and wages in the airline industry. *Industrial Relations*, **28**(3): 419-430.
- Kahn, A. 1971. *The Economics of Regulation: Principles and Institutions*. New York, NY: John Wiley.
- Kaplan, S., Murray, F., R. Henderson. 2003. Discontinuities and top management: assessing the role of recognition in pharmaceutical firm response to biotechnology. *Industrial and Corporate Change*, **12** (2): 203-234.
- Kim, B., J. E. Prescott. 2005. Deregulatory forms, variations in the speed of governance adaptation, and firm performance. *Academy of Management Review*, **30**(2): 414-425.
- Kim, J., J. T. Mahoney. 2006a. How property rights economics furthers the resource-based view: Resources, transaction costs and *entrepreneurial discovery*. *International Journal of Strategic Change Management*, **1** (1): 40-52.

- Kim, S., J. T. Mahoney. 2006b. Mutual commitment to support exchange: Relation-specific IT system as a substitute for managerial hierarchy. *Strategic Management Journal*, **27** (5): 401-423.
- King, A. A., C. L. Tucci. 2002. Incumbent entry into new market niches: The role of experience and managerial choice in the creation of dynamic capabilities. *Management Science*, **48**(2): 171-188.
- Knott, A. M., Bryce, D. J., H. E. Posen. 2003. On the strategic accumulation of intangible assets. *Organization Science*, **14** (2): 192-207.
- Kogut, B., U. Zander. 1992. Knowledge of the firm: combinative capabilities and the replication of technology. *Organization Science*, **3**(3) 383-397.
- Kor, Y.Y. 2003. Experience-based top management team competence and sustained growth. *Organization Science*, **14** (6): 707-719.
- Kor, Y.Y., H. Leblebici. 2005. How do interdependencies among human-capital deployment, development, and diversification strategies affect firms' financial performance? *Strategic Management Journal*, **26** (10): 967-985.
- Kor, Y.Y., J. T. Mahoney. 2000. Penrose's resource-based approach: The process and product of research creativity. *Journal of Management Studies*, **37** (1): 109-139.
- Kor, Y.Y., Mahoney, J.T., S. Michael. 2007. Resources, capabilities and entrepreneurial perceptions. *Journal of Management Studies*, forthcoming.
- Kraatz, M. S., E. J. Zajac. 2001. How organizational resources affect strategic change and performance in turbulent environments. *Organization Science*, **12** (5): 632-657.
- Lado, A., Boyd, N., Wright, P., M. Kroll. 2006. Paradox and theorizing within the resource-based view. *Academy of Management Review*, **31**: 115-131.
- Langlois, R. N. 1992. Transaction-cost economics in real time. *Industrial and Corporate Change*, **1** (1): 99-127.
- Lavie D. 2006. Capability reconfiguration: An analysis of incumbent responses to technological change. *Academy of Management Review*, **31**(1): 153-174.
- Leonard-Barton, D. 1992. Core capabilities and core rigidities: a paradox in managing new product development. *Strategic Management Journal*, **13**: 111-125.
- Levinthal, D. 1991. Organizational adaptation and environmental selection – interrelated processes of change. *Organization Science*, **2** (1): 140-145.
- Levinthal, D. 1992. Surviving Schumpeterian environments: An evolutionary perspective. *Industrial and Corporate Change*, **1** (3): 427-443.

- Li, Y., James, B., Madhavan, R., J.T. Mahoney. 2007. Real options: Taking stock and looking ahead. *Advances in Strategic Management*, 24 (June), forthcoming.
- MacAvoy, P. W. 1979. *The Regulated Industries and the Economy*. New York, NY: Norton.
- Madhok, A. 1996. The organization of economic activity: Transaction costs, firm capabilities and the nature of governance. *Organization Science*, 7 (5): 578-590.
- Mahon, J., E. Murray. 1981. Strategic planning for regulated companies. *Strategic Management Journal*, 2: 251-262.
- Mahoney, J. T. 1995. The management of resources and the resource of management. *Journal of Business Research* 33: 91-101.
- Mahoney, J. T., J. R. Pandian 1992. The resource-based view within the conversation of strategic management. *Strategic Management Journal*, 13: 363-380.
- March, J. G. 1991. Exploration and exploitation in organizational learning. *Organization Science*, 2 (1): 71-87.
- Matthews, J. A. 2003. Competitive dynamics and economic learning: An extended resource-based view. *Industrial and Corporate Change*, 12 (1): 115-145.
- Meyer, J. 1980. Transportation deregulation: possibilities and prospects. *Journal of Contemporary Business*, 9: 69-85.
- Miles, R., C. Snow 1978. *Organizational Strategy, Structure and Process*. New York, NY: McGraw-Hill.
- Miller, D. 2003. An asymmetry-based view of advantage. *Strategic Management Journal*, 24: 961-976.
- Moran, P., S. Ghoshal. 1999. Markets, firms and the process of economic development. *Academy of Management Review*, 24: 390-412.
- Mosakowski, E. 1993. A resource-based perspective on the dynamic strategy-performance relationship: An empirical examination of the focus and differentiation strategies in entrepreneurial firms. *Journal of Management*, 19: 819-839.
- Mosakowski, E. 1997. Strategy making under causal ambiguity: Conceptual issues and empirical evidence. *Organization Science*. 8 (4): 414-442.
- Nelson, R. R. and S. G. Winter (1982). *An Evolutionary Theory of Economic Change*. Cambridge, MA: Belknap Press of Harvard University Press.

- Nonaka, I. 1994. A dynamic theory of organizational knowledge creation. *Organization Science*, **5** (1): 14-37.
- Penrose, E. T. 1959. *The Theory of the Growth of the Firm*. New York, NY: John Wiley & Sons.
- Penrose, E. T. 1995. Foreword in E. T. Penrose *The Theory of the Growth of the Firm*. Oxford: Basil Blackwell.
- Peteraf, M. 1993. The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal*, **14**: 179-191.
- Peteraf, M., J. Barney. 2003. Unraveling the resource-based tangle. *Managerial and Decision Economics*, **24**: 309-323.
- Peteraf, M., M. Bergen. 2003. Scanning dynamic competitive landscapes: a market-based and resource-based framework. *Strategic Management Journal*, **24**(10): 1027-1041.
- Pettigrew, A. 1990. Longitudinal field research on change: Theory and practice. *Organization Science*, **1** (3): 267-292.
- Pettigrew, A., Woodman, R., K. Cameron. 2001. Studying organizational change and development: Challenges for future research. *Academy of Management Journal*, **44**: 697-713.
- Pettus, M. L. 2001. The resource-based view as a developmental growth process: Evidence from the deregulated trucking industry. *Academy of Management Journal*, **44**(4): 878-896.
- Pettus, M. L. 2003. *Growth from Chaos*. Westport, CT: Praeger.
- Pisano, G. 1994. Knowledge, integration, and the locus of learning: an empirical analysis of process development. *Strategic Management Journal*, **15** (Special Issue): 85-100.
- Powell, T. 1992. Organizational alignment as competitive advantage. *Strategic Management Journal*, **13**: 119-134.
- Ranft, A., M. D. Lord 2002. Acquiring new technologies and capabilities: A grounded model of acquisition development. *Organization Science*, **13** (4): 420-441.
- Reger, R., Duhaime, I. M., J. L. Stimpert. 1992. Deregulation, strategic choice, risk and financial performance. *Strategic Management Journal*, **13**: 189-204.
- Rosenbloom, R. 2000. Leadership, capabilities and technological change: the transformation of NCR in the electronic era. *Strategic Management Journal*, **21**: 1083-1104.
- Rumelt, R. 1984. Toward a strategic theory of the firm. In R. Lamb (ed.), *Competitive Strategic Management*, 556-570. Englewood Cliffs, NJ: Prentice Hall.

- Rumelt, R., Schendel, D., D. J. Teece. 1991. Strategic management and economics. *Strategic Management Journal*, **12** (Winter): 5-29.
- Sanchez, R. 1995. Strategic flexibility in product competition. *Strategic Management Journal*, **16**: 135-159.
- Sanchez, R., J. T. Mahoney. 1996. Modularity, flexibility, and knowledge management in product and organization design. *Strategic Management Journal*, **17** (December): 63-76.
- Schumpeter, J. 1942. *Capitalism and Democracy*. New York, NY: Harper and Row.
- Silverman, B., Nickerson, J., J. Freeman. 1997. Profitability, transactional alignment and generalization mortality in the U.S. trucking industry. *Strategic Management Journal*, **18**: 31-52.
- Smith, K., C. Grimm. 1987. Environmental variation, strategic change and firm performance: a study of railroad deregulation. *Strategic Management Journal*, **8**: 363-376.
- Spender, J. 1992. Strategy theorizing: Expanding the agenda. *Advances in Strategic Management*, **8**: 8-32.
- Spulber, D. F. 1989. *Regulation and Markets*. Cambridge, MA: MIT Press.
- Stigler, G. J. 1971. The theory of economic regulation. *Bell Journal of Economics*, **2** (Spring): 3-21.
- Tan, D., J. T. Mahoney. 2006. Why a multinational firm chooses expatriates: Integrating resource-based, agency and transaction costs perspectives. *Journal of Management Studies*, **43** (3): 457-484.
- Teece, D. J. 1982. Towards an economic theory of the multi-product firm. *Journal of Economic Behavior and Organization*, **3**: 39-63.
- Teece, D. J. 1986. Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *Research Policy*, **15** (6): 285-305.
- Teece, D. J. 1987. Profiting from technological innovation: implications for integration, collaboration, licensing, and public policy. In D. Teece (Ed.) *The Competitive Challenge*, pp. 53-78. Cambridge, MA: Ballinger.
- Teece, D. J. 1990. Innovation, dynamic competition, and antitrust policy. *Regulation*, **13**: 35-44.
- Teece, D. J., G. Pisano. 1994. The dynamic capabilities of firms. *Industrial and Corporate Change*, **3** (3): 537-556.
- Teece, D. J., Pisano, G., A. Shuen. 1997. Dynamic capabilities and strategic management. *Strategic Management Journal*, **18**((7): 509-533.

- Teece, D. J., Rumelt, R., Dosi, G., S. Winter. 1994. Understanding corporate coherence: theory and evidence. *Journal of Economic Behavior and Organization*, **23**: 1-30.
- Teske, P. 2004. *Regulation in the States*. Washington, D. C.: Brookings Institution Press.
- Thornhill, S., R. Amit. 2003. Learning about failure: bankruptcy, firm age, and the resource-based view. *Organization Science*, **14**: 497-509.
- Tripsas, M. 1997. Surviving radical technological change through dynamic capabilities: Evidence from the typesetter industry. *Industrial and Corporate Change*, **6** (2): 341-377.
- Tripsas, M., G. Gavetti. 2000. Capabilities, cognition and inertia: evidence from digital imaging. *Strategic Management Journal*, **21**: 1147-1162.
- Tushman, M., L. Rosenkopf. 1996. Executive succession, strategic re-orientation and performance growth: A time-varying study in the U.S. cement industry. *Management Science*, **42**(7): 939-953.
- Van de Ven, A. 1992. Suggestions for studying strategy process: A research note. *Strategic Management Journal*, **13** (Special Issue): 169-188.
- Van de Ven, A. H., G. P. Huber. 1990. Longitudinal field research methods for studying processes of organizational change. *Organization Science*, **1** (3): 213-219.
- Vasconcellos, J., D. Hambrick (1989). Key success factors: Test of a general framework in the mature industrial-product sector. *Strategic Management Journal*, **10**: 367-382.
- Viscusi, A., Vernon, R., K. Harrington. 1992. *Economies of Regulation and Antitrust*. New York, NY: John Wiley and Sons.
- Virany, B., Tushman, M., E. Romanelli. 1992. Executive succession and organization outcomes in turbulent environments: an organization learning approach. *Organization Science* **3**: 72-91.
- Walker, G., Madsen, T. L., G. Carini. 2002. How does institutional change affect heterogeneity among firms? *Strategic Management Journal*, **23**: 89-104.
- Wang, H. and J. Barney. 2006. Employee incentives to make firm-specific investments: implications for resource-based theories of corporate diversification. *Academy of Management Review*, **31**: 466-476.
- Wernerfelt, B. 1984. A resource-based view of the firm. *Strategic Management Journal*, **5**(2): 171-180.
- Winter, S. G. 2000. The satisfying principle in capability learning. *Strategic Management Journal*, **21**: 981-996.

- Winter, S. G., G. Szulanski. 2001. Replication as strategy. *Organization Science*, **12** (6): 730-743.
- Winter, S. G. 2003. Understanding dynamic capabilities. *Strategic Management Journal*, **24**: 996-997.
- Yamaguchi, K. 1991. *Event History Analysis*. Newbury Park, CA: Sage.
- Zahra, S., G. George. 2002. Absorptive capacity: A review, reconceptualization, and extension. *Academy of Management Review*, **27**: 185-203.
- Zajac, E., S. Shortell. 1989. Changing generic strategies: likelihood, direction, and performance implications. *Strategic Management Journal*, **10**: 413-430.
- Zajac, E., Kraatz, M., R. Bresser. 2000. Modeling the dynamics of strategic fit: a normative approach to strategic change. *Strategic Management Journal*, **21**: 429-453.
- Zander, U., B. Kogut. 1995. Knowledge and the speed of transfer and imitation of organizational capabilities: An empirical test. *Organization Science* **6** (1): 76-82.
- Zollo, M., Reuer, J. J., H. Singh. 2002. Inter-organizational routines and performance in strategic alliances. *Organization Science* **13** (6): 701-713.
- Zollo, M., S. Winter. 2002. Deliberate learning and the evolution of dynamic capabilities. *Organization Science*, **13**: 339-351.

Figure 1

The Sequential Development of Dynamic Capabilities in Deregulated Industries

