Strategic Supply Chain Innovation: A Strategic Management Perspective for Business Education

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Innovation that leverages distinctive competencies in a firm’s supply chain is a potential source of competitive advantage. Firms develop capabilities to use supply chains to tap innovations that sustain their competitive advantage. We refer to this as strategic supply chain innovation. Innovation within supply chains pertains to how firms leverage suppliers to develop more effective ways to serve either existing or new markets, whether by harnessing existing knowledge or by creating new knowledge. Building on these dimensions of market and knowledge, we propose a strategic perspective to capture the essential management capabilities of strategic supply chain innovation.

I. INTRODUCTION

Supply chain management is evolving as a multidisciplinary field of inquiry with its early roots in operations management, marketing and information systems. More recently, supply chain management has become an increasingly important topic in the academic literature on strategic management (Hult, Ketchun, and Mathias 2007). Supply chain management has grown along with the needs of industry and the insights of practitioners and academic researchers. This paper argues that the theory and practice of supply chain management could benefit from an extension beyond its functional roots, embracing a more strategic perspective and being appreciated for its practical strategic importance.

A firm’s capability to successfully leverage the distinctive competencies of firms in their supply chain is critical to sustaining the competitive advantage of the firm itself. An integrative strategic perspective is increasingly required as firms see their supply chains as extensions of firm level strategy.

Firms that once relied on vertical integration to manage the production of goods and services now increasingly turn to suppliers to leverage an ever deeper pool of firm specific resources and capabilities (Akira, 2001). The automobile industry is perhaps the classic example of an industry where there was a massive shift from strategies of vertical integration to strategic outsourcing (Kotabe, Martin and Domoto, 2003). A number of factors have been driving this trend, including such things as the complexities of the products such as cars (Womack, Jones and Roos, 1990), electronics, and aircraft, just to name a few, as well as fast changing emergence of global markets and competition. To be competitive, firms must focus on what they do best but at the same time firms must become experts at recruiting other firms to provide complementary products, services and technologies (Schroeder, Bates and Junttila, 2002). The meshing of the
distinctive competencies of the firm with the resources and capabilities of potential suppliers is the central theme of the strategic view of supply chain management. As innovation grows to be a dominant source of competitive advantage firms must learn how to manage relationships with suppliers to assure that they provide opportunities to do new things or to do the same things in a different way, which is the essence of strategy (Porter, 1996).

II. SUPPLIERS AS STRATEGIC INNOVATION PARTNERS

Strategic supply chain innovation poses new challenges that require mastering new management capabilities. Firms cannot merely organize themselves to tap internal sources of innovation (Lorsch and Lawrence, 1965) when so much of what makes the firm successful lies beyond its own boundaries. Part of the task of coordinating efforts within supply chains can be mediated by information technology (Kim and Mahoney, 2006) but the more intensive aspects of relationship building require development of a deeper sense of mutual understanding (Hooker, 2005) as firms struggle learn how to most effectively tap the resources of other firms as if they were their own (Dyer and Hatch, 2006). In a dynamic global environment where new entrants, technologies and business models rapidly emerge to displace dominant firms, a firm’s supply chain must be understood as a strategically valuable source of competitive resources and capabilities and not merely a source of products and services. (Charitou and Markides, 2003).

It is clear from the explosion of interest in both academia and the business world that innovation is an extremely hot topic. In the market place for ideas and talent, business has made clear that building a greater capacity for innovation is critical to their future success. These same firms struggle to overcome the pull of conflicting functional perspectives within their own administrative systems. Where the large functional bureaucracies of the industrial world once dominated, more agile, flexible and more entrepreneurial business organizations are becoming more prominent. Cross functional innovation processes are replacing traditional functional approaches to business administration both as the central challenge for business managers and the dominant logic for developing new forms of business organization. For business educators, the rising importance of innovation also put a strain on purely functional perspectives which if taken alone risk becoming increasingly obsolete.

III. THE EDUCATORS DILEMMA

The basic functional design of business education reflects its origins in the early 20th century. Finance, accounting and operations were the cornerstones of business education. As marketing grew in importance it too rose to a high level of functional importance. With the emergence and widespread implementation of information technology, the field of operations management expanded beyond the firm to include the management of information systems that linked buyers and suppliers. Supply chain management developed as a logical extension of expanding operational interdependencies in open systems in subject areas such as logistics and related information systems. Purchasing management also rose in importance as supplier selection decisions came to be viewed as critical to the success of the firm.

Despite the ongoing process of evolution of the business environment and many incremental advances in academic research, supply chain management can still be viewed as a field dominated by functional expertise in operations. More recently, pressures from the business environment drive supply chain management to adopt a broader strategic paradigm – one in which a firm’s supply chain is configured to achieve strategic objectives and build sustainable competitive advantage. More specifically, strategic supply chain management
may hold the key to sustainable competitive advantage based on innovation. The remainder of this paper will build this theme and provide a conceptual model of the field of supply chain management as viewed from a broad strategic viewpoint.

Business students today face the challenge of succeeding in organizations that are in transition from cost-based strategies and efficiency-oriented organizational designs - designs in which business functions are the dominant logic -- to new forms of more flexible firm that more systematically strive to achieve their full innovation potential (Anthony, Eyring and Gibson, 2006). As future business managers they need to be equipped to face challenging new expectations for them to excel as leaders of strategic innovation.

IV. MAPPING STRATEGIC SUPPLY CHAIN INNOVATION

Strategic supply chain innovation can be mapped into four subject areas. First, there is innovation which takes the form of the incremental development of new products, services and processes using the resources and capabilities found within the firm’s supply chain based on existing knowledge resources used to satisfy existing markets. For complex products, incremental new product development invariably requires many parallel improvements and new combinations of specialized knowledge that no single organization can master. New product development is instead increasingly embedded in more “open” types of innovation process that harnesses external resources (Chesbrough, 2003). Complex products that are incrementally changed can be reconfigured into new “architectures” resulting in dramatic changes that destroy the usefulness of the knowledge of established firms (Henderson and Clark, 1990). As supply chains are the source of most of these incremental changes, their importance in rapid product development and improvement provide competitive advantage to the firm. The complexity of new product introductions requires large scale concurrent product-process design participation by suppliers (Howells, James and Mailik. 2003). Japan’s success owes much to the fact that Japanese firms leverage suppliers’ capabilities to enable faster, more productive product and process development (Womack, Jones and Roos, 1990).

Customers in supply chains also play a role in effective supply chain innovation (Linder and Jarvenpaa, 2003; Quinn, 2000). Engineering approaches such as quality function deployment (Akao, 1988) provide design engineers working in supply chains with a greater capability to modularize and customize designs to meet customer needs. Von Hippel emphasizes the role of lead customers in creating new products (Thomke and Von Hippel, 2002). In this sense networks of buyers and suppliers can form a demand driven system of innovation.

To simplify complex product development supply chains, firms can keep the underlying product architecture constant and promote modular innovation using existing knowledge without disrupting the value creation accomplishments of other parts of the supply chain (Henderson and Clark, 1990). To tame the complexities of new product innovation (Santos and Williamson, 2004) rapid improvement can be built on “platform products” – allowing for a series of product variations based on stable product architecture. This allows firms operating in complex supply chains to rapidly introduce variations, without the need to constantly change the underlying design architecture.

The second type of strategic supply chain innovation involves the development of new ventures that tap entrepreneurial capabilities within the firm and its supply chain to leverage existing knowledge in pursuit of new markets. New ventures frequently involve some for of discontinuous innovation in which there is a need to break away from existing organization practices and perspectives. This is often easier to do outside the control of dominant firms. A new industry entrant or a firm in a supply chain that
is subject to differing external forces is more likely to pursue a discontinuous innovation. The creation and spinning off of a new venture is one means of seeding the supply chain with new business ideas and strategies (Christensen and Raynor, 2003). In a similar vein, recruiting a new non-traditional supplier can bring fresh ideas to an industry.

A third area of strategic supply chain innovation involves the development of new intellectual property based on the search for new knowledge to satisfy an existing market. Innovation has long been considered the product of scientific research conducted in a traditional R&D department. R&D develops knowledge from within the firm but also draws on scientific work from outside the firm. Researchers are more likely to look to other scientists and technologists in their field as a reference point. Departments that focus on basic research are more likely to be staffed by people with PhDs whose training is geared to scientific discovery as a process of development within a broader community, not bounded by the firm. Departments that focus on basic research are more likely to be staffed by people with PhDs whose training is geared to scientific discovery as a process of development within a broader community, not bounded by the firm.

Real options reasoning provides another way that firms can view R&D as firms in their supply chains pursue developments with uncertain and hard to evaluate market potential. Given high levels of uncertainty, a real options approach allows organizations to make flexible commitments to R&D undertaken outside the firm (McGrath, 1997). Organizations conduct R&D knowing that new knowledge cannot easily be developed into products and processes with concurrent developments in a range of related technologies, most of which reside outside the expertise of the firm. Lags between scientific discovery and successful commercialization often result from missing forms of knowledge pertaining to product design and production know-how. Supply chains provide a necessary source of complementary knowledge assets and technologies (Subramaniam and Youndt, 2005).

The fourth type of strategic supply chain innovation deals with the introduction of disruptive technologies (Christensen, 1997) based on high levels of novelty, and new creative appreciations of opportunities to use new knowledge to create new markets. Sustainable competitive advantage based on disruptive innovation depends on identifying emergent opportunities before their potential can be known with certainty (Brabandere, 2005). Porter observes that environments characterized by extreme factor conditions present special opportunities and challenges (Porter, 2001). Serving the most elusive and demanding customers, overcoming input shortages or limited infrastructure conditions as well as conditions of intense competition all cause innovation to thrive. Recruiting suppliers who have successfully faced extreme or unusual competitive environments can be good for innovation in the supply chain.

V. FUTURE DIRECTIONS

The concept of strategic supply chain innovation as presented in this paper provides a perspective that builds on the strategic management literature rather than functional disciplines. If supply chain management is inherently interdisciplinary, we need to search for perspectives that provide a larger overview of the opportunities and challenges of supply chain management. This does not imply that functional perspectives are not valid – indeed the dilemma for supply chain management is that the functional knowledge required is so vast as to be impossible to capture and disseminate. Further, if innovation is critical for competitive advantage, it is equally apparent that successful innovation is the product of firms embedded in complex supply chains, and not solely a matter of the capabilities of the firm acting alone, limited to its own resources, capabilities and initiatives. By viewing supply chains as an opportunity to achieve strategic innovation objectives, firms can leverage the resources and initiatives of other firms to achieve their own goals.
These four areas of development mapped in this paper barely scratch the surface of what the future of strategic supply chain management innovation is likely to hold. The map is sparse and the terrain is enormous as are the educational challenges. But that does not negate the value of the journey or the value in adopting a more strategic overview of the field.

Each of the four principal types of innovation presented briefly here requires its own unique combination of management skills and competencies when considering the role of suppliers in the innovation processes of the firm. In each of the four primary types of innovation listed above, effective engagement of the resources and capabilities found in supply chains are a critical extension of the innovative process of the firm (Niezen and Weller, 2006). When the knowledge base of an industry is diverse and complex, when competition is global, when innovators have found ways to dramatically shorten product life cycles and when new entrants are able to use innovation to erase the competitive advantage of incumbent firms (Doz and Williamson, 2004) then the challenge of innovation is clearly beyond the resources and capabilities of any individual firm. Nowhere has this been more clear than in the aerospace industry where no firm exists in the world today that has all the resources and capabilities to design and build a modern aircraft. As these circumstances become more common across all industries, the challenge of innovation inescapably is extended beyond the capacity of the single firm acting alone. The absolute strategic imperative to tap external innovative resources and capabilities is the central challenge facing supply chain management today.

VI. REFERENCES


