

**A STUDY OF KNOWLEDGE-BASED SUPPLY CHAIN FIT WITH STRATEGIC TYPE
AND ITS RELATIONSHIP WITH COMPETITIVE PRIORITIES**

G. Tomas M. Hult
Professor of Marketing, International Business & Strategic Management
Michigan State University
Email: hult@msu.edu

David J. Ketchen, Jr.
Professor of Management
Auburn University

Jeannette A. Mena
Ph.D. Candidate in Marketing & International Business
Michigan State University

We appreciate the research assistance and support from the Marketing Science Institute (MSI), Council of Supply Chain Management Professionals, Institute of Supply Management, and the Center for International Business Education and Research at Michigan State University. We are also grateful for input provided by S. Tamer Cavusgil, Roger J. Calantone, Donald R. Lehmann, John T. Mentzer, David Closs, Phil Carter, and Seyda Deligonul during the research process.

A STUDY OF KNOWLEDGE-BASED SUPPLY CHAIN FIT WITH STRATEGIC TYPE AND ITS RELATIONSHIP WITH COMPETITIVE PRIORITIES

ABSTRACT

Emerging thoughts in strategy suggest that knowledge is a principal source of value creation. In this study, the resource-based view (RBV) is used as the theoretical foundation to assimilate a set of nine vitally important knowledge constructs for supply chains. Using strategic choice theory coupled with configuration theory, a profile deviation analysis is conducted among 913 supply chain members (545 logistics and 368 supply management professionals) using the ideal “knowledge profile” for five strategy types (prospectors, analyzers, low-cost defenders, differentiated defenders, and reactors) as the benchmark. The findings suggest that knowledge-based supply chain fit with strategic type is associated with supply chain performance (i.e., speed, quality, cost, flexibility, and combined SQCF). The findings lend support to the notion that capitalizing on knowledge represents a strategic vehicle to create superior performance in supply chains. The makeup of these “ideal” profiles is also discussed.

A STUDY OF KNOWLEDGE-BASED SUPPLY CHAIN FIT WITH STRATEGIC TYPE AND ITS RELATIONSHIP WITH COMPETITIVE PRIORITIES

The last decade has seen an increased focus on organizational learning (Sinkula 1994), the learning organization (Slater and Narver 1995) and the knowledge creating company (Nonaka 1994). For example, companies such as Corning, General Electric, and Xerox are applying knowledge initiatives to gain a competitive edge (Marquardt and Reynolds 1994), while scholars are theorizing about how knowledge creates this competitive edge in varied settings (Grant 1996). Both the managerial and theoretical perspectives are founded on the notion that knowledge, as an intangible strategic resource, is crucial in an organization's efforts to create value in a unique, inimitable, and non-transferable way (Jensen and Meckling 1992).

More directly, Grant (1996) argues that all human productivity is knowledge dependent, and technical tools and machines are simply embodiments of knowledge. Building on Simon's (1991) notion of bounded rationality, Grant's approach can be extended to suggest that an organization's charge is to draw primarily on individuals' collective wisdom in such a way as to perform important tasks well (e.g., providing the goods and services that customers want). Continual success in these "knowledge" tasks helps ensure the organization's long-term prosperity. In this study, we define knowledge as credible information and/or experience that is of potential value to a marketing function.

While past studies have primarily applied the notion of knowledge as a strategic resource to organizations, we seek to expand the application through a focus on supply chains. The focus on supply chains is both theoretically interesting and practically valuable because of their increasingly important role in affecting an organization's overall success (Niraj, Gupta, and Narasimhan 2001). Additionally, given the complexity of supply chains (Handfield and Nichols 2003), these chains represent an area in which knowledge initiatives can create unique competitive advantage (Carter

and Narasimhan 1996). Conversely, an organization's ability to provide value to customers can be severely impeded by dysfunctional supply chains (Venkatesh, Kohli, and Zaltman 1995). For example, many firms have devoted significant resources to knowledge initiatives for the purpose of enhancing the performance of supply chain systems. FedEx recently spent \$100 million to re-organize their supply chain structure, and UPS has spent \$9 billion on information technology since 1986 – both to improve supply chain performance (Farhoomand and Ng 2000). Given the importance of supply chains to the success of firms and marketing's important role in supply chains, the present study attempts to contribute to a fuller understanding of knowledge as a strategic marketing resource in supply chains.

A supply chain is defined as a “network of facilities and activities that performs the functions of product development, procurement of material from suppliers, the movement of materials between facilities, the manufacturing of products, the distribution of finished goods to customers, and after-market support for sustainment” (Mabert and Venkataraman 1998, p. 538). Two critical marketing functions can be derived from this supply chain definition: logistics (e.g., Mentzer, Flint, and Hult 2001) and supply management (e.g., Cannon and Homburg 2001). Specifically, within Mabert and Venkataraman's (1998, p. 538) definition, logistics entails “the distribution of finished goods to customers” and supply management refers to “procurement of material from suppliers.” Although these brief descriptions do not encompass all elements of logistics and supply management, they do place each function at the center of marketing's influence in supply chains (cf. Homburg, Workman, and Krohmer 1999).

In this study, we examine a model of knowledge and its effect on performance in supply chains. The theoretical foundation is composed of strategic choice theory (Child 1972), configuration theory (e.g., Doty, Glick, and Huber 1993; Miller 1997), and the resource-based view of the firm (e.g., Barney 1991; Penrose 1959; Wernerfelt 1984). Specifically, these theories guide

us in assimilating a set of nine knowledge constructs that are examined as value creation elements within different strategy types of supply chains. The research questions addressed by the study are: What are the strategically important knowledge constructs and how are they integrated to shape important outcomes in different strategy-focused supply chains? We now review the literature on knowledge and introduce hypotheses, followed by a discussion of the method, analysis, results, and implications that can be derived from the research.

THEORETICAL INTEGRATION

Assessing whether supply chains' knowledge resources are organized in ways that enable desired performance requires the simultaneous consideration of multiple characteristics (e.g., Doty, Glick, and Huber 1993) of knowledge (e.g., Barney 1991; Penrose 1959; Wernerfelt 1984). Recent work in marketing (Vorhies and Morgan 2003) has adopted configuration theory as a useful foundation to address such considerations using profile deviation analysis (e.g., Doty, Glick, and Huber 1993; Miller 1987). A configuration denotes a multidimensional constellation (e.g., Meyer, Tsui, and Hinings 1993) of knowledge characteristics of a supply chain. For these knowledge characteristics, configuration theory posits that an ideal constellation exists that results in superior performance. In studying knowledge-based profiles, these configurations are considered ideal because they represent complex "gestalts" of multiple, interdependent, and mutually reinforcing knowledge characteristics that enable supply chains to achieve their strategic goals (Ketchen, Thomas, and Snow 1993; Miller 1997; Vorhies and Morgan 2003). In Figure 1, we provide an illustration of the links between the degree to which knowledge characteristics are organized in ways that enable strategy implementation with performance.

Insert Figure 1 about here

To specify and test such relationships, configuration theory studies draw on the well-established literature on "fit" (e.g., Doty, Glick, and Huber 1993; Venkatraman and Camillus 1984;

Zajac, Kraatz, and Bresser 2000). This literature specifies that when fit among multiple variables is considered simultaneously (as in the holistic study of the relationship between knowledge characteristics and strategy types) and the impact on criterion variables is assessed (i.e., supply chain performance), fit should be conceptualized and assessed via “profile deviation analysis” (e.g., Venkatraman 1990). Profile deviation analysis views fit between knowledge characteristics and strategy in terms of the degree to which the knowledge characteristics of a supply chain differ from those of an “ideal” profile for implementing a particular strategy (Venkatraman 1990; Zajac, Kraatz, and Bresser 2000). Given the relatively new focus on knowledge as a strategic marketing resource, theory does not provide a guide to specify ideal knowledge profiles for each strategy scenario in the supply chain (cf. Gresov 1989). As such, we later derive empirically based ideal profiles for each strategy type (Ketchen, Thomas, and Snow 1993), i.e., we identify high-performing supply chains implementing a given strategy and calibrate all other cases relative to this ideal profile (e.g., Drazin and Van de Ven 1985).

Configuration Elements of Knowledge-Based Supply Chain Fit With Strategy

As depicted in Figure 1, configuration theory (e.g., Doty, Glick, and Huber 1993), strategic choice theory (Child 1972), and the knowledge literature (e.g., Grant 1996) suggest two major constructs that are relevant to understanding and assessing knowledge-based supply chain fit with strategy: strategic types and knowledge-based supply chain characteristics. “Strategic type pertains to the planned patterns of organizational adaptation to the market through which a business seeks to achieve its strategic goals” (Vorhies and Morgan 2003, p. 102; cf. Conant, Mokwa, and Varadarajan 1990; Matsuno and Mentzer 2000). Founded in the seminal work by Miles and Snow (1978), which was rooted in strategic choice theory (Child 1972), Walker and Ruekert (1987) proposed five distinct strategic types centered around product-market strategy choices: prospectors, analyzers, low-cost defenders, differentiated defenders, and reactors.

Prospectors are frequently the first to adopt new supply chain concepts. They do not hesitate to use new supply chain tools when the opportunity arises. These organizations concentrate on supply chain tools that push performance boundaries. Their aim is to always have the most innovative supply chain practices, whether based on substantial performance improvement or cost reduction. *Analyzers* are seldom first to implement new supply chain practices or to adopt new supply chain tools. However, by monitoring supply chain activity, they can be early-followers using a second but better supply chain strategy, increased user benefits, or lower total costs. *Low-cost defenders* attempt to maintain a relatively stable domain by aggressively protecting their supply chain practices. They are rarely at the forefront of supply chain development. Instead they focus on implementing their current supply chain activities as efficiently as possible. These organizations generally focus on lowering the cost of their existing supply chain practices. *Differentiated defenders* attempt to maintain a relatively stable domain by aggressively protecting their supply chain practices (niches), often peculiar to specialized customer needs. They are rarely at the forefront of supply chain development. Instead they focus on implementing their current activities by taking advantage of elements that they do particularly well. The cost of their practices is typically higher than the industry average. *Reactors* do not seem to have a consistent supply chain strategy. They primarily act in response to competitive or other chain pressures in the short-term.

Although the social science literature identifies a plethora of knowledge constructs, the resource-based view (RBV) (Wernerfelt 1984) provides a guide to the selection of constructs that are particularly important in the formation of a strategic knowledge resource in supply chains. The RBV contends that an organization's resources shape performance. Resources are defined as physical assets, intangible assets, and organizational capabilities that are tied semi-permanently to the firm (Wernerfelt 1984). Some resources are much more important than others. Non-unique resources such as market access and cash are possessed by many organizations. In contrast, when an

organization possesses “strategic” resources, the organization has an advantage over rivals lacking such resources in the generation of sustained outcomes (Barney, 1991; Chi, 1994). Consistent with Hult et al. (2006), we propose that “knowledge” is an intangible strategic resource in supply chains.

Based on the RBV, strategic marketing, and strategic management literatures, nine knowledge characteristics have been delineated to be critical in the formation of a multiple, interdependent, and mutually reinforcing knowledge profile that can be used to create an ideal, unique *strategic knowledge resource* (Hult et al. 2006). These are: organizational memory, tacitness of knowledge, knowledge prioritizing, accessibility of knowledge, quality of knowledge, knowledge use, knowledge intensity, responsiveness, and learning capability.

Organizational *memory* is defined as achieved level of knowledge, experience, and familiarity regarding supply chain operations; it is the stored representation of the learning upon which supply chain members can subsequently base their actions (Moorman and Miner 1997). *Tacitness* of knowledge is defined as the degree of codifiability and teachability of the knowledge that exists in the supply chain (Zander and Kogut 1995; Simonon 1999). *Knowledge prioritizing* is defined as the systematic, organizational-level filtering of supply chain knowledge into levels of importance (cf. Huber 1991). *Accessibility* of knowledge is defined as the degree to which knowledge that exists in the supply chain is easily available and obtainable (O’Reilly 1982). *Quality* of knowledge refers to the relevance, accuracy, reliability, and timeliness of knowledge provided in the supply chain (Low and Mohr 2001). *Knowledge use* refers to the direct application of knowledge to solve a particular supply chain problem or a make a particular supply chain decision (Deshpandé and Zaltman 1982). *Knowledge intensity* is defined as the extent to which a supply chain depends on the knowledge inherent in its operations as a source of competitive advantage (Autio, Sapienza, and Almeida 2000). In our study, *responsiveness* is defined as the product-specific action taken as a functioning of the knowledge that has been generated and

disseminated in the supply chain (Kohli, Jaworski, and Kumar 1993). *Learning capacity* is defined as the extent to which a supply chain continually increases its degree of usable knowledge to create a source of competitive advantage (cf. Grant 1996; Hurley and Hult 1998). Thoughts derived from the resource-based view indicates that fit between these knowledge characteristics and strategic type may exhibit the valuable, rare, inimitable, and non-substitutable characteristics identified as essential for sustainable competitive advantage (cf. Grant 1996; Vorhies and Morgan 2003).

HYPOTHESIS DEVELOPMENT

The literature on “competitive priorities” forms the basis for the set of performance variables included in the study. According to this literature, four “priorities” are directly tied supply chain performance: speed, quality, cost, and flexibility (e.g., Anderson, Cleveland, and Schroeder 1989; Boyer and Lewis 2002; Boyer and Pagell 2000; McKone, Schroeder, and Cue 2001; Ward et al. 1998; Youndt et al. 1996). To achieve maximum competitive advantage, organizations often opt to focus on only one or a few of the four priorities (Boyer and Pagell 2000). Thus, given that the “competitive priorities” literature argue that these four dimensions of performance may not converge, supply chains make important tradeoffs in emphasizing a particular priority outcome (Boyer and Lewis 2002):

“It is difficult (if not impossible) and potentially dangerous for a company to try to compete by offering superior performance along all these dimensions, since it will probably end up second best on each dimension to some company that devotes more of its resources to developing that competitive advantage” (Hayes and Wheelwright 1984, p. 141).

Given that the ideal knowledge profile, which “fits” with a certain strategic type, may depend on the chosen performance objective, we include all four competitive priorities as performance outcomes in this study for each of the strategy types. The focus on these four priorities was directly tied to the order fulfillment process, with the notion that the process-based speed, quality, cost, and flexibility results in a superior product or services to the end customer. However, given that Reactors do not

seem to have a consistent strategy, the literature does not provide any guidance as to the “knowledge profile” which best achieves competitive-priorities performance in supply chains (cf. Miles and Snow 1978). As such, we include reactors (n=75) in the analyses, for value-added comparison purposes, but we do not offer any theoretical rationale on the ideal knowledge profile–performance relationship.

Speed. In our study, speed refers to the time it takes from initiation to completion of an order fulfillment process in the supply chain (Mentzer, Flint, and Hult 2001). The focus of speed (e.g., delivery time, cycle time) is the ability to deliver on time, according to a set schedule. In such cases, the organization may not have the least costly, greatest flexibility, or the highest quality process, but is able to compete on the basis of reliably delivering products when promised (Ward et al. 1998). The competitive priorities literature (e.g., Boyer and Lewis 2002) and strategic choice theory (Child 1972) suggest that for speed-focused supply chains of each strategic type, an ideal supply chain profile exists in which the configuration of “knowledge” characteristics enables the implementation of its strategy in a way that leads to superior speed in the order fulfillment process (e.g., Hult, Ketchen, and Nichols 2002; Hult et al. 2000).

For example, since prospectors are frequently the first to adopt new supply chain concepts, tools, and innovative practices to push performance boundaries, these organizations depend on cutting-edge knowledge and a systematic, organizational-level filtering of supply chain knowledge to sort out the knowledge that is not clearly useful to achieve speed in the order fulfillment process (cf. Autio, Sapienza, and Almeida 2000; Huber 1991). Contrary to prospectors who set the benchmark on speed-achieving operations, successful analyzers, low-cost defenders, and differentiated defenders, in their “follower” roles, all need to efficiently and effectively implement product-specific actions to achieve speed (cf. Hult et al. 2000). In addition, given their strategic focus on increased user benefits and lower costs, analyzers are prone to strive to continually

increase their degree of usable knowledge to achieve speed (cf. Hurley and Hult 1998). Low-cost defenders, on the other hand, stress their existing experience and familiarity with supply chain operations to achieve speed, while differentiated defenders stress the direct application of knowledge, based on what they do particularly well, to achieve speed (cf. Deshpandé and Zaltman 1982). In summary, we expect that the speed of the order fulfillment processes in supply chains be greater when their knowledge profiles are similar to those of the speed-maximizing ideal profile of a certain strategy type. As such, we hypothesize:

H₁: The more similar a supply chain's knowledge profile to that of the ideal profile for (a) prospectors, (b) analyzers, (c) low-cost defenders, and (d) differentiated defenders, the greater the speed of the order fulfillment process.

Quality. In our study, quality is tied to the order fulfillment process itself, not directly the product or service resulting from it. However, supply chains that stress quality-based operations continually focus on improving their supply chain processes to increase product reliability and customer satisfaction (Youndt et al. 1996). In such cases, the organization may not have the fastest cycle time, least costly operations, or greatest process-flexibility, but is able to compete on the basis of implementing processes that strive for the highest quality throughout (Ward et al. 1998). The competitive priorities literature (e.g., Boyer and Lewis 2002) and strategic choice theory (Child 1972) suggest that for quality-focused supply chains of each strategic type, an ideal supply chain profile exists in which the configuration of "knowledge" characteristics enables the implementation of its strategy in a way that leads to superior quality in the order fulfillment process (e.g., Youndt et al. 1996).

For example, since prospectors always strive to have the most innovative supply chain practices, whether based on substantial performance improvement or cost reduction, these organizations primarily depend on a combination of innovative new knowledge coupled with effective integration of existing knowledge in their operations to achieve quality processes (cf.

Autio, Sapienza, and Almeida 2000). Similar to a focus on speed performance, successful analyzers, low-cost defenders, and differentiated defenders, in their “follower” roles, all need to stress a high degree of responsiveness (i.e., efficiently and effectively implement product-specific actions) to achieve quality in the supply chain process (cf. Youndt et al. 1996). In addition, given that the focus is on achieving quality, analyzers (who by design focus on increased user benefits and/or lower total costs) also rely on the relevance, accuracy, reliability, and timeliness of knowledge provided in the supply chain (cf. Low and Mohr 2001) to achieve quality. Low-cost defenders and Differentiated Defenders stress their existing experience and familiarity with supply chain operations (cf. Moorman and Miner 1997), while differentiated defenders also focus on the relevance, accuracy, reliability, and timeliness of knowledge in the chain (Low and Mohr 2001). In summary, we expect that the quality of the order fulfillment processes in supply chains be greater when their knowledge profiles are similar to those of the quality-maximizing ideal profile of a certain strategy type. As such, we hypothesize that:

H₂: The more similar a supply chain’s knowledge profile to that of the ideal profile for (a) prospectors, (b) analyzers, (c) low-cost defenders, and (d) differentiated defenders, the greater the quality of the order fulfillment process.

Cost. In our study, cost is tied to the order fulfillment process itself, not the product or service resulting from it. However, cost-driven supply chains strive to create customer value by either reducing costs or increasing benefits in the supply chain equation (i.e., value = benefits/costs) (Youndt et al. 1996). In such cases, the organization may not have the fastest cycle time, highest quality process, or greatest process-flexibility, but is able to compete on the basis of implementing processes that strive for the lowest overall cost (Ward et al. 1998). The competitive priorities literature (e.g., Boyer and Lewis 2002) and strategic choice theory (Child 1972) suggest that for cost-focused supply chains of each strategic type, an ideal supply chain profile exists in which the

configuration of “knowledge” characteristics enables the implementation of its strategy in a way that leads to superior cost efficiencies in the order fulfillment process (e.g., Ward et al. 1998).

For example, since prospectors are frequently the first to adopt new supply chain concepts, these organizations depend on easily accessible, high degree knowledge inherent in the operations – both new innovative knowledge and existing knowledge in memory bins (cf. O’Reilly 1982) – to achieve cost efficiencies in their supply chain processes. Given the strong ties between quality and cost (e.g., Boyer and Lewis 2002), analyzers, low-cost defenders and differentiated defenders, as “follower” strategy types, focus on the relevance, accuracy, reliability, and timeliness of knowledge (cf. Low and Mohr 2001) coupled with efficiently and effectively implementing product-specific actions to achieve cost efficiencies in the supply chain process (cf. Youndt et al. 1996). However, analyzers also rely on effective application of knowledge to make a particular supply chain decision (cf. Deshpandé and Zaltman 1982), while Low-cost defenders and differentiated defenders rely on their experience and familiarity with supply chain operations (cf. Moorman and Miner 1997) to achieve cost efficiencies. In summary, we expect that the cost efficiencies of the order fulfillment processes in supply chains be greater when their knowledge profiles are similar to those of the cost-maximizing ideal profile of a certain strategy type. As such, we hypothesize:

H₃: The more similar a supply chain’s knowledge profile to that of the ideal profile for (a) prospectors, (b) analyzers, (c) low-cost defenders, and (d) differentiated defenders, the greater the cost efficiency in the order fulfillment process.

Flexibility. As an increasing number of organizations are achieving high-quality and low-cost positions in the marketplace, some organizations are seeking alternative sources of competitive advantage in their supply chain operations (Handfield and Nichols 2003). Flexibility in operations has become a viable alternative (Upton 1995). In our study, flexibility refers to a supply chain’s agility, adaptability, and responsiveness (Youndt et al. 1996). In such cases, the organization may not have the fastest cycle time, highest quality process, or greatest cost efficiencies, but is able to

compete on the basis of implementing processes that strive for the greatest overall flexibility to adapt to market situations (Ward et al. 1998). The competitive priorities literature (e.g., Boyer and Lewis 2002) and strategic choice theory (Child 1972) suggest that for flexibility-focused supply chains of each strategic type, an ideal supply chain profile exists in which the configuration of “knowledge” characteristics enables the implementation of its strategy in a way that leads to superior flexibility in the order fulfillment process (e.g., Boyer and Pagell 2000).

For example, regardless of strategy type, achieving flexibility in the supply chain requires product-specific action to be taken (cf. Youndt et al. 1996) as a functioning of the knowledge that has been generated and disseminated in the supply chain (cf. Kohli, Jaworski, and Kumar 1993). However, given the elusive nature of the concept of flexibility coupled with prospectors’ focus on “being first” in the marketplace, prospectors strategy types use an “integrated plethora” of knowledge initiatives to achieve flexibility-performance (e.g., existing experience coupled with easily available knowledge which is also considered relevant and timely). Low-cost defenders and differentiated defenders focus on their achieved level of knowledge, experience, and familiarity regarding supply chain operations to base their actions (cf. Moorman and Miner 1997) in an effort to achieve a high degree of flexibility in the supply chain process. The most difficult profile to predict is that of analyzers who try to achieve flexibility-performance. Analyzers by design are seldom first to implement new supply chain practices or to adopt new supply chain tools. Instead, they monitor supply chain activities to strive to be early-followers with a better supply chain strategy, increased user benefits, and/or lower total costs. As such, analyzers make very calculated moves to achieve success; typically not a feature that results in a high degree of flexibility. However, as a “follower” strategy type, analyzers can achieve flexibility in their chain by implementing product-specific actions that are taken as a functioning of the knowledge that has been generated and disseminated in the supply chain (cf. Kohli, Jaworski, and Kumar 1993). In

summary, we expect that the flexibility of the order fulfillment processes in supply chains be greater when their knowledge profiles are similar to those of the flexibility-maximizing ideal profile of a certain strategy type. As such, we hypothesize:

- H₄: The more similar a supply chain's knowledge profile to that of the ideal profile for (a) prospectors, (b) analyzers, (c) low-cost defenders, and (d) differentiated defenders, the greater the flexibility of the order fulfillment process.

METHOD

Samples

To examine the hypothesized model in Figure 1, we gathered data from separate samples of logistics and supply management (purchasing) professionals which did not originate from the same organization. This paper is a fine-grained follow-up to the coarse-grained analysis in the Hult, Ketchen, Cavusgil, and Calantone (2006) article in the *Journal of Operations Management* using the same database but different sample size due to the availability of more cases for the measures in this analysis. Thus, our study of supply chains incorporated two critical marketing functions. In this study, logistics represents the outbound activity (“the distribution of finished goods to customers”) and supply management represents the inbound activity (“procurement of material from suppliers”) of supply chains (Mabert and Venkataraman 1998, p. 538). Additionally, it is important to clearly specify the level of analysis conducted to avoid cross-level fallacy issues. We focused on knowledge as a strategic resource in supply chains (as opposed to knowledge at the individual level which can be viewed as an asset). Key informants were used as the survey respondents to address knowledge-related supply chain-level phenomena. The unit of analysis is the logistics function and its order fulfillment process for the sample of logistics executives and the supply management function and its order fulfillment process for the sample of supply management executives. Thus, both samples were centered on order fulfillment, and both samples focused on a functionally based marketing segment of supply chains.

Prior to collecting the data, two measures were taken to ensure quality of the research design and the quality of key informants. To ensure the quality of the research design, we conducted a pretest involving two logistics, two supply management, and three marketing academics, and two logistics and two supply management business executives to assess the face validity of the scale items and the general quality of the research design. This pretest resulted in modifications to the wording of some of the items as well as revisions to parts of the instructions to the survey respondents. Second, we selected firms with a manufacturing focus only, and we pre-selected key informants to be in a management position in either logistics or supply management. As such, we omitted any firms that were not manufacturing-based, and we also omitted any potential respondents who were not in a management position in logistics or supply management. Finally, we instructed the respondents to answer the survey only if they had a high degree of knowledge about logistics or supply management, respectively, within the context of order fulfillment processes in supply chains.

Logistics sample. The sampling frame of logistics professionals was provided by The Council of Logistics Management (CLM). Founded in 1963, CLM is a not-for-profit professional business organization consisting of 14,000 individuals who have responsibilities in logistics and related functions that make up the logistics profession. We restricted our logistics sample to manufacturing organizations. The data collection was undertaken online and consisted of a sampling frame of 4,000 logistics professionals. These professionals had such titles as Director of Logistics, Manager of Modal Logistics, Logistics Manager, International Logistics Manager, Manager of Corporate Logistics, VP Global Logistics, Group Logistics Manager, Senior Director of Logistics, Director of Logistics Systems Integration, Logistics Service Manager, Logistics Program Manager, Logistics Brand Manager, Director of Transportation and Logistics, and Senior Logistics Engineer.

The request for survey participation was relayed via email to the CLM professionals and the survey was posted online. An original email and a follow-up request two weeks after the initial contact were used to encourage participation in the study (each email included a description of the study, a hyperlink to the website for the survey, a promise of anonymity of responses, and an option to receive a report of the findings). Of the 4,000 logistics professionals targeted, 545 responded for an effective response rate of 16.9 percent (781 surveys were non-deliverable). These individuals represented organizations that had existed for an average of 52 years, employed an average of 11,695 people, and with 25 percent of their logistics activities being international in scope.

Supply management sample. The sampling frame of supply management (purchasing) professionals was provided by the Institute of Supply Management (ISM; formerly known as the National Association of Purchasing Management). Founded in 1915, ISM is a not-for-profit professional business organization consisting of 48,000 individuals who have responsibilities in purchasing and related functions that make up the supply management profession. Similar to the logistics sample, we restricted our supply management sample to manufacturing organizations. Unlike to the logistics sample, the data collection was undertaken both online and via regular mail; the approach taken was dependent on available contact information. The sampling frame consisted of a total of 3,000 supply management professionals (1,300 were contacted via email and 1,700 were contacted via regular mail). In the ISM sample, the individuals had such titles as Senior Buyer, Manager of Purchasing, Director of Purchasing, Senior Purchasing Agent, Director of Purchasing and Materials Management, Sourcing Manager, VP of Procurement, Corporate MRO Buyer, Global Purchasing Manager, Purchasing Supervisor, Regional Purchasing Manager, Chief Purchasing Officer, Information Manager of Global Procurement, Director of Global Strategic Sourcing, Manager of Strategic Sourcing, and Corporate Purchasing Manager.

Regardless of the contact format, respondents were instructed to complete the survey online. An original email and a follow-up request two weeks after the initial contact were used to encourage participation in the study for those who could be reached via email. The supply management professionals who were contacted via mail were only sent one request to participate. Each email/letter included a description of the study, the URL to the website for the survey, a promise of anonymity of responses, and an option to receive a report of the findings. Of the 3,000 supply management professionals targeted, 368 responded for an effective response rate of 15.6 percent (642 were non-deliverable). These individuals represented organizations that had existed for an average of 55 years, employed an average of 3,080 people, and with 24 percent of their supply management activities being international in scope.

Non-response bias and comparison of samples and segments. The extrapolation procedure suggested by Armstrong and Overton (1977) was used to assess potential: (1) non-response bias; (2) differences across the two waves of data collection (1st and 2nd waves); (3) differences across the methods of data collection in the supply management sample (email and regular mail); and (4) differences across the sample types (logistics and supply management). First, in the logistics sample (n=545), we found no differences in age (p=.20), size (p=.66), and international scope (p=.53) of the early- (n=273) and late-responding (n=272) organizations. Likewise, in the supply management sample (n=368), we found no differences in age (p=.27), size (p=.12), and international scope (p=.90) of the early- (n=184) and late-responding (n=184) organizations. Second, no systematic differences were found between size (p=.90) and international scope (p=.85) in the two waves (n=339 in wave 1 and n= 205 in wave 2) of the survey mailouts to the logistics professionals, but we did find differences in age (wave 1 age = 56 years, wave 2 age = 45 years) (p=.04). No systematic differences were found between age (p=.25), size (p=.60), and international scope (p=.99) in the two waves (n=209 in wave one and n=64 in wave 2) of the email-based survey

mailouts to the supply management professionals. Third, no systematic differences were found between age ($p=.20$), size ($p=.58$), and international scope ($p=.72$) in the different methods of collecting the supply management data ($n=273$ for the email-based survey and $n=95$ for the regular mail-based survey). This result is consistent with the findings of Klassen and Jacobs (2001) that surveys can be administered via surface mail and electronic mail with no cause for concern as long as the research design is solid and the questionnaire is consistent. Finally, no systematic differences were found between age ($p=.46$) and international scope ($p=.14$) in the logistics ($n=545$) versus supply management ($n=368$) samples, but we did find that the size in the logistics sample (11,695 people) was larger than in the supply management sample (3,080 people) ($p=.04$). Although two of the 18 analyses resulted in significant differences, the data appear reasonably free from systematic difference bias across: (1) early and late respondents; (2) the waves of data collection; (3) the methods of data collection in supply management; and (4) across sample types.

Measures

The measures used in this study are included in the Appendix. Three categories of measures were used to assess the fit of the knowledge-based supply chain profile with strategy types and its effect on performance: strategy types, knowledge measures, and competitive priorities (performance).

Strategy types. We used the conceptual foundation provided by Miles and Snow (1978) and Walker and Ruekert (1987) and previous work by Doty, Glick, and Huber (1993) and Slater and Olson (2000) to operationalize strategy types via the self-identifying paragraph descriptor approach (cf. Vorhies and Morgan 2003). Descriptive paragraphs, tied directly to the logistics or supply management setting, as appropriate, were created for prospectors, analyzers, low-cost defenders, differentiated defenders, and reactors. The descriptor approach has been used successfully in a number of studies in strategic marketing (e.g., Matsuno and Mentzer 2000; McDaniel and Kolari

1987; Vorhies and Morgan 2003). In this study, 162 (17.7%) respondents characterized their supply chain strategy as prospector, 316 (34.6%) as analyzer, 288 (31.5%) as low-cost defender, 72 (7.9%) as differentiated defender, and 75 (8.2%) as reactor.

Knowledge measures. Established scales were used to measure the constructs of organizational memory (OM; Moorman and Miner 1997), tacitness of knowledge (TK; Simonin 1999; Zander and Kogut 1995), accessibility of knowledge (AOK; O'Reilly 1982), quality of knowledge (QOK; O'Reilly 1982), knowledge use (KU; Deshpandé and Zaltman 1982), knowledge intensity (KI; Autio, Sapienze, and Almeida 2000), and product-specific responsiveness (R; Kohli, Jaworski, and Kumar 1993). New scales were developed to measure knowledge prioritizing (KP; developed based on work by Huber 1991 and Moorman 1995) and learning capacity (LC; developed based on work by Grant 1996 and Hurley and Hult 1998)

Competitive priorities. The measure of logistics/supply management performance was theoretically founded in the “competitive priorities” literature (e.g., Anderson, Cleveland, and Schroeder 1989; Boyer and Pagell 2000; McKone, Schroeder, and Cue 2001; Youndt et al. 1996). Competitive priorities both form the potential strategies as well as the preferred outcomes associated with supply chain operations. According to this literature, four competitive priorities are directly tied to process-based settings such as supply chains, including: speed (S), quality (Q), cost (C), and flexibility (F). Typically, organizations opt to focus on one or more of the four priorities as a means to measure performance. For comprehensiveness, our study includes all four competitive priorities as performance variables in this study.

ANALYSIS

Psychometric Analysis and Properties

The correlations among the study variables are reported in Table 1. The means, standard deviations, average variances extracted, composite reliabilities (and coefficient alphas), factor

loadings, and fit indices are reported in Table 2. To ensure that the strategic fit hypotheses (H₁ to H₄) can be tested without influence of the supply chain setting or strategy types, a six-step approach was used to assess the measures across the logistics and supply management segments and across the five strategy types. These steps include: (1) conducting exploratory factor analyses in each of the logistics and supply management samples, (2) testing the robustness of each item across the logistics and supply management samples, (3) testing the robustness of each item across the five strategy types, (4) conducting a confirmatory factor analysis using the full sample (n=913), (5) assessing the reliability and validity of the scales, and (6) testing to ensure that common method variance does not inhibit the hypothesis testing.

Insert Tables 1 and 2 about here

Exploratory factor analysis. Given the large number of 13 constructs and 65 items included in the study and the mix of established and new scales, we first conducted maximum likelihood factor analyses with promax rotation using SPSS 11.0. These factor analyses were performed for each supply chain sample (logistics and supply management) separately to verify the dimensionality of the 13 factors in each sample. In these analyses, we found eight problematic items (i.e., S3, S5, Q3, Q5, C3, C5, F3, and F5 – marked in the Appendix with a “2”). The eight items were deleted, leaving 57 items for subsequent analysis.

Equivalence of the item loadings across supply chain samples. To test the robustness of the survey items, we employed a two-step approach. First, we conducted a multi-sample CFA using the input matrices from the logistics and supply management samples using LISREL 8.54 to examine the robustness of each item across the supply chain samples (Jöreskog et al. 2000). Specifically, we examined the robustness of each item loading across the supply chain groups by constraining appropriate β estimates to be equal and then different across the two groups. Then we evaluated whether the $\Delta\chi^2_{(\Delta df=1)}$ was significant (Jöreskog et al. 2000). The results indicated that of the

remaining 57 items, six items were significantly different ($p < .05$) across the logistics and supply management samples (i.e., TK3, QK4, R1, R2, R6, and KO1 – each of those questions are marked in the Appendix with a “³”). The six items were deleted, leaving 51 items for subsequent analysis.

Equivalence of the item loadings across strategy types. The second step in assessing the robustness of the items across groups entailed conducting a multi-sample CFA using the input matrices from the five strategy types to examine the robustness of each item across those strategy types (Jöreskog et al. 2000). Each item loading was examined across the strategy groups by constraining pairs of β estimates, one pair at a time, to be equal and different across the five groups. Then we evaluated whether the $\Delta\chi^2_{(\Delta df=4)}$ was significant (Jöreskog et al. 2000). The results indicated that of the remaining 51 items, three items were significantly different ($p < .05$) across the five strategy types (i.e., KU2, R3, LC2 – each of those questions are marked in the Appendix with a “⁴”). The three items were deleted, leaving 48 items for subsequent analysis.

Confirmatory factor analysis (CFA). The next step in the analysis of the measurement properties was to conduct a CFA on the remaining 48 items using the full sample ($n=913$). The model fits were evaluated using a series of indices. The DELTA2 index (Bollen 1989), the relative noncentrality index (RNI)(McDonald and Marsh 1990), and the comparative fit index (CFI) (Bentler 1990) have been shown to be most stable fit indices by Gerbing and Anderson (1992). Hu and Bentler (1999) suggested that the Tucker-Lewis index (TLI) (Tucker and Lewis 1973) and the root mean square error of approximation index (RMSEA) (Steiger and Lind 1980) be added in evaluating CFA and SEM analyses. Using this series of fit indices, the CFA resulted in DELTA2, RNI, CFI, and TLI all being .95, and RMSEA = .09 ($\chi^2 = 8,192.3$, $df = 1,002$). Thus, the measurement structure of 13 factors and 48 items produced excellent fit statistics.

Reliability and validity assessments. Within the CFA setting, composite reliability was calculated using the procedures outlined by Fornell and Larcker (1981) based on the work of Werts, Linn, and Jöreskog (1974). The formula specifies that:

$$CR_{\eta} = \frac{(\sum \lambda \gamma_i)^2}{(\sum \lambda \gamma_i)^2 + (\sum \varepsilon_i)},$$

where CR_{η} = composite reliability for scale η ; λ_{γ_i} = standardized loading for scale item γ_i , and ε_i = measurement error for scale item γ_i (coefficient alphas are also included in Table 2 for comparison). Additionally, the parameter estimates and their associated t-values were examined along with the average variance extracted for each construct (Anderson and Gerbing 1988). Average variance extracted was calculated using the following formula:

$$V_{\eta} = \frac{\sum \lambda \gamma_i^2}{\sum \lambda \gamma_i^2 + \sum \varepsilon_i},$$

where V_{η} = average variance extracted for η ; λ_{γ_i} = standardized loading for scale item γ_i , and ε_i = measurement error for scale item γ_i . The composite reliabilities for the 13 scales ranged from .78 to .95 (coefficient alphas ranged from .78 to .94), the factor loadings ranged from .51 to .97 ($p < .01$), with average variances extracted ranging from 55.3 to 90.3 percent. In addition, the 48 purified items were found to be reliable and valid when evaluated based on each item's error variance, modification index, and residual covariation. Also, the skewness and kurtosis results of each item indicated that the data were normally distributed.

Discriminant validity was assessed by calculating the shared variance between pairs of constructs and verifying that it was lower than the average variances extracted for the individual constructs (Fornell and Larcker 1981). Shared variance was calculated as:

$$\gamma^2 = 1 - \psi,$$

where γ^2 = shared variance between constructs, and with the diagonal element of ψ indicating the amount of unexplained variance. Since η and ε were standardized, γ^2 was equal to the squared correlation between the two constructs. In all cases, the average variances extracted were higher than 50 percent, the recommended cutoff by Fornell and Larcker (1981) (ranging from 55.3 to 90.3 percent; see Table 2). The shared variances between pairs of all possible scale combinations indicated that the variances extracted were higher than the associated shared variance in all cases (see Table 1 for correlations and Table 2 for average variances extracted).

In the interest of thoroughly examining discriminant validity, we conducted one additional test of discriminant validity (e.g., Anderson 1987; Bagozzi and Phillips 1982). This test entailed analyzing all possible pairs of constructs in a series of two-factor CFA models using LISREL 8.54. Each model was run twice – once constraining the ϕ coefficient to unity and once freeing this parameter. A χ^2 -difference test was performed on the nested models to assess if the $\Delta\chi^2$ was significantly lower for the unconstrained models (Anderson and Gerbing 1988). The critical value ($\Delta\chi^2_{(\Delta df=1)} > 3.84$) was exceeded in all cases. Thus, the 13 constructs and their purified 48 indicators were found to be reliable, valid, and robust across samples.

Testing for potential common method bias. Before moving on to the hypothesis testing, we conducted an examination of potential common method variance problems. Specifically, since all items used to test the hypotheses in Figure 1 are based on logistics/supply management professionals' subjective judgments, it was important to establish that common method bias was not likely to be an inhibiting factor in the hypothesis testing. As such, the 48 remaining items were factor analyzed via SPSS 11.0 with a maximum likelihood extraction method and promax rotation to examine if one single factor would emerge and/or if one general factor would account for most of the covariance in the variables (e.g., Podsakoff and Organ 1986). Using a promax rotation, the factors had variances explained ranging from 3.78 to 13.99 percent. Without rotation, the first

factor explained 20.27 percent of the total 73.14 percent. Thus, our inference is that common method bias does not appear to be an inhibiting factor in this study.

Configuration Theory Testing via Profile Deviation Analysis

In the testing of H_1 to H_4 , we followed the literatures on configuration theory (e.g., Doty, Glick, and Huber 1993; Miller 1997) and profile deviation analysis (e.g., Van de Ven and Drazin 1985; Venkatraman and Prescott 1990). This method is consistent with theoretical underpinnings in strategic marketing (e.g., Walker and Ruekert 1987) and has also been successfully implemented in empirical strategic marketing studies (e.g., Vorhies and Morgan 2003). The data were standardized (mean-centered) to remove the effects of different measurement units and potential multicollinearity (e.g., Gresov 1989; Jaccard and Turrisi 2003).

The first step in the profile deviation analysis was to identify ideal knowledge-based supply chain profiles that could be used as the benchmark against which the fit of all profiles in the sample with strategic type could be examined (e.g., Doty, Glick, and Huber 1993; Vorhies and Morgan 2003). To identify the ideal profiles in each strategy type, we examined the frequencies of the each of the performance variables (speed, quality, cost, flexibility, and the combined effect) coupled with the general guidelines in profile deviation studies of selecting the about 10 percent of the performers to be included in the ideal profile (e.g., Venkatraman and Prescott 1990). In each scenario, we selected a cut-off point within the top 10 percent of the performers where a significant drop-off in performance was apparent (this resulted in a range of 4 to 17 cases being included in each ideal profile).

In testing each hypothesis (H_1 to H_4), we calculated the mean scores of the top performers for each strategic type and performance variable (speed, quality, cost, flexibility, and the combined effect) on the nine knowledge constructs to form an ideal knowledge-based supply chain profile (Venkatraman 1989; Vorhies and Morgan 2003). For the cases (supply chains) excluded from the top performers, we calculated the Euclidian distance (ED) of each case from the ideal profile for its

strategic type across the nine knowledge dimensions (e.g., Drazin and Van de Ven 1985; Venkatraman 1990). The following formula was used:

$$ED = \sqrt{\sum_j^N (X_{sj} - \bar{X}_{ij})^2},$$

where X_{sj} = the score for a supply chain case on the j^{th} dimension, \bar{X}_{ij} = the mean for the ideal profile along the j^{th} dimension, and j = the number of profile dimensions (i.e., 1, 2, 3, ..., 9).

These calculations result in a profile deviation score that represents the degree to which the knowledge-based supply chain profile is similar to that of the ideal profile for each strategic type and performance variable. The profile deviation score was then regressed, using the OLS method, on each of the performance variables. We also included size and age of the organization, indicated by the natural logarithm of the number of employees and years respectively, as control variables (e.g., Amburgey and Rao 1996; Baum 1996; Bharadwaj, Varadarajan, and Fahy 1993). For H_1 to H_4 to be supported, the results should indicate that deviation from the ideal knowledge-based profile is negatively related to the performance variables for each of the strategy types (e.g., Drazin and Van de Ven 1985; Gresov 1989).

Prior to analyzing the hypotheses, it was important to validate two assumptions regarding our strategy type conceptualization (e.g., Vorhies and Morgan 2003). First, configuration theory (e.g., Doty, Glick, and Huber 1993) coupled with marketing research on strategy types (e.g., Conant, Mokwa, and Varadarajan 1990; Slater and Olson 2000) assumes that any one of the strategic types can lead to superior performance. As such, we examined, via analysis of variance tests (ANOVA), that supply chain performance variations between cases in our dataset were not simply a function of strategy type. The ANOVA results revealed no significant differences between strategy groups on either of the competitive priorities (speed, quality, cost, flexibility) or their combined effect (F-statistics ranged from .51 to .1.38). Second, we compared performance

outcomes of deviation from two different ideal knowledge-based supply chain profiles, one developed from cases of the same strategic type and one developed regardless of the strategy type (e.g., Venkatraman 1990; Vorhies and Morgan 2003). The results indicate that calibrating ideal supply chain profiles within strategy type produces greater beta coefficients (Cohen et al. 2003) and greater explanatory power (Chow 1960) in the regression models.

RESULTS

Table 3 reports the standardized regression results for knowledge-based supply chain profile fit with strategic type and its effect on performance. Table 4 summarizes the mean scores for the ideal knowledge-based supply chain profiles based on strategy types. The results for the control variables – size and age of the organization – are also included in Table 4. Four hypotheses, involving 16 profile-deviation regression models, were tested in this study; this represents hypothesized linkages for the combinations of each competitive priority (speed, quality, cost, flexibility) and strategy type (prospectors, analyzers, low-cost defenders, and differentiated defenders). We also included similar tests for the combined effect of speed, quality, cost, and flexibility as well as for reactors.

Insert Tables 3 and 4 about here

Additionally, for each hypothesized model tested, we also examined an alternative “non-ideal” model, where the “average performers” (those cases at the median on each performance scale) were selected from each strategy group and competitive priority to form the “average benchmark” model used to create profile deviation scores. In all model comparisons involving H_1 to H_4 , we found that the results support the notion that calibrating ideal supply chain profiles within strategy type produces stronger profile deviation coefficients (Cohen et al. 2003) and greater explanatory power (Chow 1960) than the average benchmark cases (however, in the flexibility model for reactors, the average model outperformed the ideal model). Also, for all models, the

Variance Inflation Factors (VIF) were lower than 1.30, indicating that multicollinearity does not inhibit the analysis (Mason and Perreault 1991).

Speed (H1). H₁ predicted that the more similar a supply chains' knowledge-based profile to that of the ideal profile for its strategy type, the greater is its speed of the order fulfillment process. Using OLS regression, the results show a significant, positive effect of the speed-maximizing ideal profile for prospectors ($\beta=-.46$, $p<.01$, $R^2=.18$), analyzers ($\beta=-.39$, $p<.01$, $R^2=.15$), and low-cost defenders ($\beta=-.22$, $p<.05$, $R^2=.08$). However, no such effect was found for differentiated defenders. The ideal profile was significant in the reactor model ($\beta=-.27$, $p<.10$, $R^2=.11$) but the equation was not (F-value=1.49). Thus, H_{1a-c} were supported.

Quality (H2). H₂ predicted that the more similar a supply chains' knowledge-based profile to that of the ideal profile for its strategy type, the greater is its quality of the order fulfillment process. Using OLS regression, the results show a significant, positive effect of the quality-maximizing ideal profile for prospectors ($\beta=-.42$, $p<.01$, $R^2=.20$), analyzers ($\beta=-.33$, $p<.01$, $R^2=.13$), low-cost defenders ($\beta=-.42$, $p<.01$, $R^2=.20$), and reactors ($\beta=-.47$, $p<.05$, $R^2=.27$). The ideal profile was significant in the differentiated defender model ($\beta=-.38$, $p<.05$, $R^2=.15$) but the overall equation was not (F-value=1.59). As such, H_{2a-c} were supported.

Cost (H3). H₃ predicted that the more similar a supply chains' knowledge-based profile to that of the ideal profile for its strategy type, the greater is its cost efficiency in the order fulfillment process. Using OLS regression, the results show a significant, positive effect of the cost-maximizing ideal profile for prospectors ($\beta=-.38$, $p<.01$, $R^2=.14$), analyzers ($\beta=-.27$, $p<.01$, $R^2=.10$), low-cost defenders ($\beta=-.42$, $p<.01$, $R^2=.20$), differentiated defenders ($\beta=-.42$, $p<.01$, $R^2=.25$), and reactors ($\beta=-.30$, $p<.10$, $R^2=.16$). As such, H_{3a-d} were all supported in the analyses.

Flexibility (H4). H₄ predicted that the more similar a supply chains' knowledge-based profile to that of the ideal profile for its strategy type, the greater is its flexibility of the order fulfillment process. Using OLS regression, the results show a significant, positive effect of the flexibility-maximizing ideal profile for prospectors ($\beta = -.36$, $p < .01$, $R^2 = .14$), analyzers ($\beta = -.34$, $p < .01$, $R^2 = .13$), low-cost defenders ($\beta = -.36$, $p < .01$, $R^2 = .15$), and differentiated defenders ($\beta = -.64$, $p < .01$, $R^2 = .25$). However, no such effect was found for reactors. As such, H_{4a-d} were supported.

$\Sigma(S, Q, C, F)$. In addition to analyzing the relationships specified in H₁ to H₄, we also included an examination of overall performance of the order fulfillment process (i.e., combined effect of speed, quality, cost, and flexibility). Some researchers argue that tradeoffs between competitive priorities are inappropriate (e.g., Noble 1995). For example, an argument has been made that high quality plants need to be more responsive to customer needs (flexibility), more reliable in delivery time (speed), and more efficient operationally (cost) (e.g., Szejczewski, Mapes, and New 1997). In support of these arguments, the results of the OLS regression analyses show a significant, positive effect of the combined competitive priority-maximizing ideal profile for prospectors ($\beta = -.43$, $p < .01$, $R^2 = .19$), analyzers ($\beta = -.36$, $p < .01$, $R^2 = .17$), low-cost defenders ($\beta = -.50$, $p < .01$, $R^2 = .28$), differentiated defenders ($\beta = -.54$, $p < .01$, $R^2 = .36$), and reactors ($\beta = -.44$, $p < .01$, $R^2 = .30$).

DISCUSSION AND IMPLICATIONS

The purpose of this study was to advance the literature on knowledge as a strategic resource in marketing functions. Our specific focus is on supply chains, with the inclusion of the marketing-specific functions of logistics and supply management (purchasing). Two research questions guided our study: What are the strategically important knowledge constructs and how are they integrated to shape important outcomes in different strategy-focused supply chains? Based on previous strategic marketing thought (e.g., Walker and Ruekert 1987), we studied knowledge-based supply

chain fit with strategic type and its relationship with supply chains' competitive priorities. The profile deviation predictor, together with size and age of the organization as control variables, explained between 8 and 38 percent of the variance in the performance variables. These values are similar to other configuration studies in marketing (e.g., Vorhies and Morgan 2003) and management (e.g., Doty, Glick, and Huber 1993). Strategic choice theory (e.g., Child 1972), the resource-based view (e.g., Wernerfelt 1984), and configuration theory (e.g., Miller 1997) served as the foundation for the integration of strategy types, knowledge elements, and assessment method. A number of interesting findings and implications were found for each of the strategy types (i.e., prospectors, analyzers, low-cost defenders, differentiated defenders, and reactors).

Prospectors

In the analyses of the prospector strategy type, we find that the knowledge-based profile deviation predictor was significant in each of the regression models (i.e., where speed, quality, cost, flexibility, and the combined SQCF effect were criterion variables). The profile deviation predictor, together with size and age of the organization as control variables (neither was significant in any of the equations), explained between 14 and 20 percent of the variance in the performance variables. In examining the ideal knowledge profiles in Table 4, we find two knowledge constructs that universally drive competitive-priority performance: organizational memory and knowledge intensity. Additionally, responsiveness appears influential in the majority of the cases, including the combined SQCF model (i.e., quality, flexibility, and the combined SQCF effect). Thus, in the strategic role signified by being first to adopt new supply chain concepts, use new supply chain tools, push performance boundaries, and always have innovative practices (e.g., Dell), these *prospector-based supply chains* rely on the chain's achieved level of knowledge, experience, and familiarity with supply chain operations as well as always advocating a high degree of knowledge throughout the chain to achieve a competitive advantage. Product-specific action, although

secondary to organizational memory and knowledge intensity, is also critical in many instances to achieve success.

Analyzers

In the examination of the analyzer strategy type, we find that the knowledge-based profile deviation predictor is significant in each of the regression models (i.e., where speed, quality, cost, flexibility, and the combined SQCF effect were criterion variables). The profile deviation predictor, together with size and age of the organization as control variables (age was significant in three of the five equations), explained between 10 and 17 percent of the variance in the performance variables. In examining the ideal knowledge profiles in Table 4, we found two knowledge constructs that universally drive competitive-priority performance: knowledge use and responsiveness. Additionally, quality of knowledge appears influential in the majority of the cases, including the combined SQCF model (i.e., quality, flexibility, and the combined SQCF effect). Thus, in the strategic role signified by seldom being first to implement new supply chain practices, infrequently adopt new supply chain tools, monitoring supply chain activity to implement a better strategy than the first-movers in the marketplace (e.g., Panasonic), these *analyzer-based supply chains* rely on an efficient and effective application of knowledge to solve a particular problem or a make a particular decision coupled with product-specific action taken as a direct functioning of the knowledge that they have generated and disseminated in the supply chain. The immediate relevance, accuracy, reliability, and timeliness of knowledge provided in the supply chain are also critical in many instances to achieve success.

Low-Cost Defenders

In the analyses of the low-cost-defender strategy type, we find that the knowledge-based profile deviation predictor was significant in each of the regression models (i.e., where speed, quality, cost, flexibility, and the combined SQCF effect were criterion variables). The profile

deviation predictor, together with size and age of the organization as control variables (age was significant in all five equations), explained between 8 and 28 percent of the variance in the performance variables. In examining the ideal knowledge profiles in Table 4, we found two knowledge constructs that universally drive competitive-priority performance: knowledge use and responsiveness. Additionally, organizational memory appears influential in the majority of the cases, including the combined SQCF model (i.e., speed, quality, cost, and the combined SQCF effect). Thus, in the strategic role signified by maintaining a relatively stable domain, rarely being in the forefront in supply chain development, implementing their current supply chain activities as cost efficiently as possible (e.g., Wal-Mart), these *low-cost-defender supply chains*, like their analyzer counterparts, rely on the direct application of knowledge to solve a particular problem or to make a decision together with product-specific action taken as a functioning of the knowledge processing that has taken place in the supply chain. Unlike analyzers, which also focuses on quality of knowledge to gain a competitive edge, low-cost defenders also heavily stress their experiences with supply chain operations to achieve success.

Differentiated Defenders

In the examination of the differentiated-defender strategy type, we find that the knowledge-based profile deviation predictor was significant in four of the regression models (i.e., where quality, cost, flexibility, and the combined SQCF effect were criterion variables). However the profile predictor was not significant in the “speed” model, and the regression equation was not significant for the “quality” model. For the remaining three equations (cost, flexibility, and the combined SQCF effect), the profile deviation predictor, together with size and age of the organization as control variables (neither was significant in the three equations but size was significant in the “speed” equation), explained between 25 and 38 percent of the variance in the performance variables. In examining the ideal knowledge profiles in Table 4, we found a wide

range of knowledge focuses depending on which competitive priority was studied. Knowledge use and responsiveness appeared to be the most universally based constructs that drive performance. However, organizational memory and quality of knowledge also play a significant role. Thus, in the strategic role signified by maintaining a relatively stable domain by aggressively protecting their supply chain practices, rarely being in the forefront of supply chain development, and taking advantage of elements that they do particularly well (e.g., United States Postal Service), these *differentiated defender-based supply chains* rely on a combination of experience, high quality knowledge, and the use of specific knowledge to solve a particular supply chain problem, while also taking very product-specific actions.

Reactors

In the examination of the reactor strategy type, we find that the knowledge-based profile deviation predictor was significant in three of the regression models (i.e., where quality, cost, and the combined SQCF effect were criterion variables). For the three significant scenarios, the profile deviation predictor, together with size and age of the organization as control variables (size was significant in two of the equations), explained between 16 and 30 percent of the variance in the performance variables. In examining the ideal knowledge profiles in Table 4, we found one knowledge constructs that universally drive competitive-priority performance: responsiveness. Additionally, organizational memory and quality of knowledge appear influential in the majority of the cases, including the combined SQCF model (i.e., speed, cost, and the combined SQCF effect). Although reactor-based supply chains typically do not have a consistent strategy and primarily act in response to competitive or other supply chain pressures in the short-term (e.g., Enron), high-performing *reactor-based supply chains* stress product-specific actions taken as a functioning of the knowledge that has been generated and disseminated in the supply chain to achieve success.

Additionally, reactors gain some advantage by their experiences as well as from quality knowledge

that they have obtained.

CONCLUSION

Marketing functions in supply chains are increasingly important to organizations, but the literature offers little insight into what distinguishes effective and ineffective chains. This study offers an important step toward closing the gap between what we know about supply chains and what we need to know. Our model drew on three theoretical traditions (i.e., strategic choice theory, configuration theory, and the resource-based view) to guide our identification of high performing supply chains implementing a given strategy. These high performers were used to calibrate all other cases relative to these ideal profiles. Nine knowledge characteristics were identified as critical in the formation of a multiple, interdependent, and mutually reinforcing supply chain profile that can be used to create an ideal, unique *strategic knowledge resource*. These are: memory, tacitness, prioritizing, accessibility, quality, use, intensity, responsiveness, and learning capability. Looking to the future, recent trends suggest that organizations will increasingly look to supply chain management as a tool to increase effectiveness. If so, our results suggest that knowledge management will play a key role in the relative success of these supply chain initiatives.

REFERENCES

- Amburgey, Terry L. and Hayagreeva Rao (1996), "Organizational Ecology: Past, Present, and Future Directions," *Academy of Management Journal*, 39 (5), 1265-1286.
- Anderson, James C. (1987), "An Approach for Confirmatory Measurement and Structural Equation Modeling of Organizational Properties," *Management Science*, 33 (April), 525-541.
- Anderson, James C. and David W. Gerbing (1988), "Some Methods for Respecifying Measurement Models to Obtain Unidimensional Construct Measurement," *Journal of Marketing Research*, 19 (November), 453-460.
- Anderson, John C., Gary Cleveland, and Roger G. Schroeder (1989), "Operations Strategy: A Literature Review," *Journal of Operations Management*, 8 (2), 133-158.
- Armstrong, J. Scott and Terry S. Overton (1977), "Estimating Nonresponse Bias in Mail Surveys," *Journal of Marketing Research*, 14 (August), 396-402.
- Autio, Erkkö, Harry J. Sapienza, and James G. Almeida (2000), "Effects of Age at Entry, Knowledge Intensity, and Imitability on International Growth," *Academy of Management Journal*, 43 (5), 909-924.
- Bagozzi, Richard P. and Lynn W. Phillips (1982), "Representing and Testing Organizational Theories: A Holistic Construal," *Administrative Science Quarterly*, 27 (September), 459-489.
- Barney, Jay B. (1991), "Firm Resources and Sustained Competitive Advantage," *Journal of Management*, 17 (1), 99-120.
- Baum, J. (1996), "Organizational Ecology," in *Handbook of Organizational Studies*, S. Clegg, C. Hardy and W. Nord, Eds., London: Sage Publications, 77-114.
- Bentler, Peter M. (1990), "Comparative Fit Indexes In Structural Equation Modeling," *Psychological Bulletin*, 107, 238-246.
- Bharadwaj, Sundar G., P. Rajan Varadarajan, and John Fahy (1993), "Sustainable Competitive Advantage in Service Industries: A Conceptual Model and Research Propositions," *Journal of Marketing*, 57 (October), 83-99.
- Bollen, Kenneth A. (1989), *Structural Equations with Latent Variables*, New York: Wiley & Sons.
- Boyer, Kenneth K. and Marianne W. Lewis (2002), "Competitive Priorities: Investigating the Need for Trade-offs in Operations Strategy," *Production and Operations Management*, 11 (1), 9-20.
- Boyer, Kenneth K. and Mark Pagell (2000), "Measurement Issues in Empirical Research: Improving Measures of Operations Strategy and Advanced Manufacturing Technology," *Journal of Operations Management*, 18 (3), 361-374.

Cannon, Joseph P. and Christian Homburg (2001), "Buyer-Seller Relationships and Customer Firm Costs," *Journal of Marketing*, 65 (January), 29-43.

Carter, Joseph R. and Ram Narasimhan (1996), "Supply management and Supply Management: Future Directions and Trends," *International Journal of Supply management and Materials Management*, 32 (Fall), 2-12.

Chi, Tailan (1994), "Trading in Strategic Resources: Necessary Conditions, Transaction Cost Problems, and Choice of Exchange Conditions," *Strategic Management Journal*, 15 (4), 271-290.

Child, John (1972), "Organizational Structure, Environment, and Performance: The Role of Strategic Choice," *Sociology*, 6, 1-22.

Conant, Jeffrey S., Michael P. Mokwa, and P. Rajan Varadarajan (1990), "Strategic Types, Distinctive Marketing Competencies, and Organizational Performance: A Multiple Measures-Based Study," *Strategic Management Journal*, 11 (5), 365-383.

Deshpandé, Rohit and Gerald Zaltman (1982), "Factors Affecting the Use of Market Research Information: A Path Analysis," *Journal of Marketing Research*, 19 (May) 14-31.

Doty, D. Harold, William H. Glick, and George P. Huber (1993), "Fit, Equifinality, and Organizational Effectiveness: A Test of Two Configurational Theories," *Academy of Management Journal*, 30 (December), 1196-1250.

Drazin, Robert and Andrew H. Van de Ven (1985), "Alternative Forms of Fit in Contingency Theory," *Administrative Science Quarterly*, 30 (December), 514-539.

Farhoomand, Ali F. and Pauline Ng (2000), *FedEx Corp.: Structural Transformation Through e-Business*, Harvard Business School Case Collection.

Fornell, Claes and David F. Larcker (1981), "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error," *Journal of Marketing Research*, 18 (February), 39-50.

Grant, Robert M. (1996), "Toward a Knowledge-Based Theory of the Firm," *Strategic Management Journal*, 17 (Winter Special Issue), 109-122.

Gresov, Christopher (1989), "Exploring Fit and Misfit with Multiple Contingencies," *Administrative Science Quarterly*, 34 (September), 431-453.

Handfield, Robert B. and Ernest L. Nichols, Jr. (2003), *Supply Chain Redesign: Transforming Supply Chains into Integrated Value Systems*, Upper Saddle River, NJ: Prentice-Hall, Inc.

Hayes, Robert H. and Steven C. Wheelwright (1984), *Restoring Our Competitive Edge: Competing Through Manufacturing*, New York: John Wiley & Sons.

Homburg, Christian, John P. Workman, Jr., and Harley Krohmer (1999), "Marketing's Influence Within the Firm," *Journal of Marketing*, 63 (April), 1-17.

Hu, Li-tze and Peter M. Bentler (1999), "Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives," *Structural Equation Modeling*, 6 (1), 1-55.

Huber, George P. (1991), "Organizational Learning: The Contributing Processes and the Literatures," *Organization Science*, 2 (February), 88-115.

Hult, G. Tomas M., Robert F. Hurley, Larry C. Giunipero, and Ernest L. Nichols, Jr. (2000), "Organizational Learning in Global Purchasing: A Model and Test of Internal Users and Corporate Buyers," *Decision Sciences*, 31 (2), 293-325.

Hult, G. Tomas M., David J. Ketchen, Jr., S. Tamer Cavusgil, and Roger J. Calantone (2006), "Knowledge as a Strategic Resource in Supply Chains," *Journal of Operations Management*, 24 (5), 458-475.

Hult, G. Tomas M., David J. Ketchen, Jr., and Ernest L. Nichols, Jr. (2002), "An Examination of Cultural Competitiveness and Order Fulfillment Cycle Time within Supply Chains," *Academy of Management Journal*, 45 (3), 577-586.

Hurley, Robert F. and G. Tomas M. Hult (1998), "Innovation, Market Orientation, and Organizational Learning: An Integration and Empirical Examination," *Journal of Marketing*, 62 (July), 42-54.

Jaccard, James and Robert Turrissi (2003), *Interaction Effects in Multiple Regression* (2nd Edition), Sage Publishing, Newbury Park California.

Jensen, Michael C. and William H. Meckling (1992), "Specific and General Knowledge and Organization Structure," In *Contract Economics*, Lars Werin and Hans Wijkander, Eds., Oxford: Blackwell, pp. 251-274.

Jöreskog, Karl G., Dag Sörbom, Stephen Du Toit, and Mathilda Du Toit (2000), *LISREL 8: New Statistical Features* (2nd Edition), Chicago, IL: Scientific Software International, Inc.

Ketchen, David J., Jr., James B. Thomas, and Charles C. Snow (1993), "Organizational Configurations and Performance: A Comparison of Theoretical Approaches," *Academy of Management Journal*, 36 (6), 1278-1313.

Klassen, R.D. and J. Jacobs (2001), "Experimental Comparison of Web, Electronic and Mail Survey Technologies in Operations Management," *Journal of Operations Management*, 19 (6), 713-728.

Kohli, Ajay K., Bernard J. Jaworski, and Ajith Kumar (1993), "MARKOR: A Measure of Market Orientation," *Journal of Marketing Research*, 15 (November), 467-477.

Li, George and S. Rajagopalan (1999), "Process Improvement, Quality, and Learning Effects," *Management Science*, 44 (11), 1517-1532.

- Low, George S. and Jakki J. Mohr (2001), "Factors Affecting the Use of Information in the Evaluation of Marketing Communication Productivity," *Journal of the Academy of Marketing Science*, 29 (1), 70-88.
- Mabert, Vincent A. and M.A. Venkataramanan (1998), "Special Research Focus on Supply Chain Linkages: Challenges for Design and Management in the 21st Century," *Decision Sciences*, 29 (3), 537-552.
- Matsuno, Ken and John T. Mentzer (2000), "The Effects of Strategy Type on the Market Orientation – Performance Relationship," *Journal of Marketing*, 64 (October), 1-16.
- Marquardt, Michael J. and Angus Reynolds (1994), *The Global Learning Organization: Gaining Competitive Advantage Through Continuous Learning*, Burr Ridge, IL: Richard D. Irwin, Inc.
- McDonald, Roderick P. and Herbert W. Marsh (1990), "Choosing a Multivariate Model: Noncentrality and Goodness of Fit," *Psychological Bulletin*, 107 (2), 247-255.
- Mackenzie, Kenneth D. (2000), "Processes and Their Frameworks," *Management Science*, 46 (1), 110-125.
- McKone, Kathleen E., Roger G. Schroeder, and Kristy O. Cua (2001), "The Impact of Total Productive Maintenance Practices on Manufacturing Performance," *Journal of Operations Management*, 19 (1), 39-58.
- Mentzer, John T., Daniel J. Flint, and G. Tomas M. Hult (2001), "Logistics Service Quality as a Segment-Customized Process," *Journal of Marketing*, 65 (October), 82-104.
- Meyer, Alan D., Anne S. Tsui, and C.R. Hinings (1993), "Configurational Approaches to Organizational Analysis," *Academy of Management Journal*, 30 (December), 1175-1195.
- Miles, Raymond E. and Charles C. Snow (1978), *Organizational Strategy, Structure, and Process*, New York: McGraw-Hill.
- Miller, Danny (1997), "Configurations Revisited," *Strategic Management Journal*, 13 (Summer), 111-125.
- Moorman, Christine (1995), "Organizational Market Information Processes: Cultural Antecedents and New Product Outcomes," *Journal of Marketing Research*, 32 (August), 318-335.
- Moorman, Christine and Anne S. Miner (1997), "The Impact of Organizational Memory on New Product Performance and Creativity," *Journal of Marketing Research*, 34 (February), 91-106.
- Niraj, Rakesh, Mahendra Gupta, and Chakravarthi Narasimhan (2001), "Customer Profitability in a Supply Chain," *Journal of Marketing*, 65 (July), 1-16.
- Noble, Margaret A. (1995), "Manufacturing Strategy: Testing the Cumulative Model in a Multiple Country Context," *Decision Sciences*, 26 (5), 693-721.

Nonaka, Ikujiro (1994), "A Dynamic Theory of Organizational Knowledge Creation," *Organization Science*, 5 (1), 14-37.

O'Reilly, Charles A., III (1982), "Variations in Decision Makers' Use of Information Sources: The Impact of Quality and Accessibility of Information," *Academy of Management Journal*, 25 (4), 756-771.

Penrose, Edith T. (1959), *The Theory of the Growth of the Firm*, New York: Wiley.

Podsakoff, Philip M. and Dennis W. Organ (1986), "Self-Reports in Organizational Research: Problems and Prospects," *Journal of Management*, 12 (4), 531-544.

Simon, Herbert A. (1991), "Bounded Rationality and Organizational Learning," *Organization Science*, 2 (February), 125-134.

Simonin, Bernard (1999), "Ambiguity and the Process of Knowledge Transfer in Strategic Alliances," *Strategic Management Journal*, 20 (7), 595-623.

Sinkula, James M. (1994), "Market Information Processing and Organizational Learning," *Journal of Marketing*, 58 (January), 35-45.

Slater, Stanley F. and John C. Narver (1995), "Market Orientation and the Learning Organization," *Journal of Marketing*, 59 (July), 63-74.

Slater, Stanley F. and Eric M. Olson (2000), "Strategy Type and Performance: The Influence of Sales Force Management," *Strategic Management Journal*, 21 (8), 813-830.

Steiger, J.H. and J.C. Lind (1980), "Statistically Based Tests for the Number of Common Factors," paper presented at the annual meeting of the Psychometric Society, Iowa City, IA.

Szwejczewski, Marek, John Mapes, and Colin New (1997), "Delivery and Trade-Offs," *International Journal of Production Economics*, 53 (3), 323-330.

Tucker, L.R. and C. Lewis (1973), "A Reliability Coefficient for Maximum Likelihood Factor Analysis," *Psychometrika*, 38, 1-10.

Upton, David M. (1995), "What Really Makes Factories Flexible?" *Harvard Business Review*, 73 (4), 74-84.

Venkatesh, R., Ajay K. Kohli, and Gerald Zaltman (1995), "Influence Strategies in Buying Centers," *Journal of Marketing*, 59 (October), 71-82.

Venkatraman, N. (1989), "The Concept of Fit in Strategy Research: Toward Verbal and Statistical Correspondence," *Academy of Management Review*, 14 (3), 423-444.

Venkatraman, N. (1990), "Performance Implications of Strategic Coalignment: A Methodological Perspective," *Journal of Management Studies*, 27 (1), 19-41.

Venkatraman, N. and John C. Camillus (1984), "Exploring the Concept of 'Fit' In Strategic Management Research," *Academy of Management Review*, 9 (3), 513-525.

Venkatraman, N. and John E. Prescott (1990), "Environment-Strategy Coalignment: An Empirical Test of Its Performance Implications," *Strategic Management Journal*, 11 (January), 1-23.

Vorhies, Douglas W. and Neil A. Morgan (2003), "A Configuration Theory Assessment of Marketing Organization Fit with Business Strategy and Its Relationship with Marketing Performance," *Journal of Marketing*, 67 (January), 100-115.

Walker, Orville C. and Robert W. Ruekert (1987), "Marketing's Role in the Implementation of Business Strategies: A Critical Review and Conceptual Framework," *Journal of Marketing*, 51 (3), 15-33.

Ward, Peter T., John K. McCreery, Larry P. Ritzman, and Deven Sharma (1998), "Competitive Priorities in Operations Management," *Decision Sciences*, 29 (4), 1035-1046.

Wernerfelt, Birger (1984), "A Resource-Based View of the Firm," *Strategic Management Journal*, 5, 171-180.

Werts, C.E., R.I. Linn, and Karl G. Jöreskog (1974), "Interclass Reliability Estimates: Testing Structural Assumptions," *Educational and Psychological Measurement*, 34, 25-33.

Youndt, Mark A., Scott A. Snell, James W. Dean, and David P. Lepak (1996), "Human Resource Management: Manufacturing Strategy, and Firm Performance," *Academy of Management Journal*, 39 (4), 836-866.

Zajac, Edward J., Mathew S. Kraatz, and Rudi K. F. Bresser (2000), "Modeling the Dynamics of Strategic Fit: A Normative Approach to Strategic Change," *Strategic Management Journal*, 21 (4), 429-453.

Zander, Udo and Bruce Kogut (1995), "Knowledge and the Speed of the Transfer and Imitation of Organizational Capabilities: An Empirical Test," *Organization Science*, 6 (1), 76-92.

TABLE 1
Correlations (n=913)

	OM	TK	KP	AOK	QOK	KU	KI	R	LC	S	Q	C	F	Size	Age
OM	1.0														
TK	.44	1.0													
KP	.36	.42	1.0												
AOK	.62	.52	.49	1.0											
QOK	.62	.48	.53	.75	1.0										
KU	.48	.41	.42	.53	.63	1.0									
KI	.66	.53	.52	.63	.73	.58	1.0								
R	.31	.36	.33	.38	.41	.38	.35	1.0							
LC	.42	.43	.48	.43	.48	.42	.50	.35	1.0						
S	.29	.36	.34	.38	.41	.33	.39	.35	.36	1.0					
Q	.35	.36	.46	.37	.44	.38	.44	.42	.40	.67	1.0				
C	.35	.39	.43	.41	.48	.35	.45	.35	.37	.62	.66	1.0			
F	.33	.39	.40	.40	.44	.42	.44	.38	.42	.63	.66	.63	1.0		
Size	.01	.03	-.04	-.05	-.05	.01	.00	-.04	-.04	-.07	-.02	-.05	-.04	1.0	
Age	-.09	-.05	.01	-.04	-.04	-.00	-.12	-.03	-.07	-.10	.01	-.08	-.09	.23	1.0

All correlations above .09 are significant at the p<.05 level.

Labels:

OM = organizational memory

TK = tacitness of knowledge

KP = knowledge prioritizing

AOK = accessibility of knowledge

QOK = quality of knowledge

KU = knowledge use

KI = knowledge intensity

R = responsiveness

LC = learning capacity

S = speed of logistics process

Q = quality of logistics process

C = cost of logistics process

F = flexibility of logistics process

Size = size of the organization (in number of people)

Age = age of the organization (in years)

TABLE 2
Basic Statistics and Confirmatory Factor Analysis Results (n=913)

Variable	Mean	Standard Deviation	Variance Extracted	Composite Reliability	Coefficient Alpha	Factor Loadings
OM	5.22	1.25	74.3%	.92	.90	.64 to .94
TK	3.65	1.28	76.5%	.85	.83	.65 to .89
KP	4.61	1.20	67.9%	.94	.94	.72 to .87
AOK	4.77	1.38	82.0%	.93	.92	.88 to .95
QOK	4.93	1.20	77.6%	.95	.94	.81 to .93
KU	5.27	1.02	65.4%	.93	.89	.71 to .85
KI	4.58	1.52	90.3%	.93	.94	.85 to .93
R	5.51	1.04	88.5%	.88	.84	.80 to .97
LC	4.64	1.35	80.3%	.92	.91	.83 to .94
S	4.78	1.11	55.3%	.78	.78	.51 to .84
Q	4.80	1.13	66.0%	.85	.86	.65 to .89
C	4.40	1.14	62.0%	.83	.83	.58 to .90
F	4.52	1.16	69.0%	.87	.88	.65 to .92
Fit Statistics						
χ^2			8,192.3			
Degrees of Freedom			1,002			
DELTA2			.95			
RNI			.95			
CFI			.95			
TLI			.95			
RMSEA			.09			

TABLE 3
Knowledge-Based Supply Chain Profile Fit with
Strategic Type and Performance: Standardized Regression Results

<u>Predictor Variables</u>	<u>Competitive Priority (Criterion Variable)</u>				$\Sigma(S,Q,C,F)^1$
	Speed	Quality	Cost	Flexibility	
Prospectors					
KB-SC Profile Deviation ²	-.46***	-.42***	-.38***	-.36***	-.43***
Size of Organization (log)	.03	.06	-.02	-.03	.03
Age of Organization (log)	-.10	.09	-.01	.07	-.02
R ²	.18	.20	.14	.14	.19
F-value	6.35***	5.90***	3.61**	3.68**	4.93***
Analyzers					
KB-SC Profile Deviation ²	-.39***	-.33***	-.27***	-.34***	-.36***
Size of Organization (log)	-.11	-.01	-.12	-.09	-.13
Age of Organization (log)	.17*	.12	.17*	.14	.22**
R ²	.15	.13	.10	.13	.17
F-value	7.48***	6.23***	4.98***	6.68***	8.33***
Low-Cost Defenders					
KB-SC Profile Deviation ²	-.22**	-.42***	-.42***	-.36***	-.50***
Size of Organization (log)	-.06	-.07	.06	.06	.01
Age of Organization (log)	-.20**	-.17*	-.23**	-.27***	-.25***
R ²	.08	.20	.18	.15	.28
F-value	3.04**	8.80***	7.77***	5.92***	13.27***
Differentiated Defenders					
KB-SC Profile Deviation ²	-.27	-.38**	-.42**	-.64***	-.54***
Size of Organization (log)	.31*	.06	.14	-.10	.09
Age of Organization (log)	-.27	.01	-.18	.11	-.13
R ²	.22	.15	.25	.38	.36
F-value	2.74*	1.59	2.93**	5.87***	4.62**
Reactors					
KB-SC Profile Deviation ²	-.27*	-.47**	-.30*	-.12	-.44**
Size of Organization (log)	-.18	-.17	-.23	-.50***	-.29**
Age of Organization (log)	.01	.18	-.07	-.08	.03
R ²	.11	.27	.16	.26	.30
F-value	1.49	4.64***	2.35*	4.14***	4.95**

¹ $\Sigma(S,Q,C,F)$ = summated scale of 1/4(speed + quality + cost + flexibility)

²KB-SC Profile Deviation = knowledge-based supply chain profile deviation

* p<.10
** p<.05
*** p<.01

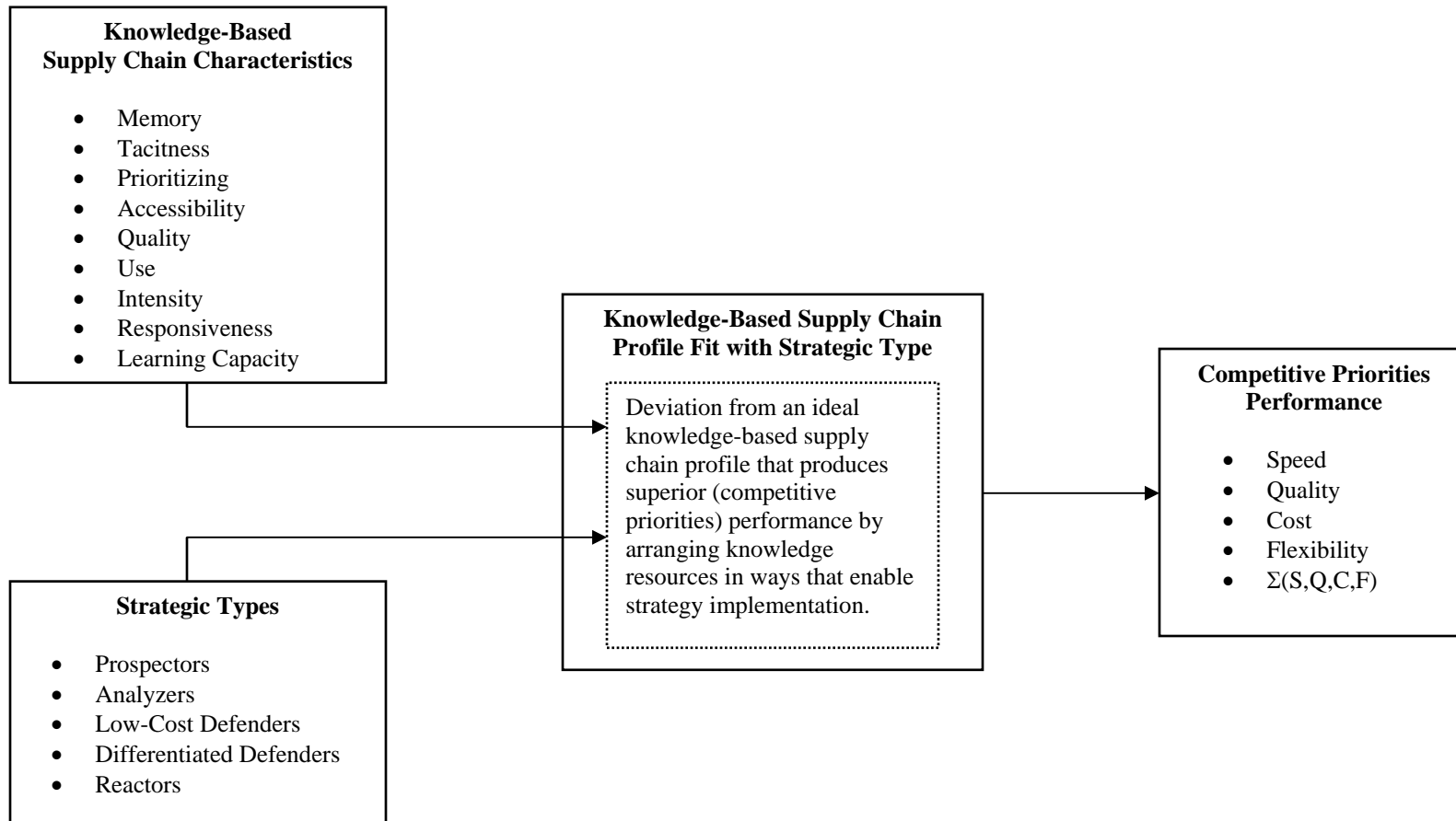
TABLE 4
Ideal Mean Scores of Knowledge-Based Supply Chain Profiles

<u>KB-SCM Characteristics</u>	<u>Competitive Priority</u>					$\Sigma(S,Q,C,F)$
	Speed	Quality	Cost	Flexibility		
Prospectors						
Organizational Memory	6.50	6.47	6.61	6.55	6.50	6.50
Tacitness of Knowledge	6.00	5.09	5.19	5.28	5.28	5.28
Knowledge Prioritizing	6.61	6.00	5.29	5.89	5.88	5.88
Accessibility of Knowledge	6.11	6.00	6.40	6.13	6.00	6.00
Quality of Knowledge	6.13	6.20	6.20	6.12	6.18	6.18
Knowledge Use	6.09	6.06	6.06	5.92	5.94	5.94
Knowledge Intensity	6.78	6.50	6.62	6.63	6.63	6.63
Responsiveness	6.11	6.41	6.29	6.37	6.33	6.33
Learning Capacity	5.50	5.96	5.97	5.64	5.57	5.57
Analyzers						
Organizational Memory	5.68	5.60	6.00	5.90	5.53	5.53
Tacitness of Knowledge	4.72	4.12	4.14	4.44	4.33	4.33
Knowledge Prioritizing	5.52	5.44	5.66	5.65	5.44	5.44
Accessibility of Knowledge	5.45	5.16	5.70	5.42	5.06	5.06
Quality of Knowledge	5.52	5.69	5.83	5.90	5.57	5.57
Knowledge Use	5.95	5.76	6.04	6.21	5.75	5.75
Knowledge Intensity	5.53	5.53	5.91	5.58	5.38	5.38
Responsiveness	5.98	6.24	5.91	6.33	6.27	6.27
Learning Capacity	5.66	5.17	5.34	5.44	5.28	5.28
Low-Cost Defenders						
Organizational Memory	5.58	5.69	5.43	5.15	5.75	5.75
Tacitness of Knowledge	3.36	3.83	4.05	3.40	4.08	4.08
Knowledge Prioritizing	4.48	4.82	4.79	5.68	5.08	5.08
Accessibility of Knowledge	4.74	5.07	5.12	5.33	5.50	5.50
Quality of Knowledge	5.27	5.44	5.42	5.16	5.70	5.70
Knowledge Use	5.33	5.93	5.52	6.17	5.91	5.91
Knowledge Intensity	4.78	5.40	4.85	4.53	5.33	5.33
Responsiveness	6.11	6.41	6.18	6.47	6.25	6.25
Learning Capacity	4.89	4.94	5.11	5.44	5.38	5.38
Differentiated Defenders						
Organizational Memory	4.81	5.33	5.50	5.80	5.69	5.69
Tacitness of Knowledge	3.94	3.96	4.94	4.95	5.06	5.06
Knowledge Prioritizing	5.04	4.64	5.21	4.89	5.36	5.36
Accessibility of Knowledge	4.42	4.72	5.92	5.33	5.50	5.50
Quality of Knowledge	5.40	5.07	5.95	5.76	6.15	6.15
Knowledge Use	5.50	5.33	5.92	5.83	5.67	5.67
Knowledge Intensity	5.08	4.56	5.25	5.00	5.00	5.00
Responsiveness	5.75	6.33	6.42	5.53	6.00	6.00
Learning Capacity	5.31	5.08	5.63	5.35	5.44	5.44

TABLE 4 Continued
Ideal Mean Scores of Knowledge-Based Supply Chain Profiles

<u>KB-SCM Characteristics</u>	<u>Competitive Priority</u>				$\Sigma(S,Q,C,F)$
	Speed	Quality	Cost	Flexibility	
Reactors					
Organizational Memory	4.60	5.00	4.45	3.63	5.20
Tacitness of Knowledge	3.40	3.06	3.05	2.31	3.15
Knowledge Prioritizing	4.54	5.05	3.91	3.14	4.93
Accessibility of Knowledge	3.87	3.58	3.87	2.83	4.20
Quality of Knowledge	5.12	5.50	3.68	3.75	5.04
Knowledge Use	4.77	4.83	4.30	4.50	4.90
Knowledge Intensity	4.07	3.92	2.93	2.67	3.53
Responsiveness	4.58	5.33	5.13	4.67	4.93
Learning Capacity	4.95	4.75	4.90	3.38	5.25

FIGURE 1
Knowledge-Based Supply Chain Fit with Strategic Type and Its Relationship with Competitive Priorities Performance



APPENDIX

Measures and Sources¹

Strategy Types (Based on work by Miles and Snow 1978 and Walker and Ruekert 1987; Descriptions adapted from Doty, Glick, and Huber 1993 and Slater and Olson 2000). The word “logistics” in the statements below was replaced with “supply management” in the supply management survey.

Prospector Strategy

These organizations are frequently the first to adopt new logistics concepts. They do not hesitate to use new logistics tools where there appears to be an opportunity. These organizations concentrate on logistics tools that push performance boundaries. Their proposition is to always have the most innovative logistics practices, whether based on substantial performance improvement or cost reduction.

Analyzer Strategy

These organizations are seldom first to implement new logistics practices or to adopt new logistics tools. However, by monitoring logistics activity, they can be early-followers with a better logistics strategy, increased user benefits, or lower total costs.

Low-Cost Defender Strategy

These organizations attempt to maintain a relatively stable domain by aggressively protecting their logistics practices. They rarely are at the forefront of logistics development. Instead they focus on implementing their current logistics activities as efficiently as possible. These organizations generally focus on lowering the cost of their existing logistics practices.

Differentiated Defender Strategy

These organizations attempt to maintain a relatively stable domain by aggressively protecting their logistics practices. They rarely are at the forefront of logistics development. Instead they focus on implementing their current logistics activities by taking advantage of elements that they do particularly well. The cost of their logistics practices is typically higher than the industry average.

Reactor Strategy

These organizations do not seem to have a consistent logistics strategy. They primarily act in response to competitive or other logistics pressures in the short-term.

Organizational Memory (Adapted from Moorman and Miner 1997)

We have a great deal of knowledge about logistics.

We have a great deal of experience with logistics.

We have a great deal of familiarity with logistics.

We have invested a great deal of research and development related to logistics.

Tacitness of Knowledge (Items 1 to 4 are adapted from Zander and Kogut 1995; item 5 is new based on Simonin 1999)

A useful manual describing our logistics activities can be written for new employees. <R>

We have extensive documentation describing our logistics activities for new employees. <R>

New personnel can easily learn our logistics activities by talking to skilled workers. <R>³

Training new logistics personnel is a quick and easy job. <R>

New personnel can easily identify the knowledge needed to perform our logistics activities. <R>

Knowledge Prioritizing (New scale based on Huber 1991 and Moorman 1995)

We filter logistics knowledge into levels of importance in our organization.

We filter logistics knowledge into levels of importance in our unit.

We filter logistics knowledge into levels of importance across units.

We filter logistics knowledge into levels of importance for our activities.

We filter logistics knowledge into levels of importance to reduce its complexity.

We filter logistics knowledge into levels of importance to share it in meaningful ways.

We filter logistics knowledge into levels of importance to effectively share it in our organization.

APPENDIX (Continued) Measures and Sources¹

Accessibility of Knowledge (Based on O'Reilly 1982)

Knowledge that exists in our organization is readily available to assist in making our logistics decisions.
Logistics knowledge contained in our organization is easily accessible when needed.
On the average, it is easy to obtain logistics knowledge from key people in this organization.

Quality of Knowledge (Adapted from O'Reilly 1982)

The logistics knowledge we have is very accurate.
The logistics knowledge we have is very reliable.
The logistics knowledge we have is very relevant to our needs.
The logistics knowledge we have is very specific to our needs.³
The logistics knowledge we have is exactly what we need.
The logistics knowledge we have is very useful.

Knowledge Use (Adapted from Deshpandé and Zaltman 1982)

Our existing knowledge enriched the basic understanding of our latest logistics activity.
Our latest logistics activity would have been very different if the existing knowledge had not been available.⁴
Our existing knowledge reduced the uncertainty of our latest logistics activity.
Our existing knowledge identified aspects of our latest logistics activity that would otherwise have gone unnoticed.
We used our existing knowledge to make specific decisions for our latest logistics activity.
Without our existing knowledge, our latest logistics decision would have been very different.

Knowledge Intensity (Adapted from Autio, Sapienze, and Almeida 2000)

We have a strong reputation for having cutting-edge knowledge about logistics.
Knowledge intensity is a characteristic of our logistics practices.
There is a strong knowledge component in our logistics practices.

Responsiveness (Based on Kohli, Jaworski, and Kumar 1993)

We respond effectively to changes in a competitor's product offerings.³
We respond rapidly to changes in our customers' product needs.³
We periodically review our products to ensure that they are in line with our customers want.⁴
We rapidly attend to product complaints from our customers.
When we find out that our customers are unhappy with a product, we take corrective action immediately.
When we find out that our customers would like us to modify a product, we make a concerted effort to do so.³

Learning Capacity (New scale; item 1 is based on Hurley and Hult 1998; items 2-5 are motivated by Grant 1996)

The number of logistics suggestions implemented in our organization is greater than last year.³
The percentage of skilled logistics workers is greater than last year.⁴
The number of logistics individuals learning new skills is greater than last year.
The resources spent on learning have resulted in increased logistics productivity.
Our learning activities have resulted in better logistics performance than last year.

Process Outcomes (The process-outcome-framework of speed, quality, cost, and flexibility is based on work in operations management – e.g., Anderson, Cleveland, and Schroeder 1989; Boyer and Lewis 2002; Boyer and Pagell 2000; Hult, Ketchen, and Nichols 2002; McKone, Schroeder, and Cue 2001; Ward et al. 1998; Youndt et al. 1996)

Speed

The length of the order fulfillment process is getting shorter every time.
We have seen an improvement in the cycle time of the order fulfillment process recently.
We are satisfied with the speediness of the order fulfillment process.²
Based on our knowledge of the order fulfillment process, we think it is short and efficient.
The length of the order fulfillment process could not be much shorter than today.²

APPENDIX (Continued) Measures and Sources¹

Quality

The quality of the order fulfillment process is getting better every time.

We have seen an improvement in the quality of the order fulfillment process recently.

We are satisfied with the quality of the order fulfillment process.²

Based on our knowledge of the order fulfillment process, we think it is of high quality.

The quality of the order fulfillment process could not be much better than today.²

Cost

The cost associated with the order fulfillment process is getting better every time.

We have seen an improvement in the cost associated with the order fulfillment process recently.

We are satisfied with the cost associated with the order fulfillment process.²

Based on our knowledge of the order fulfillment process, we think it is cost efficient.

The cost associated with the order fulfillment process could not be much better than today.²

Flexibility

The flexibility of the order fulfillment process is getting better every time.

We have seen an improvement in the flexibility of the order fulfillment process recently.

We are satisfied with the flexibility of the order fulfillment process.²

Based on our knowledge of the order fulfillment process, we think it is flexible.

The flexibility of the order fulfillment process could not be much better than today.²

Notes:

¹ All items used a 7-point Likert-type scale ranging from “strongly disagree” to “strongly agree.” The word “logistics” was changed to “supply management” for the supply management sample (the term supply management was used instead of supply management given that the sponsoring organization, which used to be named the National Association of Supply management Management, recently changed name to the Institute of Supply Management)

² Item deleted after the exploratory factor analysis.

³ Item deleted after the item-level analysis across the logistics and supply management groups (i.e., an item was deleted if it were not robust across the logistics and supply management samples).

⁴ Item deleted after the item-level analysis across the five strategy types (i.e., an item was deleted if it were not robust across all five strategy types – prospectors, analyzers, low-cost defenders, differentiated defenders, and reactors).
