

LOGISTICS STRATEGIES AND COMPETITIVE ADVANTAGE

Thuong T. Le*

More firms are focusing their competitive strategies not on attaining cost leadership, through experience effects and scale economies, but rather on cultivating their core competence, forming strategic alliances and developing time-based advantage. Reflecting these strategic shifts, they increasingly redirect their logistics strategies away from the conventional emphasis on cost minimization and toward third-party services, logistics partnerships and turbo logistics. This article examines these logistics strategies within the context of an overall quest for competitive advantage.

In today's highly competitive environment, being cost efficient is essential but not, by itself, sufficient for the firm to remain competitive. The firm has to develop distinctive capabilities that form its core competence. Toward this end, it may outsource some operations that tie up resources but add little to its competitiveness and then refocuses these resources on enhancing its core competence. It should be ready to form strategic alliances with other firms so as to gain competitive capabilities it does not possess and cannot justify developing on its own. It should be quick to exploit time to its advantage by responding to environmental changes before competitors can react.

* Thuong T. Le is a Professor of Marketing in the College of Business Administration at the University of Toledo, Toledo, Ohio.

Logistics is the vital link between the firm and its markets and supply sources. It is an integral element of the firm's competitive strategy. Yet, "to understand the importance and changing role of logistics in any company, it is insufficient to state that logistics has an important strategic impact. Instead . . . one has to understand how the company's logistics activities contribute to creating a competitive advantage. To do this, logistics should be linked to the business strategy -- a linkage that is neither evident nor very well explored" (Persson, 1991). This article examines how a shift in competitive strategy has been translated into changes in logistics strategy, namely, a movement away from the conventional emphasis on total cost minimization toward utilization of third-party services, formation of logistics alliances and development of time-based capabilities. These strategies are widely discussed in academic literature but seldom analyzed within the broader context of competitive strategy. They will therefore be analyzed in this article from that angle. For each strategic choice, this article will highlight the firm's overall competitive thrust and corresponding operating philosophy. It will then show how logistics thrust, performance metric and business relationship reflect these overall strategic considerations.

CONVENTIONAL LOGISTICS

Pursuing Cost Leadership

Until around the early 1980s, cost leadership was widely considered as the key source of competitive advantage. Exploiting experience effects and scale economies to lower unit cost and to gain a competitive edge dominated strategic thinking. Cost leadership requires vigorous cost controls over all areas of operations. It favors worker and equipment specialization to increase productivity, long production runs to minimize the down time for machine setup and large production scales to lower unit production costs. For low-volume and customized or semi-customized products, it seeks scale economies further upstream. It uses, to the furthest

extent possible, standard parts and components that the firm holds in stock and assembles or modified into finished products according to customer order (Sharman, 1984).

The quest for cost leadership entails logistics cost minimization. After all, logistics constitutes a major cost component. Conventional logistics strategy seeks cost tradeoffs among logistics activities, e.g., higher freight cost (of faster modes of transportation) for larger cost savings in inventory and warehousing. It acknowledges the importance of superior customer service but, in practice, it seldom pursues cost-service tradeoffs. It generally assumes that logistics cost would rise faster than service improvements and the additional revenues from improved service would not justify the higher cost in most cases. It treats customer service as a constraint and strives for *total cost minimization, subject to maintaining a service level comparable to competitors* (Poist, 1986).

Maintaining Adversarial Buyer-Seller Relationships

Conventional logistics recognizes the firm as only a link in the supply chain. Logistics performance should theoretically be optimized on a system-wide basis. One major obstacle to such optimization is the adversarial relationships among channel members. The conventional view on competition treats suppliers and customers as two of the five forces competing against the firm (the other forces are direct rivals, new market entrants and substitute products). These forces would seek their gains at the firm's expenses (Porter, 1979).

Viewing suppliers as adversaries, the firm purchases materials and logistics services from many vendors and switches among them to gain price concessions. Theoretically, it should get lower prices for the purchased materials and services because rival vendors compete hard for its business. Buyer-seller relationships become transaction oriented and adversarial. Information flows between the firm and its vendors are limited. Each side is concerned that any information beyond the minimum

necessary for concluding and implementing a supply agreement can be used by the other side to weaken its bargaining position.

Adversarial relationships tend to justify investments in asset-intensive logistics activities, e. g., private warehousing and transportation. By bringing these logistics activities in-house, the firm can theoretically exercise tighter controls over them and thereby be assured of high service quality at a lower cost. In-house logistics capabilities also lessen its dependence on outside vendors and strengthen its bargaining position.

Overlooking Inefficiencies

The traditional quest for cost leadership creates many hidden inefficiencies, e. g., worker and equipment specialization reduces operating flexibility while long production runs need large buffer stocks. Although these practices may lower *direct* unit costs (e.g., labor cost and capital outlays per unit of output), they also reduce market responsiveness. Lead time stretches out because long production runs cannot respond quickly to market changes. Sale forecasts far into the future become less accurate; some products pile up inventories while others experience stockouts. Back orders and rush shipments increase. They crowd out shipping and production schedules and stretch out lead time even further, with adverse consequences on forecasting accuracy and inventories (Mather, 1984).

An adversarial business relationship also causes inefficiencies. It undermines quality control at supply sources and thereby requires quality inspection of incoming materials at points of delivery. Statistical sampling techniques are used for testing small samples of materials and to decide if an entire lot meets an acceptable quality standard. This means some defective materials can pass through the system, causing adverse effects on product quality, cost and cycle time.

THIRD PARTY LOGISTICS

Building the Core Competence

Since the early 1980s, successful market penetration by Asian firms has seriously challenged the conventional wisdom of attaining cost leadership through long production runs and large manufacturing scales. Through innovative practices such as just-in-time (JIT) manufacturing and total quality management (TQM), Japanese firms can produce a wide variety of products at low volumes and cut their unit costs simultaneously. Other firms from newly industrialized countries such as South Korea and Taiwan also disrupt Western firms' experience advantage by capitalizing on the low labor costs in their home countries.

In response, some Western firms seek quick relief from competition through offshore sourcing that allows them to avoid investments at home and to benefit from low labor costs abroad. They scale back their investments in manufacturing facilities and processes and eventually lose their expertise to design and ability to innovate. They no longer possess the key competencies necessary to adapt to market changes, to capitalize on emerging opportunities and to counter competitors' inroads (Markides and Berg, 1988).

Other firms try to leapfrog market leaders by implementing JIT, TQM and practices that have served leading competitors well. Their goal and efforts go beyond catching up. They cultivate a set of distinctive skills that sets them apart from their rivals and enables them to adapt quickly to market changes. These distinctive skills, or key competencies, form the core competence that involves harmonization of diverse functional skills and integration of multiple streams of technologies. It requires continuous improvements over many years or decades and cannot be readily imitated by competitors (Prahalad, 1990). Logistics can be a key competency. The rise of Japanese steel producers into the market leaders, despite their virtual reliance on imported raw materials from distant sources, was attributable

to their procurement and logistics competencies (Mohan and Berkowitz, 1988).

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Few firms can excel in more than a few key competencies. Most firms have to outsource some products and services so as to acquire the missing pieces for their core competence. Outsourcing also releases scarce resources from peripheral activities that can be much better used in developing other key competencies. In this context, outsourcing should be aimed at gaining long-term competitive advantage, not short-term cost savings.

Redeploying Scarce Resources

Logistics is asset-intensive. It requires physical assets (e.g., private truck fleets and warehouses) that tie up resources but may be underutilized and thus do not necessarily give the firm any competitive advantage. This is where outsourcing makes strategic sense. Known as third-party logistics, outsourcing logistics services enables the firm *to free up its resources that could be better used to strengthen its core competence*. Mark & Spencer, the largest British retail chain, relies totally on outside contractors to handle the physical distribution of merchandise from vendors to its stores and customers. Its decision to use third-party logistics is motivated by a desire to devote itself to its core business. "As retailers, we have specific

skills in purchasing, marketing and selling merchandise. Why blunt our focus by encumbering the operation with technical functions, in which we have no expertise" (Machlin, 1988).

Third party logistics also provides other benefits, including cost reduction, improved service, increased flexibility and access to specialized expertise and information system (LaLonde & Maltz, 1992). As profit-driven outsiders, third party vendors have to compete for the firm's business. Competition promote efficiency and innovation. By serving several clients, they can also attain a "critical mass" that their clients individually cannot. Logistics assets become more productive in the hands of third party vendors. For the firm, many fixed costs become variable, enabling it to expand and contract logistics operations in response to market changes. Gillette was a target of several hostile takeover attempts in the 1980s which prompted the company to restructure its operations, to trim its work force and to sell off underutilized assets. Two of its managers proposed to outsource international logistics services. They went on to form INTRAL, an independent logistics management company, with Gillette as the first client. INTRAL would oversee Gillette's international logistics operations, including consolidating product requirement forecasts, planning materials orders, coordinated deliveries to distribution centers and shipping products to Gillette affiliates worldwide. Its customer base, expanded beyond Gillette, enabled it to gain concessions from carriers that Gillette could not have gained on its own. For Gillette, it would pay only for the volume of merchandise and materials shipped (McCabe, 1990).

Small firms in fast growing industries may find third party logistics essential for keeping pace with growth. Third part vendors offer them logistics capabilities (e.g., international distribution) that they either do not have the time, resources and experience to develop internally or cannot justify the economies of such development. The founders of E-Machines, a start up makers of large screen computer monitors, went to a trade show to sell a few prototypes as a way to get their business started. The demand far exceeded expectation. E-Machines received large orders it would have

to fill in 90 days. As a start up company, it had only a design team. So, it had to concentrate its limited resources in establishing manufacturing and marketing operations and to contract out logistics services. It entered a third party logistics arrangement with TEK Logistics Services, a vendor specialized in serving electronics industry worldwide. The arrangement gave E-Machines immediate access to an established global logistics network, something it would need years and millions of dollars to develop (Buckner, Sigworth & Leith, 1989).

Using third-party logistics does not mean downgrading the importance of logistics. The firm must retain ultimate control over major logistics decisions to ensure integration of third-party services into its logistics and competitive strategies. Marks & Spencer still holds the ultimate responsibility for managing its logistics operations, despite its total reliance on third-party contractors. It maintains a small staff that sets the parameters for logistics operations and monitor contractors' performance (Canna, 1988).

Seeking Contract Oriented Cooperation

Adversarial seller-buyer relationship must give way to cooperation. Cooperative relationship facilitates the flow of information between the firm and third-party vendors. It promotes better understanding of the firm's logistics needs and vendors' service capabilities. It creates a stable environment that allows vendors to tailor their services to the firm's specific logistics requirements. It also permits the problems encountered during implementation to be brought into the open for corrective measures on a timely basis.

Cooperative relationship under third-party logistics is usually framed in contractual agreements to assure the firm of some pre-defined levels of logistics performance and specific cost savings. These contracts specify the services to be provided, the fee structure for compensating third-party vendors and their performance measurements (e.g., lead time, on-time

consistency, and freight damage). They contain penalty and default clauses to protect the firm from disruptions in its operations as a result of a vendor's problems (Anderson, 1988). Third-party logistics is practically synonymous with contract logistics.

Leveraging Logistics Capabilities

Since logistics can be a key competency, some firms nurture their logistics capabilities instead of outsourcing. They leverage their logistics capabilities by becoming third-party vendors themselves -- spinning off their logistics departments into stand-alone profit centers that market services to the parent firms and other clients. They boost asset utilization and improve staff expertise while retaining full ownership and managerial control over their logistics departments. As third-party vendors, they are generally selective about their clients, targeting service offerings at users with logistics needs similar to their own so that they can continue nurturing their logistics competency.

Tektronics is a manufacturer of electronics instrumentation with production, sale and service operations in the United States, Asia and Europe. In the early 1980s, it was threatened by strong competition, excess inventories and declining profit. It had to restructure its logistics system for greater efficiency. Instead of downsizing logistics operations and turning to outside providers, it created TEK Logistics Services to leverage its logistics capabilities as a third-party vendor. Over the years, TEK has targeted three user groups with logistics needs similar to its own: startup high-tech firms in need of third-party logistics services to expand quickly without diverting resources from their core business; high-tech firms having problems with their logistics; and Asian suppliers of electronics components lacking logistics capabilities to serve the United States market (Buckner, Sigworth and Leith, 1989).

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LOGISTICS PARTNERSHIPS

Seeking Collaborative Advantage

In its quest for competitive advantage, the firm may find it necessary to form strategic alliances with others. In an alliance, individual partners gain access to other partners' competencies that they do not possess. They increase utilization of shared resources and attain scale economies that would otherwise be elusive to any one of them operating individually. They pool resources to lower risks where the resources required for market entry can be too vast for individual firms to commit on their own (Ohmae, 1989). They can also enjoy the benefits of coordination without the problems traditionally associated with vertical integration. Each partner focuses on just one stage of operations. This sense of focus translates into lower overhead, leaner staff and increased responsiveness (Johnson and Lawrence, 1988).

Strategic alliances go beyond outsourcing. When the firm outsources, it simply "rents" its partners' capabilities. On the other hand, when it forms strategic alliances, its main objective is to internalize its partners'

distinctive skills. It uses alliances to build its own competencies (Hamel, Doz & Prahalad, 1989). Strategic alliances should therefore take place within the context of the firm's long-term strategic plan to seek dramatic improvements in its competitive position through interfirm collaboration.

Striving for Service Excellence

Logistics alliances, or partnerships, are increasingly common (Ellram, 1992). Their primary focus is on service quality. The time when customers look for low prices at an acceptable product-service quality has passed. Today's customers demand the highest quality at reasonable prices. A service level that was deemed "acceptable" not too long ago is probably not so today. Consumers are much more willing to pay for convenience and time saving as they devote more time to professional and other personal pursuits. Business buyers expect supporting services that help them do more with less (e.g., lower inventories and leaner staff). Smart competitors strive to expand the scope and upgrade the levels of service to maintain customer loyalty. They realize that while perfection may be unattainable, a corporate culture based on acceptable service quality will surely lead to failures (Bowersox, 1990). They also realize that adversarial buyer-seller relationships undermine service quality. So, they turn to logistics partnerships for essential skills and resources that they do not possess.

Through logistics partnerships, leading competitors seek *dramatic improvements in service quality that propel them into significantly higher levels of logistics performance*. They increasingly measure logistics performance in terms of not only such "outcome" dimensions as order lead time and service dependability but also service "process" dimensions (how logistics service is being delivered). The latter dimensions include service tangibles (appearance of facilities, equipment and personnel), responsiveness (willingness to meet customers' special requests), assurance (ability to convey trust and confidence) and empathy (attention to individual customers' requirements). Customers see service quality when

the service they receive meets or exceeds their expectation. Research findings show service outcome dimensions more important in meeting customer expectation and service process dimensions more important in *exceeding* customer expectation. Customers want ongoing "relationship" with their service providers -- partners who make sincere efforts to know them and help them solve their problems (Parasuraman, Berry & Zeithaml, 1991).

The logistics partnership between Toyota, APC (American President Companies) and FKK (Fujiki Kaiun Kaisha) -- known as VASCOR (Value-Added Service Corporation) -- manages shipments of imported auto parts and steel to Toyota's assembly plant in Georgetown, Kentucky. It brings together partners with complimentary competencies. It can reach a level of logistics performance that none of them can attain individually. FKK acts as a freight forwarder and consolidator in Japan. It brings to VASCOR its extensive knowledge of Japan's transportation system. APC is the leader in container shipping on transpacific routes and intermodal transportation in the United States. It offers the partnership unrivaled line-haul carriage capability. Still, APC finds it necessary to supplement its carriage capacity with services from two other shipping lines that otherwise compete with it outside the scope of VASCOR alliance. Toyota, as a pioneer in JIT manufacturing, brings to VASCOR its extensive managerial experience and know-how. JIT manufacturing is nothing new at Toyota. However, on a massive scale and across an ocean, JIT manufacturing is a much more enormous challenge than anything Toyota has experienced (LaMourie, 1989).

Through logistics partnerships, the firm can develop distinctive skills that go beyond the scope of such alliances. VASCOR helps APC to build its reputation and capability as a "big-ticket" logistics vendor and an intermodal carrier on a global scale. APC is ready and able to work with various carriers and service vendors to offer its customers logistics services that utilize several modes of transportation, selected for their complementary service capabilities and cost economies, under a single

carrier's responsibility. In face, since the formation of VASCOR, APC has landed a third-party contract with Ford to manage the automaker's two-way materials flows between Hermosillo, Mexico and Detroit. Its intermodal network was originally designed to handle container traffic between the United States and the Far East, serving many Japanese automobile transplants. Its rail connections run east-west, instead of north-south. This proves no obstacle. Capitalizing on its experience in collaborating with rival carriers, APC forges an alliance with four railroads (three American and one Mexican) to build the necessary rail connections. Its experience in transborder JIT operation under VASCOR also proves a great asset (*American Shipper*, 1989).

Building Mutually Beneficial Relationships

Logistics partnerships thrive on cooperation. Partners must agree on common goals, define their roles, set performance expectations, establish evaluative measurements and specify methods of compensation. On the surface, these are also typical provisions of third-party logistics. However, logistics partnerships go beyond third-party relationships. Third party logistics is an outsourcing strategy. Its continued existence is conditional on attaining predefined levels of performance and cost savings. On the other hand, a logistics partnership is a planned, ongoing relationship. It is built on *mutual gains* -- each partner has needs that other partners can fill. Its continued existence is conditional on attaining mutual gains, rather than on vendor partners' ability to meet predefined cost-performance targets.

The needs of individual partners change with time. So do their expected gains from logistics partnerships. Successful partnerships should accommodate such changes and avoid confining partners to the strict provisions in the formal agreements. For example, Kendall (a manufacturer of health care supplies) and Yellow Freight (a highway carrier) form a logistics partnership that wins an AST&L (American Society of Transportation and Logistics) Partnership of the Year award. Despite their

Table 1
Overall Competitive Thrusts and Logistics Strategies

Conventional Logistics	Third-Party Logistics	Logistics Partnerships	Turbo Logistics
Overall Competitive Thrusts			
Cost leadership	Core competence	Collaborative advantage	Time-based advantage
Operating Philosophies			
Lower unit costs through experience effects and scale economies	Continuously improve the key competencies	Capitalize on other partner's competencies	Increase market responsiveness through speed
Support long production runs with large inventories	Redeploy resources by outsourcing non-core activities	Vertical coordination without vertical integration	Cost savings as a result, not at the expense, of time savings
Continuously improve the key competencies	Capitalize on other partners' competencies	Increase market responsiveness through speed	
Logistics Thrusts			
Minimize total cost, subject to an acceptable customer service level	Outsource logistics activities without giving up ultimate managerial responsibilities	Strive for logistics service excellence through partnerships	Develop fast-cycle capabilities by: (1) performing support activities off-line, (2) continuously
Operate on long lead time and depend totally on sale forecasts	Leverage logistics competency as third-party vendors	Build logistics skills beyond the scope of logistics partnerships	eliminating unnecessary activities and (3) acting on real-time information
Logistics Performance Metric			
Functional efficiency	Service capabilities	Service quality	Cycle time
Channel Relationships			
Transaction-oriented and adversarial relationships	Contract-oriented cooperation	Mutually beneficial cooperation	Supply chain integration possibly through partnership building

contractual agreements, the two partners are ready to split any investments deemed necessary for productivity improvement and to alter operating procedures to each other's requirements. Their partnership remains viable although Kendall has undergone several acquisitions, divestitures, reorganizations and a leveraged buyout (Gordon, 1989).

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TURBO LOGISTICS

Competing on Speed

Firms which successfully implement innovative practices such as JIT often find themselves ahead of their competitors in speed. They can capitalize on market opportunities before their competitors can respond. They discover speed, or time, as their new source of competitive advantage. They increasingly pursue time-based, instead of cost-based, competition (Stalk & Hout, 1990). As early market movers, they can secure key customers and suppliers. They can preempt attractive market segments. They can raise barriers to entry in the form of high switching

cost for customers. They may also enjoy temporarily high profit, through higher prices, during the early absence of effective competition.

Time-based advantage also enhances cost competitiveness. Cost savings materialize as a result, not at the expenses, of market responsiveness. Cost drops because inventories of materials, work-in-process and finished products are trimmed. Customer service improves because order lead time is shorter. Quality is higher because doing it fast forces time-based competitors to do it right the first time. Quality related costs (e.g., repairs under warranty) decline. Chaos and confusion diminish because fast cycle capability eliminates the need for expediting activities. Overheads are lower because unnecessary, time-consuming activities are avoided. Returns on capital investments improve because higher throughput increases asset utilization (Schmenner, 1988).

Turbo-charging Logistics Performance

Time is essentially an issue concerning logistics. As vital links between the firm and its supply sources and markets, logistics determines the speed with which the firms meets customer orders and responds to market changes. "Thus managing time as a component of competitiveness is, to a large extent, a question of logistics management" (Persson, 1991). This is confirmed in a recent survey of logistics executives -- cycle time is identified as the single most important factor shaping logistics changes for the twenty first century (La Londe and Powers, 1993).

To strive for time-based advantage, all components of a logistics system, from material supply, manufacturing supports to physical distribution, must be tuned up for much faster cycle time. The result can be characterized as turbo logistics which *seeks maximum time compression*, not minimum total cost (Le, 1994). Only through time savings does it attain cost savings. So, when low-cost imports threatens the United States garment industry, it fights back with a turbo logistics system known as Quick Response. This logistics system compresses cycle time through channel cooperation and

utilization of information technologies (e.g., bar code scanning and electronics data interchange). It now can meet half of the industry's annual sales with small, mid-season orders on lead time as low as one week, compared to the traditional 9-month cycle time. Quick Response saves the industry billions of dollar annually in lower inventories, fewer lost sales and reduced obsolescence (Hammond, 1993).

Gaining Speed through Continuity

Every product offered to the market is the result of a transformation process known as the value chain. It comprises two sets of activities: primary and support. Primary activities (inbound and outbound logistics, production, marketing and after sale service) are those directly involved in the transformation of inputs into outputs, product delivery and customer support. They create customer value. Support activities (procurement, technological development, human resource management and the firm's infrastructure) permit primary activities to occur on an ongoing basis. Each value chain activity in turn comprises a set of activities that can be separated further into primary and support activities (Porter, 1985).

In term of time, primary activities make up the main sequence that moves information and inventories through the supply chain. Support activities are, on the other hand, preparatory in nature. They can be performed off-line, separately from the main sequence. Failing to distinguish between support and primary activities, conventional logistics allows the former to hold up the latter. Experience shows, in most cases, no more than five percent of cycle time is actually spent on adding value (*Chief Executive*, 1989). The rest of time is wasted because information and inventories simply wait to be acted on. By contrast, turbo logistics isolates support activities so that they can be performed off-line without disrupting the main sequence. Continuity is the key to gaining speed. As information and inventories no longer wait to be acted on, speed can rise sharply. Cycle time approaches the minimum time it takes to complete the main sequence.

Freightliner, a manufacturer of heavy-duty trucks, used to wait until its finance department had completed customer credit checking before it scheduled the production of an order. Credit checking held up the main sequence of product assembly and delivery although very few prospective customers failed to qualify for credits. Nowadays, it schedules the production of customer orders upon receiving them while it concurrently checks customer credit. The cost of having a pull a truck off the production schedule occasionally, in case a customer fails to qualify for credit, is a small price to pay for shortening order lead time and gaining greater customer satisfaction (Stalk & Hout, 1990).

Focusing on Linkages. By separating the main sequence from support activities, value-adding activities from preparatory activities, the firm can identify activities that neither add buyer value nor facilitate the main sequence. Non-value activities not only consume resources and but also cause delays and disruptions that stretch out cycle time. Unfortunately, the way conventional logistics operates makes them indispensable. The long cycle time associated with long production runs inflates materials, work-in-process and product inventories. For as long as production runs remain long, such inventories cannot be reduced without raising the risk of stockouts. Large inventories also cause increases in other time-consuming, non-value activities such as moving, storing and inspecting.

Non-value activities must be made unnecessary before they can be eliminated (Johnson, 1990). That requires thorough understanding of the linkages between value chain activities. Linkages determine the way one activity affects another. They go beyond the tradeoffs in conventional logistics. Whereas tradeoffs focus on the "gain-loss" relationships between logistics activities, linkages constitute cause-and-effect connections between them. Delays and disruptions (e.g., stockouts) that necessitate some activities (e.g., back orders and rush shipments) may have their causes in upstream activities (e.g., long production runs). Understanding the linkages enables logistics managers to focus their solutions on the causes instead of the symptoms (e.g., inaccurate sale forecasts). So, instead of pouring

resources into developing more complex forecasting techniques and inventory control models that could slow down decision making, the garment industry invests in Quick Response to compress cycle time. Much of the inventories and many related activities can be eliminated because they are no longer needed.

"Turbo logistics uses information for problem identification and solving."

Acting on Real-Time Information

The glue that binds main sequence activities into a continuous flow is information. Conventional logistics uses information mainly for planning and control purposes. It directs the flows of information to corporate staff that uses information to draw up demand forecasts, operating plans and cost guidelines. Line managers conduct logistics operations according to these forecasts, plans and guidelines. They are generally deprived of real-time information to spot opportunities, identify problems and take timely corrective actions. A long lead time buffers between market changes and their actions.

Turbo logistics uses information for problem identification and solving. It directs information to the parts of a logistics system where information can be acted on. Timely information alerts line managers and workers to emerging market trends and discrepancies between forecast and actual results, for early detection of opportunities and problems. So, turbo logistics makes sure that information is not held up or lost in the planning and control processes. It understands these processes are support activities. Their use of information should not be allowed to hold up the main

sequence that needs real-time information to respond promptly to market changes.

Benetton, a global marketer of garments with more than five thousand stores worldwide, competes in a highly competitive and mature market that is characterized by fickle consumer demand. To maintain customer interests, it offers eight fashion collections a year on top of two basic fashion seasons. With a complete change of product lines ten times a year, it needs to develop flexibility and speed and, at the same time, maintain cost efficiency. A key element in its attainment of these capabilities is information technology. Using an advanced information system, the company can receive instantly sale orders from its agents in each country and update market information daily. It can trace and react to market trends by manufacturing only those garment styles, colors and sizes in demand. Its computer aided design (CAD) and computer aided manufacturing (CAM) system can design garments on computers and then feed these designs into knitting and cutting machines at its nearby plant. Its robotics distribution center can quickly sort incoming garments, pack and ship them out to stores worldwide around the clock. With such capabilities, the company can fill mid-season orders within two weeks where order lead time traditionally took several months (Dapiran, 1992).

By acting on real time information, turbo logistics becomes much more responsive to market demand. Certain aspects of demand (e.g., total sales) tend to be more predictable than others (e.g., sales by market areas, distribution channels or product lines). Real time information permits the firm to postpone decisions concerning hard-to-predict aspects until it receives market signals such as customer or leader orders) (Fisher, Hammond, Obermeyer & Reman, 1994).

To maintain its cost competitiveness, Benetton outsources its semiannual basic fashion collections. Order lead time for them can be up to nine months, making it hard to predict which colors will sell well. The company orders knitwear in natural color and uses its own dyeing process to give

them the right colors only shortly prior to shipping them to retail stores. This strategy allows it to postpone final physical adjustments until retail orders give a clearer picture of consumer color preference (Dapiran, 1992). Under a similar strategy, Hewlett Packard (HP) produces its Desk Jet printers in "generic" versions for worldwide markets. At the last minute, upon receiving dealer orders, it packs and ships "localized" versions by adding specific power cord and transformer to meet the plug and voltage requirements of the country and user manual written in the proper language. This strategy enables HP to save over \$30 million in inventory cost a year and, at the same time, to respond more quickly to changes in market demand in Asia and Europe, where there are many national languages and plug and voltage variations (Davis, 1993).

Supply Chain Integration for Seamless Interfaces

At the points of interfaces between firms or between activities within the firm, problems tend to occur. Examples of such problems, or seams, include: vendors' delivery schedules that do not match a manufacturer's production plans; product designs that save manufacturing costs but complicates materials procurement; and proprietary computer languages that inhibit electronics communications between firms. These seams interrupt the flows of information and inventories and stretch out cycle time. Turbo logistics removes these seams by striving externally for channel cooperation and internally for functional integration. The result is a supply chain that is much more responsive to changes than the sum of its parts.

Integration is not a foreign concept to logistics. Conventional logistics, however, confines integration within the firm. Adversarial buyer-seller relationships prohibits coordination among firms in the same supply chain. So, while conventional logistics attains some operating efficiencies through cost tradeoffs, it falls far short of its potentials, especially with respect to customer service and market responsiveness.

Turbo logistics integrates the firm's logistics activities with those of suppliers and customers often through partnership building rather than vertical integration or keiretsu arrangement (Ellram & Cooper, 1993). It allows real-time market information to reach all the way back to manufacturers and materials vendors so these parties can respond to actual sales instead of inevitably inaccurate market forecasts. Materials and product inventories can reach the next stage of operation in precise quantities, varieties and time frames. Turbo logistics also redefines channel relationships to allow shifting logistics responsibilities from one party to another who can perform them more efficiently. It eliminates duplications of activities (e.g., inventory holdings at several levels of distribution) which add little or no customer value.

The Quick Response system works because all firms in the garment supply chain cooperates. Technologies such as bar code scanning and electronics communications have been available for some time. A lack of common standards hinders their applications. Recognizing this problem, retailers, garment makers and textile vendors have formed several voluntary groups to work on standardization of bar codes, shipping container markings, EDI formats and others. Their cooperation goes beyond data interchange. Merchandise preparation and tagging are shifted to manufacturers who can perform these tasks more efficiently than retailers. Lacking proper space and facilities, retailers often spent two weeks on such tasks before the Quick Response era. They now can also reclaim valuable retail space from their old stockrooms (Hammond, 1993).

CONCLUSION

In recent years, leading competitors move away from the conventional quest for cost leadership through experience effects and scale economies as they discover the hidden inefficiencies of this cost-based strategy. They increasingly outsource peripheral operations so as to free up scarce resources that they can refocus on cultivating distinctive skills, or key

competencies. Reflecting this strategic shift, they also move away from conventional logistics that seeks cost minimization, subject to maintaining a level of customer service comparable to competition. They question the need for asset-intensive in-house logistics capabilities. So, they turn to third-party logistics without giving up their ultimate managerial responsibilities. Those firms which consider logistics excellence as a key competency can sharpen their logistics skills and increase asset utilization by becoming third-party vendors themselves.

Leading competitors also seek dramatic improvements in their market positions through strategic alliances with other firms. They gain access to those competencies that they do not possess or cannot justify developing on their own. With respect to logistics, they form partnerships with other channel members and service vendors. By pooling their distinctive skills, they attain much higher levels of logistics performance that none of them can attain individually. They consistently outperform their competitors in speed. They can respond to customer demand and environmental changes before their competitors can react. As they discover time as a new source of competitive advantage, they strive for turbo logistics capabilities.

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