

## Perspectives

# Innovation in logistic services and the new business model: a conceptual framework

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### Keywords

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### Abstract

Service industries hold an increasingly dynamic and pivotal role in today's knowledge-based economies. The logistics industry is a classic example of the birth and development of a vital new service-based industry, transformed from the business concept of transportation to that of serving the entire logistical needs of customers. Quantum advances in science, technology, and communication in the new millennium have compelled firms to consider the potential of the so-called new "resources" (technology, knowledge and relationship networks) that are essential if firms are to operate effectively within the emerging business model, and to utilise the opportunities to innovate and gain market leadership. Through an extensive literature review, this paper examines the factors that nurture innovation in logistics services, identifies the contributions of the new "resources" and, using industry examples, examines the application of these resources to logistics firms as they assume an extended role within the new business model.

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## Introduction

There is little doubt that services have grown to dominate world economic activity. Australia, which has been transformed from an economy based on mining and rural industries to a predominantly service economy, serves as an excellent example. The service sector in Australia contributes more than 76 per cent of GDP and accounts for four out of every five jobs (Department of Industry, Science and Resources, 2000; McLachlan *et al.*, 2002). This exponential growth in services is not at the expense of manufacturing industry, mining, and farming, but services have become an additional imperative factor that assists primary industries to achieve global competitiveness. In fact, a sizeable part of the growth in the services sector is attributable to traditional manufacturing industries "spinning-off" or outsourcing a range of previously incorporated service-based functions – such as logistics, communications, human resources (HR) and others – thus creating an apparent rapid growth in the number of independent companies undertaking such service-based activities and in the total output of those sectors generally defined as "service industries".

There is a general consensus that economic growth, higher disposable incomes, and technological advances have contributed to the rapid growth of service-sector enterprises (Mattsson, 1995; Patterson, 1995) and their increased economic importance. Growth in services has outpaced overall economic growth in the nations of the Organisation for Economic Co-operation and Development (OECD) for a number of decades, a trend that is predicted to continue (McLachlan *et al.*, 2002). According to Grönroos (2000), firms now compete on the basis of services, and not on the basis of physical products. The global marketplace has compelled every industry to transform itself into a truly customer-oriented, service-focused enterprise, irrespective of the products and services it sells. Most manufacturing firms need to be aware of the service aspects of their product-service mix, because the service component of their offerings offers the best chance of gaining sustainable competitive advantage, or, conversely, the greatest chance of losing customers through poor levels of service or a reluctance to innovate. Services



have thus become the recognised value assessment variable for predicting a firm's success in the marketplace.

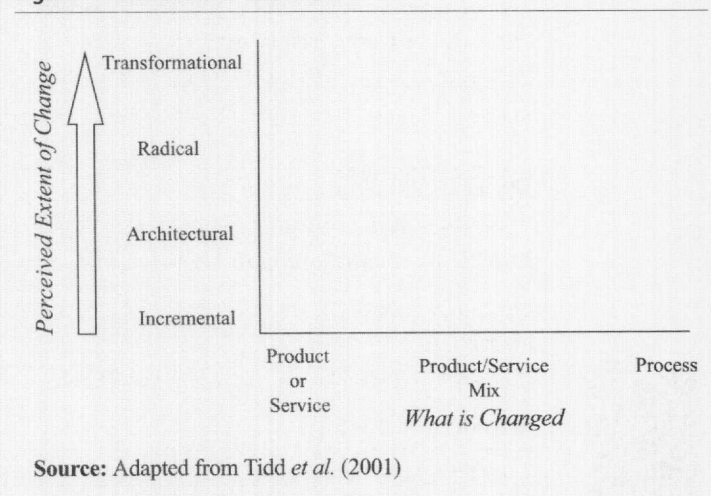
To stay ahead in the modern global marketplace, business organisations must constantly look for innovative strategies to improve their competitiveness. Continuous technological advancement has assisted industries to revolutionise the way they operate and conduct their business. Technology has traditionally been viewed as the key to productivity in manufacturing industries. However, in recent years, technology has assumed greater significance in services, has greatly facilitated the exponential growth of the sector, and has offered firms an all-important competitive edge. Technology enables service firms to improve their efficiency and effectiveness, and to enhance their services. Market competition has forced firms to incorporate modern technology into their key offerings to discerning customers who have little product loyalty. To do otherwise is to risk losing out to competitors who have adapted their strategies to the technology-based competitive environment (Bitner *et al.*, 2000; Olsen and Connolly, 2000). The growth in technology has led to considerable changes in business practices, particularly those relating to marketing, communication, and distribution (Moncrief and Cravens, 1999).

The rapid growth in information and communication technologies (ICTs) over the past 20 years has been a major driver in the growth of service industries and continues to be the main engine for innovation within the services sector. Billions of people worldwide are currently connected to the Internet, and exponential growth in this international network means that millions more are being connected annually. The Internet enables customers to engage in a higher degree of self-service (Hallowell, 2001). The nature of business today demands that firms interact with their customers and business partners using technology to provide services instantaneously across international borders. With this emerging paradigm, firms have had to reassess the opportunities and challenges and have had to re-examine how they conceptualise and conduct their business. Leading organisations today will therefore have to adopt innovative strategies and practices if they are to operate effectively in this new global market.

## Innovation in services

The term “innovation” can be used to describe myriad ideas. However, in relation to the business sector, innovation can be classified into technological innovation, organisational innovation, and market innovation (Tidd *et al.*, 2001). These classifications are particularly valuable within the services sector, in which technological innovation, particularly that concerning ICTs, has been particularly important in the rapid growth of the sector over the last ten years or so. Within the broad category of “technological innovation”, Tidd *et al.* (2001) have discerned two dimensions, as shown in Figure 1. In this Figure, on the vertical axis, the perceived extent or scope of the change brought about by the innovation can be positioned on a continuum running from “small-step” continuous innovations (which are often associated with process innovations) through to “transformational” innovations (which are so far-reaching that they change the very functioning of society). An example of the latter is the introduction of steam power in the Industrial Revolution. Between these two extremes are “architectural” innovations (which refers to novel reconfigurations of existing system components) and “radical” innovations (which redefine the way we think of, and use a product or service). The last-mentioned term is usually associated with a new product introduced to the market, or a highly differentiated product or service. On the horizontal axis of Figure 1, the continuum relates to whether the change impacts on the things that the organisation provides for its customers (goods or services) or the way in

Figure 1 Dimensions of innovation



which these things are created and delivered. The two extremes of this spectrum are traditionally called “product” and “process”, although the differentiation is not always clear-cut. In between these two extremes are innovations in the product-service mix provided by the organisation to its customers.

In addition to the above schema, innovation in the service sector can also be described in terms of technological innovation or non-technological (“soft”) innovation. Technological innovation often leads to new products or services of some form, whereas “soft” innovation focuses on organisational issues and processes that improve management practices, streamline organisational structures, customise services, enhance networking, improve distribution, advance procurement, and facilitate financing, to name only some (Howells, 2000).

Service innovations are often non-technical in nature, although technology might act as the vehicle that activates and/or enhances the process. In contrast to the product industry, these non-technical improvements in services might not necessarily involve or require formal research and development (R&D) (Pilat, 2000). Innovation in services is essentially a value-creating activity (Slater and Narver, 1995) that drives market orientation and performance. Innovation is usually defined as a holistic construct based on two or more factors. However, in a service context, it can be expressed in terms of the new services launched and the rate of improvement in the rendering of service. The market perceived value through service innovation, in terms of the specific advantage offered to the customer, is, indeed, the firm’s competitive market advantage.

### Drivers of service innovation

Service firms can embrace innovation to improve their market performance and efficiency and, ultimately, to benefit both producers and consumer (Bakos, 1998; Wymbs, 2000; Garicano and Kaplan, 2001; Hackbarth and Kettinger, 2000). These researchers argue that efficiency can include improvements in: cost-efficiency, productivity, quality of service (both production and delivery), inventory management, process improvement, value

(creation and flexibility), price, information (on service and comparison), and so on. These improvements have become the primary factors in market competition in the services sector (Hauknes, 1999). For example, leading service firm Cisco Systems effectively use their Web-based business model to channel their business activities. This innovative approach has elevated Cisco to market leadership because it has saved millions of dollars through business efficiency and has simultaneously provided better service to customers (Mougayar *et al.*, 1999). Innovation in information technology and its utilisation in business practices has revolutionised the way business is conducted in the global market.

Time and again, information technology and its effective innovation of business practices have had a major influence on the firm’s success. Subsequently, business growth and productivity improvements are evident in various sectors, including transportation, communications, wholesale and retail trade, finance, and business (Pilat, 2000). There are many factors that nurture the growth of services and drive innovation. Table I provides an overview and description of some of the important factors as discussed by various authors.

### Factors that support service innovation in the new global economy

Given the transforming changes evident in service industries today, it is imperative that firms think and operate with a new business mindset. The factors that contributed to successful innovation in the past might no longer be relevant in today’s boisterous marketplace. The transiency in science and technology, and most especially in communications, has compelled organisations to think about new “resources” in the pursuit of innovation. Today’s marketplace recognises the pre-eminence and value of people, knowledge, and technological advances, and service innovation is fundamentally reliant on the three interrelated factors of technology, knowledge, and relationship networks (Kandampully, 2002), (These will be discussed in more detail below in relation to logistics services in organisations.)

Table I Overview of some of the important factors

Force	Description
Networking and R&D	Networking and cooperation more prevalent through increased use of external knowledge and cost-sharing. Strategic alliances, purchasing groups, and retail franchises augment market share, particularly in trade, financial services, and business services (Pilat, 2000). Knowledge-intensive businesses (KIBs) assist in innovation networks by dissemination of technology and innovative concepts to other firms through consultants, training, R&D, and computing services (Den Hertog and Bilderbeek, 1998)
Investment in ICTs	Firms investing in ICT, human capital, and organisational change have higher productivity and economic performances because this aggregates networking and cooperation for innovation (Broersma and McGuckin, 1999). Introduction of electronic commerce through low-cost communication networks (satellite, cable, telephone, electricity grids) allows increase in the tradability of services and facilitates globalisation (Pilat, 2000)
Human capital	Labour-intensive services industries rely on the knowledge, expertise, skills, experience, creativity, resourcefulness, strategic thinking, and communication abilities of people. Tacit knowledge enables development of new services and innovative endeavours (Nonaka and Takeuchi, 1995). Investment in human capital through continuous training and development ensures efficient service performance in the firm conducive to innovative activities
Organisational change	Suitable organisation structures facilitate the management of innovation, especially in the effective use of modern technologies (OECD, 1999). The management of information technology in service firms is largely determined by organisational structure (Van Biema and Greenwald, 1997). New processes often require considerable organisational change (Hauknes, 1996)
Intellectual property rights (IPR)	Patents protecting software and information services are rather limited when compared with manufacturing patents. Specific characteristics of IPR allow for easy diffusion of innovation in services. Patents give IPR "protection", but in exchange for information about the innovation that allows knowledge to be diffused (Anderson and Howells, 1998). However, trademarks, copyright, and trade secrets are becoming more common in service industries (Pilat, 2000) because competitors know little about the new services or processes, and patents attempt to strengthen the returns on innovation
Changing competition and regulatory frameworks	Markets such as retailing, telecommunications, and banking are apparently saturated domestically and have therefore accessed global knowledge, innovative concepts, services, ideas, and technologies. Globalisation through direct foreign investment (joint ventures, mergers, and acquisitions) facilitates innovation (Stiglitz, 1999). Rapidly changing regulatory frameworks and government policies provide a strong driver for innovation in services. Public sector services such as health care, telecommunications and education have been privatised and allowed market forces to operate. Competition meeting of consumer needs encourages efficient services, higher productivity, and innovative activities (Pilat, 2000)

### Technology

Advances in technology, particularly in ICTs via the Internet, have directly influenced the creation of innovative services, in terms of both independent service offerings and packages of products and services. Quantum advances in communications and digital science have enabled firms to transmute the challenges of the past into opportunities for the future. For example, distance and time, previously major impediments, now present firms with numerous opportunities for creative utilisation. Technology now makes it possible for firms to assign their functional departments strategically to international locations. This allows firms to draw on a global network of knowledge and services, thus augmenting the strength of their pre-existing superior service to internal and external customers, 24 hours a day, seven days a week. For example, General Electric

and British Airways established call centres in India to handle a daily barrage of customers' enquiries originating from North America and Europe (Landler, 2001). Businesses today are forced to handle operations and serve internal and external customers spanning international borders. Firms therefore have to operate as a "collective mind", extending their functional arms to serve an expanded base of customer stakeholders, thus adding value to the firm's essential service competency (Kandampully, 2001). Indeed, service "competency" has become the new business "buzzword", and reflects fundamental changes in the way that firms conceptualise, produce, and distribute their products and services. As firms increasingly rely on their service competency in this age of technology, functional and international coordination has emerged as a strategic necessity for firms to compete in the global

market. Rapid advances in technology have also required dramatic changes in the skill levels of employees. Dependence on continuous technological innovations and their application in business have resulted in fundamental changes to business practice in the marketplace, with consequent changes in the role of employees. The past experience of employees is of limited value because new business practices require a firm's employees and its stakeholders to have the latest available knowledge. It is the firm's employees and partners who, through new knowledge, add value and enhance the firm's core competency, thus rendering it efficient and competitive in the marketplace.

### Knowledge

According to Drucker (1993, p. 38), knowledge represents a key personal and primary economic resource. He has argued that traditional production factors – such as land, labour, and capital – have become secondary, and that “knowledge is the only meaningful resource today”. Hence, a worker with knowledge commands a leading role and status, because the knowledge of their employees is the single greatest asset possessed by firms today. A firm's commitment to provide contemporary knowledge by being a “learning” and “teaching” organisation is essential if a firm is to sustain and enrich the value of its knowledge resource. Technology, competence, and capability are manifestations of a firm's knowledge assets operating at different levels of the organisation (Boisot, 1998). Developing, using, and leveraging knowledge are essential for all organisations and countries if they are to sustain economic progress. As management consultant Tom Peters (1994) has claimed: “Knowledge is indisputably the primary basis for value-added in today's companies”.

This new primacy of knowledge requires managers to rethink fundamental management practices. Webber (1993) has asserted that managers must not only invest in the necessary information tools (to support and enhance the productivity of the knowledge workers), but must also nurture a partnering relationship with employees. In essence, a firm's strategy for knowledge management should reflect its competitive strategy (Hansen *et al.*, 1999). According to Gummesson (1999), knowledge is the core

driver for competitiveness in this emulous economy. Thus firms can opt to seek the expertise of new knowledge through the effective use of extended networks of relationships. A borderless global market and the Internet present firms with an opportunity to cast the possibility of networks beyond individuals, groups, and corporations, and thus ultimately reap the creative potential of knowledge (Gummesson, 1999).

### Relationship networks

In this competitive global market, the focus on customer needs requires a firm to gain a comprehensive understanding of the buyer's entire value chain (holistic needs), not only as it is today, but also as it will evolve over time (Slater and Narver, 1994). In most cases, the holistic requirements of customers frequently extend beyond the capability of a single firm (Kandampully and Duddy, 1999a). Firms that understand the holistic needs of customers will be able to mix and match various products and services to meet those needs. If customers require products or services that are not within the realm of a firm's core competency, the firm should find ways to procure those competencies – for the benefit of the customer – by creating strategic alliances both horizontally and vertically (internal and external relationships) with individuals and firms (Peppers and Rogers, 1997; Gummesson, 1999).

Today's service organisations traverse conventional boundaries. Firms that seek assistance and enter into alliances with various individuals and suppliers do so, not as a cost-saving exercise, but to seek out specialist know-how to extend their core competency. In modern business, the term “out-sourcing” has been accorded a new meaning and has subsequently been replaced with “out-partnering” (Peters, 1994). Manuel (1996, p. 168) has argued that: “Networks are [the] fundamental stuff of which new organisations are and will be made”. Developed as networks, the various relationships that a firm nurtures and maintains frequently constitute the life source for many leading-edge firms (Kandampully and Duddy, 1999b). Indeed, most large and small projects involve numerous alliances and partners. This is particularly pertinent to services, because networks are endemic to most service business (Heskett *et al.*, 1990).

Thus a firm's service-innovation capabilities are dependent on its knowledge base, realised through the effective use of internal and external partnerships, utilising technology to extend its product mix and increase the speed and efficiency of its delivery. Kandampully (2002) has argued that this continuously updated "amorphous knowledge resource", resulting from a network of partners, represents a firm's core competency. Moreover, a firm's subsequent ability to remain at the forefront nurtures its image as a service leader, and differentiates it from its competition.

Resourcing services through networks beyond national boundaries has thus become a common feature of the global marketplace. When Cisco Systems, a respected network firm, announced a \$2.2 billion inventory write-down in the second quarter of 2001, sceptics immediately proclaimed the fall of the network business model exemplified by Cisco. However, Cisco outperformed its peers, not only during the boom years of 1995-2000, but also during the first quarter of 2001 (Hacki and Lighton, 2001). Hacki and Lighton (2001) have argued that network companies continue to outperform because they own fewer assets, leverage the resources of partner companies, require less capital and return higher revenue per employee than conventionally run companies. The ongoing dependence on network relationships, and the effective maintenance of such networks, will dictate the core survival strategy of tomorrow's service firms as they operate in the new global economy.

### **The concept of a new business model**

The new economy was essentially forged during the last quarter of the twentieth century through the advancement in information technology and the new business practices facilitated by information technology (Sweet, 2001). Although information and knowledge have always been critical components of economic growth, it is the advent of technology and the Internet that has brought about transformational changes in the economy. "Technology", in this sense, refers to the package of technological resources, skill and experience, which give firms their distinctive competitive edge in the

new global economy (Bessant and Rush, 2000).

Castells (2000) has argued that this new economy is fundamentally distinct from what has gone before because it gains its superiority through the effective use of information (knowledge), global concepts (organised on a global scale), and networks among economic agents (interaction among business networks). The creative utilisation of IT offers numerous benefits to firms that undertake business and other trading functions via the electronic marketplace. Firms that establish new business models often reap high rewards from ideas that spark new sources of revenue using applications of technology and market demand (Hamel and Skarzynski, 2001). The success of CNN, amazon.com, eBay, and others serves as testimony to the new types of resources that can be utilised through new business models. New business models provide alternative approaches to business practices for firms to consider, not only in terms of what is done, but also in terms of how it is done. Defining new business models can be difficult. However, in this context, they can be referred to as business practices that result in greater efficiency by utilising information technology.

Proponents of new business models suggest that new technology and innovative business practices provide the potential for organisational efficiency gains that are variously referred to as improvements in:

- value (Porter, 1985);
- quality of service production and delivery (Parasuraman and Grewal, 2000);
- R&D cost-efficiency (Rao, 2001);
- transaction costs (Garicano and Kaplan, 2001);
- productivity, inventory, and demand management (Kaplan and Sawhney, 2000);
- production lead-time reduction (Velocci, 2001);
- reduced search costs for customers (Bakos, 1997);
- selling process improvement (Feeney, 2001);
- increased customisation capabilities (Bakos, 1998);
- supply chain and relationships improvement (Feeney, 2001); and
- an increasingly long-term perspective of the firm, subsequently leading to business performance (Fox, 2001).

Thus, improving efficiency and effectiveness in all economic activities of the firm (buying, making, and selling) is imperative for the success of any organisation, including that of a logistics firm.

### The logistics industry

Logistics are an extension of physical-distribution management and usually pertain to the management of the materials and information stream of a business, down through a distribution channel, to the end customers. Logistics management basically concerns the physical distribution of raw materials and, ultimately, finished products (Slack *et al.*, 1999). Logistics are apparent in all firms to some degree, depending on the nature of the business and the industry. They are all-encompassing throughout the organisation; including everything from a decision on a product or service needing to be made, through to the management of incoming raw materials, the production process, storage of finished goods, delivery to the customer, and after-sales service.

There are substantial logistics activities involved in both supply and distribution. Even in service industries, firms need to obtain and convert products into intangible services. The scope and role of logistics have changed dramatically over the years. Logistics used to have a supportive role to primary functions such as marketing and manufacturing. But now they have expanded to cover warehousing and transportation activities, purchasing, distribution, inventory management, packaging, manufacturing, and even customer service (Bowersox and Closs, 1996). More importantly, logistics management has evolved from a passive, cost-absorbing function to that of a strategic factor which provides a unique competitive advantage (Bowersox and Closs, 1996; Bowersox and Daugherty, 1995; Christopher, 1993).

As organisations globalise to access new markets and achieve higher production and sourcing efficiencies, logistics play an important role in moving materials, products, and services through supply chains. By improving logistics, organisations can realise greater production, increased efficiencies, and technological competencies beyond their geographic borders (Bovet, 1991; Fawcett

*et al.*, 1993). With trade barriers being reduced, and the advent of advanced information technologies, new opportunities and global markets have become available for companies. Thus, there is increasing reliance on logistics, not only to move products and materials, but also to assist with new production requirements and customer needs. Intense competition has also required logistics providers to consider their services in terms of cost, quality, features, and value-added to their customers and to their stakeholders (Sum and Teo, 1999).

Logistics firms today acknowledge the importance of information (knowledge), not only to enhance the firm's core competency, but also as a service feature that assists customers and stakeholders. For example, "the Minitel Internet tracking system" developed by Carlberson, one of Europe's leading shipping and logistics firms, has propelled Carlberson to the forefront of its industry. Carlberson's 45,000 customers are able to obtain up-to-date information on their individual consignments by logging on to the company's Web site and selecting the customer-service package required. A customer code and password ensure that customer information remains confidential. The system also offers a multiple search facility. Customers can search a selected period (histories are kept for three months) for each of the five types of transport offered, and the status of consignments by destination. They have the option of tracking each consignment continuously. They can also interrogate the data using a reference or a receipt number. In addition, the system provides statistics on any delivery-related problems. The use of the Internet to track consignments provides customers with a very useful management tool and access to delivery schedules for various retail outlets. Thus technology provides the opportunity to offer services far beyond the firm's primary business concept. Today's innovative firms partner with their customers, allowing firms to conceive of support services that truly help customers. It is this concept of "thinking for the customer" that will allow firms to continue to excel and become the innovators of tomorrow.

Organisations today face great challenges because the successful provision of many goods and services requires the effective integration of logistics activities across a

lengthening supply chain and an increasing geographical separation. Logistics management represents a growing segment of the economy, and plays a critical role in international trade. In recent years, most industries have recognised that substantial savings are available to companies that are able to coordinate and innovate within their logistics operations. For example, the exponential growth in the distribution of digital information goods via the Internet has revolutionised the existing business models of the news, music, and film industries. This presents numerous opportunities and challenges, because perfect copies of information goods can be created and distributed via the Internet at practically no cost (Bakos, 1998).

### Imperatives for innovation in logistics

The advance of information technology and its creative use in business have been one of the most significant contributions to the world of commerce. Globalisation and the increasing use of the Internet in e-commerce and e-markets have changed the way in which business is conducted and in which products and services are traded across international borders. As a result, firms are left with little option but to innovate constantly – beyond incremental improvement. Technological changes are rapid and are often discontinuous, leading to a relatively short product life span (Achrol, 1991). The displacement of the multimillion-dollar record industry by the introduction of CDs is an example of this phenomenon. Similarly, technology-led changes have revolutionised business practice, and have significant implications for firms in the supply chain in terms of manufacturing, warehousing, auctions and procurement, and distribution. It is thus imperative that firms in this borderless market constantly anticipate their global customers' future needs – and innovate appropriately. Innovation in product or process development provides firms with an element of flexibility (Parthasarthy and Sethi, 1992). Today's turbulent competitive environment mandates that logistics firms have the ability to survive and excel.

Acknowledging the dramatic changes in the economy and the advent of the new business

paradigm, many authors have identified logistics as a distinct form of service which provides "logistical solutions". Logistics management has subsequently become an important source of competitive advantage in commerce (Achrol, 1991; Day, 1994; Porter, 1985; Stalk *et al.*, 1992; Webster, 1992). Moreover, logistics have today transcended a traditional role in "transportation" to a role in serving customers' strategic needs to gain a competitive advantage. Innovation is imperative for logistics firms serving the market in the new economy, and this can be examined on the basis of Kandampully's (2002) three requirements for service innovation:

- (1) technology;
- (2) knowledge; and
- (3) relationship networks.

### Innovation in logistics through technology

It is evident that, to improve their market standing, many logistics firms will have to keep pace with the information age. It has been argued, and is generally well accepted, that the correct implementation of ICTs can be a significant source of competitive advantage to firms. This is particularly so for the logistics industry because of its dependence on information for efficient operations. Logistics ICT refers to the hardware, software, and network design required to facilitate processing and exchange (Closs and Xu, 2000). It thus includes related components in the supply chain, such as satellite transmissions, Web-based ordering, electronic data interchange, barcoding, systems for order entry, order processing, vehicle routeing and scheduling, inventory replenishments, automated storage, and retrieval systems, to name a few.

Logistic firms that adopt and creatively deploy up-to-date technology, through the collective use of mind and knowledge, are able to implement innovative methods and gain superior competitive advantage. For instance, Langley *et al.* (1988) discussed the application of ICT as an effective means to enhance the strategic significance and operational effectiveness of firms. They were of the view that managers should look at the overall business needs first, before considering or selecting ICT hardware or software. ICT should not merely be utilised



for the benefit of the logistics firm itself. Rather, consideration should be given to how ICT can add benefit to customers and other stakeholders. Kerr (1989) has indicated how logistics ICT can contribute to the overall strategy of the firm, and that this might involve various activities outside the traditional logistical task. In the area of warehousing, for example, Stock (1990) has shown how logistics firms can effectively use technology and gain competitive advantage through automated systems, stock picking (the process of obtaining stock from the warehouse according to customers' orders), and barcoding. In addition, Closs *et al.* (1997) have offered some empirical evidence that firms innovating through the development of IT capabilities can positively influence overall logistics competency.

In France, an IT system was deployed to monitor and control the flow of inventory after discovering bottle-necks previously occurring at shipping ports. This is an example of information technology being used to integrate and link the planning, implementation, and control of traditional inventory activities such as product receipt, storage, stock picking, and shipping (Langley *et al.*, 1988). LaLonde and Auker (1973) noted that the use of technology can enable logistics firms to transform themselves from being an enabler of operational and material-handling functions to being an enabler of decision-making and activity-planning functions within the supply chain. This progressive transformation of firms from transportation services to logistical solutions requires innovation beyond traditional business capabilities. Innovation thus transcends the mere use of technology. Rather, technology makes creative use of the knowledge and relationship networks.

### **Innovation in logistics through knowledge**

Knowledge is an essential component in the flow of material, information, and services for logistics. The amount of data and information available to firms is at unprecedented levels in today's economy, and firms need to transform this information and these data into knowledge and action to be effective in innovation. Thus the establishment of effective knowledge-management processes is

an essential part of successful innovation. Knowledge in logistics incorporates two key aspects. First, ICTs create a basis for knowledge sharing within and among the organisations involved. Second, people are involved as individual actors within these organisations. To achieve fully effective knowledge-management systems both aspects have to be incorporated into a holistic approach. The combination of these two aspects creates what has been referred to as "knowledge networks" (Kandampully, 2002). Knowledge networks in logistics allow firms to create, share, and use strategic knowledge to improve operational efficiencies and to assist customers.

The business resource gained through these relationships and knowledge networks can thus be effectively used not only to improve firms' operational processes but also to enhance organisational knowledge acquisition and implementation, and trigger continuous learning (Scherer, 2000). Services are becoming increasingly complex and customer requirements are extending far beyond traditional transportation needs. Logistics firms therefore have to seek knowledge and expertise outside the realm of their traditional operations to effect the organisational transformation required to serve the entire logistical needs of the customer. Some of these needs include: customer service, transport and network management, multinational and multi-site inventory control, and multicultural facility location management. Thus leading logistics firms are obliged to seek and use new knowledge to innovate – primarily for the benefit of their customers. This new mindset recognises the fact that the all-important factor is the extrinsic organisational requirements of logistics firms necessary for the enhancement of customer value. The firm might thus choose to use various technologies and forge networks of relationships to extend its competency (knowledge), and thus offer higher value to the customer.

### **Innovation in logistics through relationship networks**

Since the 1970s, manufacturing firms have been faced with increasingly competitive pressure and increasingly discerning customers. These firms have been forced to

restructure both internal and external relationships to respond flexibly, innovatively, and rapidly to shifting and splintering market demand. International experience offers a host of examples of how manufacturers have successfully restructured to improve their international competitiveness (Kaplinsky, 1994; Gereffi, 1996; Schmitz, 1993; Schonberger, 1982, 1996; Piore and Sabel, 1984). An important component of such restructuring has been the recognition that firms cannot be islands of competitiveness in a sea of inefficiency. This recognition has created a major increase in importance of the value chain. The value chain concept was initially described by Porter (1985) and is inherently linked to the idea of relationship networks.

A value chain is a set of activities and processes tracing the stages of a product from raw materials to the final customer. Looking at the value chain as a whole requires looking at the product from the point of view of the customer – with companies providing links in the larger chain process, not merely as manufacturers of specific components. This is a subtle but significant shift in approach, and means that improving the overall value to the end customer requires suppliers and manufacturers in the chain to seek avenues for collaboration, rather than continual competition. These traditional competitive roles involved passing risk on to the supplier or buyer, and tough negotiations to get the best product or service for the lowest price in the short term. This resulted in contributors along the supply chain focusing on enlarging their profits at the expense of others in the supply chain. In contrast, recent international pressures for industry restructuring (Gereffi, 1996) focused attention on the importance of value-chain concepts. The value-chain perspective highlights interdependence among companies in a common value chain. Intermediaries become partners who deliver value to the customer, and the boundaries between organisations become more fluid as key inter-organisational business processes become more integrated. Information flows more freely along the channel and inter-company relationships broaden out to embrace logistics, merchandising, and product development – rather than simply being focused on purchasing and selling (Ernst & Young, 1999). Improving competitiveness requires both intra-firm and

inter-firm restructuring that places a major stress on the linkages among enterprises. The focus has had to shift from activity centred on individual firms to activity involving the value chains and clusters within which enterprises are embedded. This can be applied to the prevalence of logistics services throughout the supply chain, and reinforces the need for networks.

Logistics firms need to place considerable importance on relationships and networking. Critical linkages exist with other firms both up and down the supply chain, and also with firms outside the supply chain. Logistics firms should develop and maintain long-term strategic alliances with partners to improve performance in the areas of product handling, product tracking, information flow technology, and other product and process advancements. These, in turn, enhance customer satisfaction and firm performance (Epatko, 1994; Schilling and Hill, 1998; Vonderembse and Tracey, 1999; Shin *et al.*, 2000).

Organisational structures, and particularly inter-organisational structures, are important constraining or facilitating factors in logistics innovation. Firms can develop their innovative capabilities and meet the challenges for organisational learning only through adequate supportive organisational structures. In the UK, many utilities firms have joined in partnerships both up and down the supply chain. This collaborative or partnership approach is also evident within the Toyota supplier system in Japan. Such an intercompany network system greatly assists innovation in logistics. Szeto (2000) has supported the idea that inter-organisational networks with resource supplies and knowledge formation through repeated collaboration can enhance innovation capacity. The firms can “achieve financial information, latest technology and marketing intelligence, which supplement the collective innovation activities within the network” (Szeto, 2000, p. 158). The structure of inter-organisational networks has been examined by many authors, including Ghosal and Bartlett (1990), Jarillo (1998), Saxenian (1991), Snow *et al.* (1992), and Storper and Harrison (1991). Logistics integration links logistics activities to other functional areas within the firm and to the logistics activities of other firms. The authors listed above, along with many others in the past ten years or so,

have supported the notion that development of effective logistics networks leads to increased competitive scope, greater competitive advantage, and better performance.

By affiliating with networks in the industry, firms gain an opportunity to learn from best practice. Process improvement can be achieved through benchmarking within the supply chain, thus enabling logistics partners to learn from each other (Andersen *et al.*, 1999). Supplier relationships have recently adopted a changing role in which larger firms provide assistance and guidance in performance assessment or benchmarking within the supply-chain network. Similarly, appropriate performance-measurement systems can be developed and shared within the supply chain. Van Hock (2001) has stated that measurement systems contribute significantly to the expansion of alliances in supply chains. Attempts to improve efficiency and productivity in supply chains require a movement away from internal organisational measures, which, in turn, requires innovation in measurement and control systems and the development of stronger relationships across the whole supply chain.

The emphasis on supply-chain integration, value-chain approaches, and joint process improvement has altered the way in which logistics firms undertake, and benefit from, innovation. Companies are shifting inventory back up the supply chain, and are increasingly seeking integrated supply-chain solutions rather than individual, isolated improvements. Logistics networks are commonly strategically guided, extensive, and innovative. Such networks will almost certainly dominate the logistics industry over the coming decades.

## Conclusion

Logistics organisations are redesigning their structures and relationships and creating knowledge networks to facilitate improved communication of data, information, and knowledge, while improving their coordination, decision making, and planning. These new internal and external relationships are based on "new economy" technologies, and are in line with the new business paradigm. There are numerous benefits to be

gained by logistics firms through increased knowledge sharing. These include:

- the achievement of greater efficiency;
- increased customer satisfaction;
- better strategic planning;
- more flexibility and adaptation to market changes;
- improved decision making;
- rapid and flexible supply-chain management processes; and
- other benefits leading to rapid innovation capabilities.

Logistics firms need to reappraise the full extent and breadth of their functions, systems, and processes in the whole supply chain. They must aim to synchronise activities among the partners in the network with the aim of gaining and integrating knowledge. Application of new technologies, particularly ICTs, must be synchronised across the network to streamline management processes and provide efficiency and productivity improvement across the length of the supply chain. Only then can such firms be successful in reaping benefits from their innovative efforts. It is imperative for logistics firms to recognise this new business paradigm, and evolve to be part of it, if they are to stay ahead in the turbulent global economy. By recognising opportunities that emerge outside traditional business models, logistics firms must constantly seek new knowledge, "think for the customer", anticipate, and innovate services to meet customers' evolving needs. However, innovation *per se* is of limited significance in today's evolving business continuum. Rather, it is the value of the innovation as perceived by the customer that provides the advantage in a product or service. Service innovation results when a firm is able to focus its entire energies to think on behalf of the customer, and thus produce an outcome that surpasses customers' present expectation of superior value.

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