E-COMMERCE IMPACT ON THE LOGISTICS LANDSCAPE

SabariahYaakub
Dept. of International Business
SOIS, COLGIS
Universiti Utara Malaysia
Sintok, Kedah

Abstract

This paper provides a review of the e-commerce and logistics literature to develop a framework of e-commerce features and their logistical implications. The concept of e-commerce related to the field of logistics and the impact of features of e-commerce on characteristics of logistics will be discussed. This paper aims to develop theoretically based propositions of the impact of e-commerce on the logistics landscape.

Keywords:
E-commerce, Logistics, E-commerce Features, Logistics Landscape

Introduction

During the decade of 1990s, the world of commerce was irrevocably impacted by computerization, the Internet, and a range of inexpensive information transmission capabilities. Information characterized by speed, accessibility, accuracy, and most of all relevancy became the norm. The Internet has become a common and economical way to complete business-to-business (B2B) transactions (Bowersox et al., 2007). This digital age, also referred to as the e-commerce environment, has also been argued across the literature to bring changes to the logistics landscape. Electronic commerce, has revolutionized not only the way goods are sold, but how they are delivered (Bayles, 2001; UNCTAD, 2004; Maltz et al., 2004)

This paper will focus on the impact of e-commerce on logistics with the objective of developing a theoretical framework to depict the logistical implications resulting from the revolution of e-commerce based on a review of literature from the field of e-commerce and logistics.

E-commerce features

According to Laudon and Traver, there are seven unique features of e-commerce technology. These features are: ubiquity, global reach, universal standards, richness, interactivity, information density, and personalization/customization. Details of these features and their business significance are presented in Table 1.

Table 1: Seven Unique Features of E-Commerce Technology

E-commerce technology dimension	Business significance
Ubiquity- Internet/web technology is available everywhere: at work, at home, and elsewhere via mobile devices, anytime.	The marketplace is extended beyond traditional boundaries and is removed from a temporal and geographic location. "Marketspace" is created; shopping can take place anywhere. Customer convenience is enhanced, and shipping costs are reduced.
Global reach- the technology reaches across national boundaries, around the earth.	Commerce is enabled across cultural and national boundaries seamlessly without modification. "Marketspace" includes potentially billions of consumers and millions of businesses worldwide.
Universal standards- there is one set of technology standards, namely Internet standards.	There is one set of technical media standards across the globe.
Richness- video, audio, and text messages are possible.	Video, audio, and text marketing messages are integrated into a single marketing" message and consumer experience.
Interactivity- the technology works through interaction with the user.	Consumers are engaged in a dialog that dynamically adjusts the experience to the individual, and makes the consumer a co-participant in the process of delivering goods to the market.
Information density- the technology reduces information costs and raises quality.	Information processing, storage, and communication costs drop dramatically, while currency, accuracy, and timeliness improve greatly. Information becomes plentiful, cheap, and accurate.
Personalization/customization- the technology allows personalised messages to be delivered to individuals as well as groups.	Personalization of marketing messages and customization of products and services are based on individual characteristics.

Source: Laudon and Traver (2007, page 13).

We could, from the literature reviewed, presume that at least theoretically, there will be massive and unprecedented impacts of e-commerce which will change market structures and, therefore, force the companies to rethink their competitive strategies. For example, companies would have to rethink their marketing strategies using e-commerce technologies, such as web pages, and allow more interaction with customers online to be more competitive, i.e. enhancing the customer experience thereby improving customer service capability. The seven unique features of e-commerce discussed above (Table 1) will henceforth be used in the next section as the framework to analyse and discuss the impact of e-commerce on business environment.

E-Commerce Features and Logistics Implications

Ubiquity

Ubiquity, the 'everywhere', 'anywhere' availability feature of e-commerce technology (e.g. the Internet) significantly expands the size of the overall market and alters industry structures by creating new marketing channels (Laudon and Traver, 2007) and, more importantly, the

store is always open, therefore increasing the level of access for both the customers and the firm (Rayport and Jaworski, 2001; Maltz, 2004). This has two major impacts. On the customer side, the notion of convenience and availability is significantly altered because they can search, compare, and order anytime from multiple 'stores' anywhere; since anyone who has a computer and an Internet connection can become a potential customer, the most immediate impacts on the business environment are, according to Tarn et al., (2003) a huge customer base and unpredictability in demand.

To the firm, the impact of ubiquity is mainly in the form of connectivity. Golicic et al., (2002), argue in their study that connectivity in terms of market access enables the companies to access customers they could not reach prior to e-commerce. This, therefore, allows the companies to be interconnected to all their suppliers and customers. Laudon and Traver (2007) have also argued that to the firm, connectivity can create new efficiencies in industry operations and lower the costs of sales operations. As Fijalkowski (2002) has pointed out, the immediate impact of this connectivity is that it enables companies to gain access to a large network of distributors, bringing benefits similar to that of integrated supply.

Although most of the literature reviewed has looked at the convenience-availability phenomenon from the B2C perspective, it is also highly applicable to B2B. Arguably, ubiquity enables connectivity of firms in terms of market access to suppliers of goods and services. Manufacturers could experience convenience in searching for a more competitive supplier (that could be anywhere in the world) for their raw material and also for competitive logistics services providers to move these materials to their site/plant. Delfmann et al., (2002) strongly believe that this will introduce a change from stable, long-term relationships with suppliers to a more unstable spot-market relationship with changing suppliers/service providers. This change in relationship could lead to arm's length buyer-supplier relationship because of the relative difficulty in maintaining a long-term relationship when cost of service is the main competitive tool.

Customers could become highly sensitive to prices and quality of service that is available. They could easily switch to a more competitive seller due to the low searching and switching cost. In turn, these highly sensitive customers would demand competitive prices, quality products/services, and faster delivery with complete flexibility and convenience (Bayles, 2001; UNCTAD, 2001; Mahoney, 2001; Tarn et al., 2003). Bayles (2001) has described this phenomenon as seller to buyer power shift. Another aspect of purchasing through the Internet is that the customer can't physically view the product beforehand. Higher incidences of returned goods or cargo could occur if the customer is not happy with the goods that arrived (UNCTAD, 2001; Tarn et al., 2003).

Ubiquity, therefore, implies several logistics changes: substantial increase in small shipments; origins and destinations of shipments are more widely dispersed; customers have high expectations about quality of services and demand faster delivery; greater complexity in fulfilling international orders; and higher incidences of returned goods/cargo.

These changes also create new requirements for the logistics industry and its providers. Hulkrantz and Lumsden (2001), Nemoto et al., (2001), Richardson (2001), and Delfmann et al., (2002) predict a substantial increase in small shipments or what they refer to as reduced consignment size, which will lead to a more complex distribution system and more transportation assignments for logistics companies. Delfmann et al., (2002) have argued that this implies the design and implementation of completely new logistics systems. Completely

new logistics strategies, warehouses, commissioning systems and distribution concepts have to be developed.

The implication of widely dispersed origins and destinations of shipment is that there will be substitution of long-term predetermined logistics flows through stable networks by physical flows through constantly-and-fast-changing origin-and destination pairs. Long-term line services, which regularly shuttle on certain city-pair relations, may no longer be feasible. The logistics network configuration is permanently changing, creating the issue of geographical coverage for the logistics service providers. Furthermore, the increased number of potential transaction partners requires a shift from single customer warehousing towards multi-customer warehousing (Delfmann et al., 2002). This will in turn require LSPs to have flexible transportation capability, as well as warehousing scalability. Flexible transportation capability enables LSP to tackle the changing logistics transportation network configuration. Warehousing scalability would also enable LSPs to tackle the shift from single-customer to multi-customer warehousing.

Another interesting phenomenon is the prediction of higher incidences of returns. Returns imply the requirement for a facility that is prepared with enough space to receive and process the returns. Tarn et al., (2003) argues that any returns operation needs to be separate and distinct from the activities or operations in the fulfilment centre. At the same time, it must be easily integrated with other warehouse operations when the time comes to re-introduce the returned goods to inventory.

Global Reach

Global reach is arguably one of the most important catalysts to the significant impact of e-commerce on business environment. As commerce is enabled across cultural and national boundaries (Laudon and Traver, 2007) and does not have to be rooted at a particular geographic location (Wyckoff, 1997), it moves economic activity closer to some of the ideals of perfect competition: low transaction costs, low barriers to entry, and competition on a global scope (Laudon and Traver, 2007; Wyckoff, 1997).

Nemoto et al., (2001) and Damen (2001) have argued that global reach would increase global procurement, thereby increasing the average trip length (increasing the transportation distances of goods). Further supported by Bayles (2001) and Delfmann et al., (2002), this changes the logistics landscape from concentrated to longer, more dispersed global shipment. As with ubiquity impact, origins and destinations are more widely dispersed with longer distance coverage and greater complexity in fulfilling international orders than in traditional trade. Global reach implies that the logistics service providers (LSP) will have to cover all relevant geographical regions in order to solve the issue of geographical coverage. Milligan (2000) and Delfmann et al., (2002) argue that LSPs need to operate an extensive network in order to be able to cover all city-pairs required by their potential customers, thus becoming global providers.

It would seem therefore that not only do the LSP need flexible transportation capability, they would also have to offer a global service network. This could mean that the LSPs would have to develop ‘global presence capabilities’. This capability, according to study of LSP user requirements by Milligan (2000), is crucial in order for the LSP to keep up with the pace of change, especially those involving B2B commerce.

Universal Standards

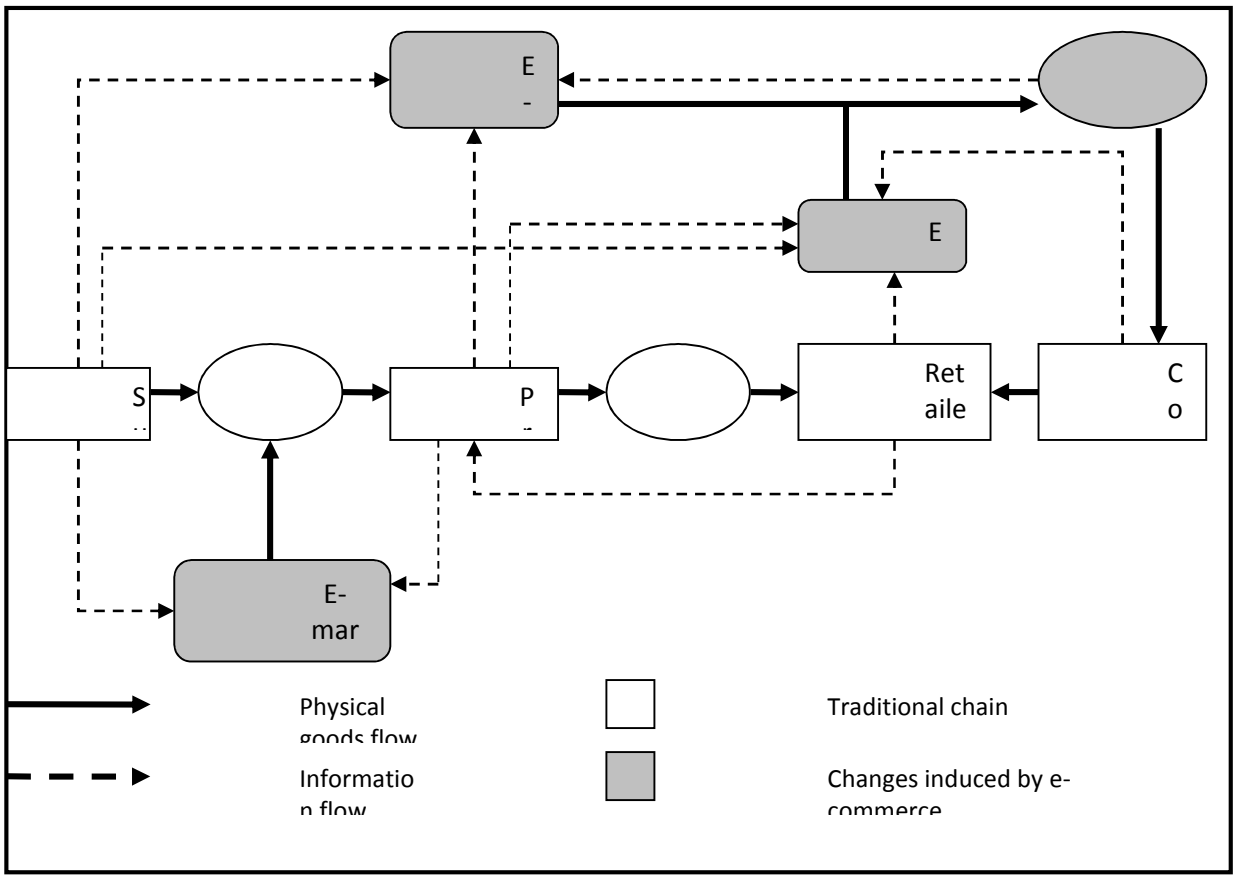
Universal standards, according to Laudon and Traver (2007) lower costs of industry operations by lowering computing and communication costs. Theoretically, this could drastically reduce the cost of establishing electronic market systems (Delfmann et al., 2002), thereby providing for the establishment of an electronic marketplace (e-marketplace). An E-marketplace is an Internet-based exchange site where suppliers, manufacturers, service providers, retailers, and wholesalers (members of the site) can offer and exchange products or services to each other efficiently with total visibility to all the members (Nemoto et al., 2001).

Waller (2004) has argued that an e-marketplace would change logistics management because these exchanges allow for communication, connectivity and collaboration among members. It could be argued therefore that the impact of universal standards is to change the logistics landscape by allowing the emergence of online trade exchanges (also referred to as an e-marketplace).

In the context of logistics service providers (LSP), e-marketplace providers, with the aim of providing their customers with higher service levels when trading in their market, are considering closer ties with pre-selected LSPs. In this case, a selection among LSPs becomes probable. Even when the Internet does not lead to the introduction of an electronic marketplace (e-marketplace), it is possible that there will be a much higher integration of supply chain partners that could lead to different order patterns and therefore to new challenges for LSPs (Delfmann et al., 2002).

Figure 2 depicts the new elements added to the generic supply chain by e-commerce applications that can either complement or substitute traditional supply chain structures relevant in the context of LSPs (Delfmann et al., 2002).

Figure 2: Generic supply chain and 3PL involvement



Source: Delfmann et al., (2002)

In Figure 2, the traditional chain elements would consist of both physical (material in forms of raw material, work-in progress i.e. components, and finished goods) and information flow from the supplier to the LSP to the producer/manufacturer, back to the LSP who will send it to the retailer/wholesaler who will sell the finished goods or components to the customer. Customers, in turn, give feedback to the retailer/wholesaler who will send this feedback to the producer.

In the e-commerce-induced chain, the major change is in the form of information flow. In this changed chain, suppliers supply information on their goods/services to the e-store and/or the e-marketplace. The producer will also visit the e-store and e-marketplace to browse the goods/services they are interested in and to compare prices between the suppliers offering the goods/services (which should eventually lead to buying). Consumers and retailers can also go to these e-stores and do the same activities as the producers: searching for products/services and comparing their prices. For the suppliers, producers, retailers/wholesalers, and the consumers, the e-store now becomes a common trading platform. The E-marketplace becomes a common trading place for suppliers, producers and 3PLs.

In the e-commerce induced chain, third party logistics companies (3PL) can handle physical goods flow-related services ordered directly from e-stores and this could include transportation, warehousing and freight forwarding. The order for logistics services for the 3PL can come directly from any of these parties/supply chain members who (virtually) frequent e-stores and/or e-marketplace: supplier, producer, retailer/wholesaler, and/or consumer. Because the e-

store and e-marketplace are mostly dealing in information flow, the 3PL companies would then also be involved in information-type transactions such as disseminating information on freight rate and service price. It could also involve information exchange such as tracing and tracking shipments. Delfmann et al., (2002) have also argued that management support capabilities would be needed to provide services such as in-depth management/logistics know-how such as logistics project controlling, logistics consultation, location analysis and layout design – services usually traded over the e-marketplace.

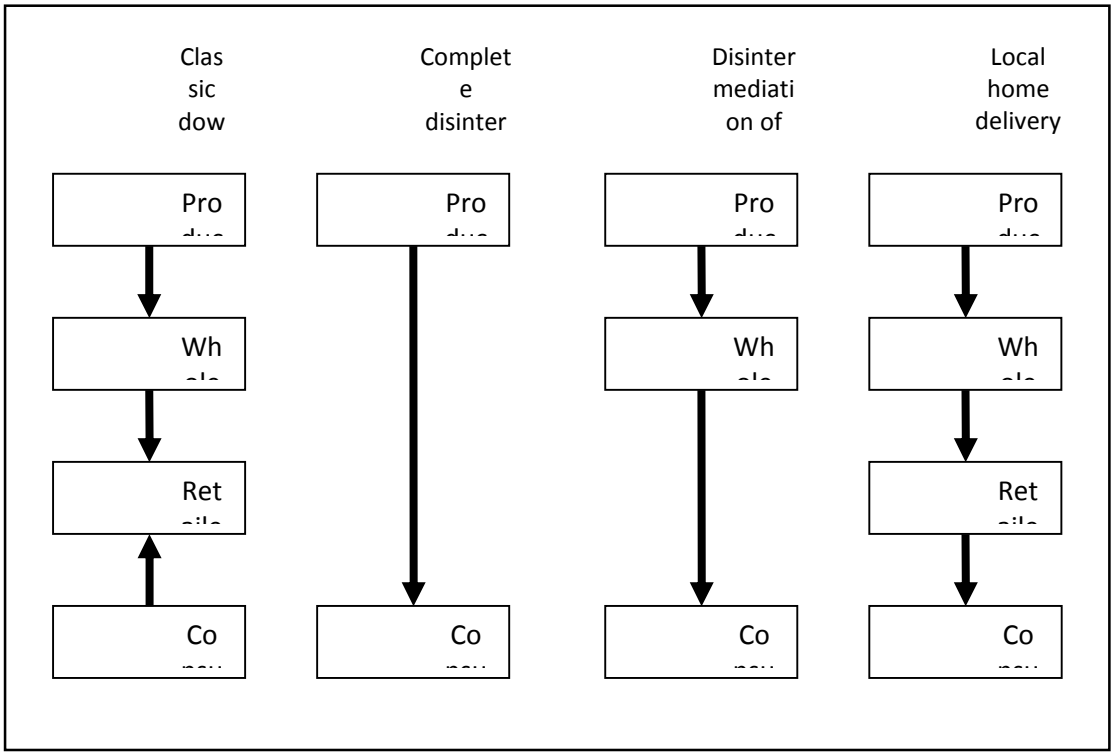
Richness

Richness reduces the strength of powerful distribution channels (Laudon and Traver, 2007) and therefore dramatically shrinks the distance between producers and consumers because purchases or selling can now be conducted directly without involving traditional middlemen, for example retailers and wholesalers (Wyckoff, 1997). This is the phenomenon many authors in the e-commerce field have described as disintermediation (Wyckoff, 1997; Evans and Wurster, 2000; Delfmann et al., 2001 etc.).

Disintermediation has been proposed by Mukhopadhyay and Setoputro (2004) as an alternative model for the manufacturer-customer supply chain to reduce distribution costs and to be more responsive to customer requirements.

To better understand the phenomenon of disintermediation and its subsequent effect on logistics, Figure 3 is offered.

Figure 3: Forms of supply chain disintermediation



Source: Delfmann et al., (2002)

As depicted in the Figure 3, e-commerce produces the most changes in the stage between consumer and retailer. If the retailer stage is not skipped, decentralised and uncoordinated logistics activities from individual customers could be transformed into potentially bundled goods flow thereby allowing room for sophisticated planning and design of effective logistics system. Delfmann et al., (2002) theoretically proposed this as the first effect of disintermediation on logistics.

However, if the retailer is skipped, highly bundled shipments to retailers are substituted with small packages to end consumers. This impact is interrelated with ubiquity and global reach. As a consequence, both the retailer and the producer will have to reconfigure their established logistics systems from consolidated or bundled shipments to small packages. This is the second effect of disintermediation on logistics (Delfmann et al., 2002).

In the case of complete disintermediation, the producer offering direct home delivery has to answer the question of who will fulfil the vast array of functions that are normally fulfilled by the wholesaler and the retailer (as in the traditional distribution case). The Internet could probably fill the most important functions of an assortment of goods, but somebody would still have to manage inventory, pick and pack, and ship items – on a larger scale (Delfmann et al., 2002).

Although Delfmann et al., (2002) demonstrated that richness produces a powerful disintermediation impact and, therefore, major changes to the logistics system, these impacts are not all that different from the impact produced by ubiquity and global reach. Richness impact in the form of disintermediation would basically change logistics in terms of shipment from bundled consignments to smaller packages.

A distribution chain that bypasses these stages would have to handle smaller shipments which have to be shipped directly to the consumer. This is not only of relevance for the transportation process but has implications for all prior activities such as warehousing, commissioning, labelling payment (Delfmann et al., 2002).Logistics service providers (LSPs) are expected to take over the distribution of small packages to end consumers. In order to do this, the 3PL is required to operate large networks as well as the dedicated transportation and handling capacities to transport the packages in a short time. This favours large operating distribution systems because timely delivery requires the establishment of large transportation networks. It also requires the LSP to possess in-depth logistics know-how. The demand for logistical consulting and other services will rise (Delfmann et al., 2002).

Another dimension of richness-related changes is greater scope for customer service. Richness enables the consumer to receive and experience integrated video, audio, and text messages (Laudon andTraver, 2007), thereby providing greater scope for customer self-service, for example completing the order form online and completing the export/import documentation on their side.

Customer service increased scope requires the LSP to have both pre-sale and post-sale capabilities. Pre-sale capabilities would enable the LSP to service the customer during the purchase decision process, for example providing information before the customer buys the services. Post-sale customer service enables the LSP to service the customer after the sale of the product or in the LSP instance, their service. This, according to Cho (2001) will ensure continuing customer satisfaction.

Interactivity

Interactiveness, according to Laudon and Traver (2007), impact the business environment by reducing reliance on sales forces, thereby reducing operations costs and enabling web-based differentiation strategies. The web-based differentiation strategies could include strategies such as the customer being able to interact with the manufacturer or logistics service provider on their order specifications via the web or self-help/troubleshooting tools provided to the customer by the manufacturing or logistics service provider companies through the companies' websites.

With regards to the supply chain, Hulkrantz and Lumsden (2001) further propose that suppliers could also be included as joint venture partners as well as customers as co-product developer, building a network of manufacturers, suppliers and customers. Golicic et al., (2002) stress that related to building networks, supply chain relationship management then becomes critical. Therefore, for this relationship to work, many companies partner with information technology providers and consultants for tacit knowledge, stability, flexibility, and growth scalability. This is where logistics service providers are presented with opportunities because, theoretically, according to Golicic et al., (2002), they are believed to have information technology and consultancy expertise.

Partnering with other companies/providers (for technology, consultancy or numerous other purposes) essentially requires interactivity to co-participate in the delivery process. Manufacturers, for example, would theoretically require a system that would enable them to electronically place orders and process their shipments. This would make the network management efficient and enhance the supply chain relationship.

Therefore, in theory, interactivity would change the logistics landscape by creating demand for on-line processing of shipments. UNCTAD (2001) suggest that this could include cargo bookings; bills of lading/airway bills; freight payment; rate quotations; landed price calculations; and tariff management. Related to this, it would seem that when the customer could actively participate in the shipment process, it also provides for an avenue of customer self-service.

The intensity of communication and sharing of information associated with on-line processing of shipments require efficient and effective flow of information. Information flow management capability is therefore essential providing ability to manage, communicate and share information across the supply chain with speed, flexibility, and specificity.

Information Density

Information density is possibly the most important feature of e-commerce. Many authors, for example Laudon and Traver (2007); Rayport and Jaworski (2001); Golicic et al., (2002), have argued that more significantly, as information now becomes plentiful, cheap and accurate, the cost of obtaining, processing and distributing information to/about customers and suppliers now becomes easier and cheaper. Perhaps more importantly, the information is more reliable, accurate, and visible to all parties in the supply chain. In short, this most attractive feature of e-commerce provides information visibility and allows companies to communicate and share information accurately and reliably across the supply chain.

In traditional logistics processes, the supply chain is fragmented where information tends to flow between individual parties in the supply chain without end-to-end visibility across the chain from producer to consumer. Often the various links of the supply chain have limited visibility into the operations of one another. The capability for end-to-end visibility of a package from manufacturer to customer has been virtually non-existent in a traditional logistics environment (UNCTAD, 2001; Bayles, 2001; Koh and Tan, 2005).

The information technology evolution has led to the restructuring of logistics into two separate yet linked domains. One domain deals with physical goods flows, the other with the flow of information associated with those goods or services being sold (Lewis, 2001; Bhatt and Emdal, 2001; Mahoney, 2001). Information density feature has the strongest impact on the information flow domain of logistics.

Authors such as Rayport and Jaworski (2001); Nemoto et al., (2001); Golicic et al., (2002); Mentzer et al., (2004); Bowersox (2007) have strongly argued that the information density-related feature of the Internet has allowed communication and information sharing across the supply chain and increased access to unique, heretofore nonexistent information. In other words, there is the potential for information visibility across the supply chain for interested supply chain partners/members. The most apparent changes to logistics as a result of

information density are therefore: potential for all firms participating in the supply chain to simultaneously have access to the same strategic and operational information (Tarn et al., 2003; Bowersox et al., 2007) leading to information visibility over the entire supply chain.

Bayles (2001); Hulkrantz and Lumsden (2001); and UNCTAD (2001) have argued that an effect of information density is a shift in the bargaining power to the customer. These authors argue that customers want to be able to track the status of their orders, reroute packages and determine delivery costs etc. This power shift effectively creates a demand for visibility and availability of information across the supply chain.

Therefore, information access and visibility, coupled with cheap, plentiful and accurate information have been rightly argued to change the logistics landscape by creating greater demand for and availability of information covering transactions over the entire supply chain (UNCTAD, 2001; Bayles, 2001; Mahoney, 2001).

Personalisation/Customisation

Personalization/customization, impacts the business environment by enabling personalised marketing strategies, therefore reducing threats of substitutes (Laudon and Traver, 2007). Rayport and Jaworski (2001) argue that firms are able to provide personalised service to their customers because they have knowledge of customer behaviour through the unprecedented customer behaviour tracking that e-commerce provides. Hulkrantz and Lumsden (2001) have suggested that this phenomenon could result in production made to order instead of to stock, and create loyal customer segments. This would mean that the production strategy will change from a push to a pull strategy. Other authors, such as Bayles (2001) and UNCTAD (2001), have also reinforced this theory in that manufacturers must be able to customise individual orders and personalise deliveries.

Logistically, the impact is where service requests vary over broader ranges and change frequently with alterations even during executions, increasing the dynamical aspect of the request (Damen, 2001). In short, there will be greater focus on one-to-one marketing, which creates demand for customised delivery and post-transaction customer services (UNCTAD, 2001). Sink et al., (1994) and Wyckoff (1997) argued long before that users of the 3PL services view their logistical needs and problems as unique, requiring individual attention and custom solutions, third party logistics service providers must attempt to diagnose and conceptualize the potential client's needs, ask the proper questions and tailor their offerings to meet and exceed customer expectations. Hoek (2000) has supported this theory by proposing that third party logistics service providers offer customised services, supplementary to existing services, to deepen the customer relationship, thus potentially positioning the providers to a value-added solution provider status.

Speed

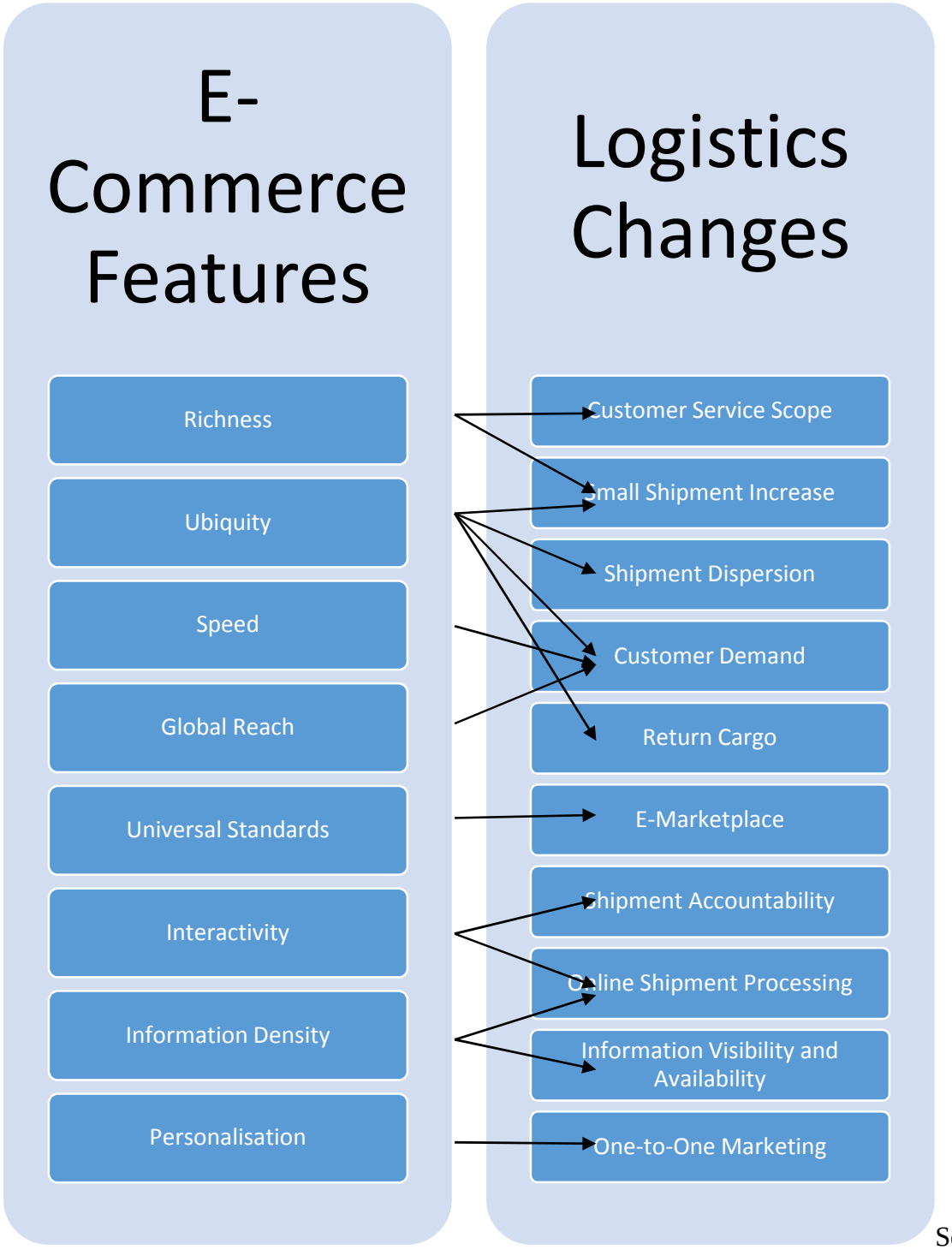
The framework of unique features of e-commerce provided by Laudon and Traver (2007), although very useful, does seem to be missing another very attractive feature of e-commerce. This feature, proposed by authors such as Golicic et al., (2002) and Tarn et al., (2003), is speed. Golicic et al., argue that business takes place rapidly in e-commerce, and the two most important components with regards to its speed are the increasing rate of change and the pace of decision-making. Electronic business evolves very quickly and faster execution of processes is, therefore, required. In this dynamic market structure, companies have to continually adapt to the rapid rate of change, and this produces an uncertain environment that may cause management difficulties for the companies.

This changes the logistics landscape in terms of fulfilment process where faster execution is required. Damen (2001) has argued that lead time will become shorter and service requests will change rapidly. Maltz et al., (2004) argue that logistics managers must supply information at Internet (rapid) speed, consistent with the instant feedback that customers expect from websites. Park and Kim (2002) further support this argument by stating that customer's desires are increasingly moving from simple transportation and storage to high-quality logistics services, emphasising rapid, accurate and safe transportation. Related to the ubiquity feature, because they can search for products or services quickly through the Internet, customers expect their orders to be fulfilled expeditiously, accurately and smoothly to their personalised preference. In short, the customer is now more time-sensitive (Nemoto et al., 2001), therefore demanding faster delivery (UNCTAD, 2001).

Speed requires faster execution of business and logistics processes so that lead time can be shorter and faster delivery can be achieved, and also rapid supply of information provided to the customer (Damen, 2001; Park and Kim, 2002; Maltz et al., 2004). As speed and accuracy are key factors in retaining customers especially in the e-commerce environment, Bhatnagar et al., (1999); and Tarn et al., (2003) have suggested applying automation, increasing process integration, speeding the flow of information upstream and expediting logistics activities through the entire supply chain.

Following the literature review, analysis and discussion on e-commerce features (ubiquity, richness, speed, global reach, universal standards, interactivity, information density, and personalization/customization), and its implications for logistics, the resulting synthesis of the theoretical relationship between e-commerce features, logistics changes, and logistics capabilities is presented in Figure 3.5.

Figure 4: Theoretical Framework of E-commerce features and their logistical implications



Source: Author, 2014

Conclusion

Electronic commerce demands an agile, high velocity approach to logistics. For example, a manufacturer or online merchant must be able to customise an individual order; ship it directly to the buyer anywhere in the world; track the whereabouts of the item at any given time along the supply chain; handle customer enquiries; handle product returns; and even offer gift wrapping – all at ten times the speed and at a fraction of the cost of traditional shipping and fulfilment (Bayles, 2001). At the same time, customers' desires are increasingly moving from simple transportation and storage to high-quality logistics services emphasising rapid, accurate and safe transportation (Park and Kim, 2002).

Logistics, therefore, is being restructured due to the information technology revolution and the rise of e-commerce (Lewis, 2001). Many major characteristics of e-commerce have been argued to impose new requirements on logistics services. In other words, a different characteristic of logistics is emerging or is expected to emerge as a result of e-commerce (Bayles, 2001; UNCTAD, 2004, Maltz et al., 2004). Bolseth and Solem (2005), for example, have strongly argued that the logistics process would be performed in a new or more automated way, meaning there will be automation of business processes along the supply chain. Several authors have also argued that the advent of the new digital economy has triggered a new type of logistics: e-logistics. E-logistics is seen as the physical fulfilment of the new transaction possibilities created through electronic business and electronic commerce. E-logistics is the agile and flexible logistics designed for the digital economy using electronic means of communication that provides both the front and back end logistics support (Ee, 2001; Bolseth and Solem, 2005).

Thus, e-commerce will open entirely new opportunities for actors in the logistics field. Logistics and distribution will need to function more effectively and efficiently in all respects because this will be crucial for the success of the companies involved. All these changes would mean that the logistics service providers would also have to change the way they do business in order to stay competitive. This implies that companies, and especially logistics companies, must identify and create new effective logistics solutions in order to compete in the marketplace (Hulkrantz and Lumsden, 2001). Conducting operations differently would take up a lot of effort and cost so there must be empirical evidence that these changes are necessary. This could be an avenue for future research.