

A Review: Applications of E-Commerce in Logistic Management System

Agus Pahala Simbolon (M10201813), Jonathan Marcel (M10201814), 邱繼榮 (M10101201),
呂皓瑋 (M10101208), 王鈴慧 (M10101203)

1. Introduction

Logistics plays a major role in enhancing organizational competitiveness by improving the information and material flows along the supply chain. Successful logistics operations not only enable rapid organizational market reach, with delivery of competitive products, but it may also reduce the total cost of these products while simultaneously improving customer satisfaction.

As the increasing growth of the Internet has changed the way corporations conduct business, logistics service providers must consider changing their traditional logistic system into an e-logistic system (Gunasekaran and Sarkis, 2008).

2. E-Commerce

Electronic commerce is the sharing of business information, maintaining business relationships, and conducting business transactions by means of telecommunication networks. The Internet has gained tremendous popularity worldwide and is beginning to revolutionize and globalize the entire commercial environment, also allowing interconnections between people and businesses at very low cost (Leung et al, 2001). As new Internet technologies and new business models are created, a virtual electronic market is formed that offers businesses major improvements in reaching new customers. The Internet has also diminished the need for retailers, thus gradually eliminating the corresponding physical distribution link and related inventory as well. Large manufacturers and small medium enterprises are now able to sell their products directly to the other side of the globe in small quantities.

3. Factors Impacting the Growth of e-commerce

3.1. Information technology and Telecommunication Systems

The computer, internet, and information infrastructure have firm impact on reaching consumers and business. E-commerce depends on high performance hardware, software, and communications to deliver information wherever the user or information is located. However, the infrastructure are lacking in developing countries, limiting their growth and participation in e-commerce. Although many information technology firms in developing countries have shown interest in internet as basis of expanding e-commerce, the gap still wide compared with developed nations and takes time to catch up.

3.2. Social/cultural infrastructure

Naturally, business decisions affected by social structure, e.g. cost of doing business, selecting suppliers in a country, and developing long-term relationships with the suppliers. Technological sophistication, e.g. familiarity about internet, is important factor that influences the growth of E-commerce. In technologically sophisticated market, existing products/services may be modified to include new technological designs and features, which have advantage over traditional business.

3.3. Commercial Infrastructure

Commercial infrastructure, such as availability, convenience, and quality of supporting services as banks, hardware manufacturers, access to IT specialists, information and network access providers, and

market research organizations are critical to the growth of e-commerce. The infrastructures are important to satisfy the current and future requirements of e-commerce, and the government plays a key role in supporting the industry.

3.4. Government/legal Infrastructure

The policies issued by government that promote supporting industries, e.g. Information technology, could help assist in achieving strong link with the world community. Lack of internationally supporting industries will hinder the growth of E-commerce. Some e-commerce issues that demand swift attention to ensure that domestic e-commerce compatible with international internet community are: customs, taxation, electronic payment systems, privacy, intellectual properties, content of material in internet, etc.

4. The Nature of the E-commerce Environment

4.1. Speed

The speed of e-commerce focused on two components, the increasing rate of change and the pace of decision making. Because e-commerce is emerging markets, so the companies are trying to get to market with their offerings faster than companies operating in traditional markets. Faster execution of process allowed companies to reduce costs, improve quality, and attract customers. E-commerce is the business in real time where quick decision making is the key.

4.2. Connectivity

Two components of connectivity are interaction and market access. Internet allows companies to communicate and share information across supply chain. The companies also get ability to reach customers they could not reach prior to e-commerce. In addition to

providing firms the opportunity to strengthen relationships with customers, the electronic environment also expands to develop customer base, thus eliminating the restriction of market by geographical locations.

4.3. Information Visibility

E-commerce technology provides information visibility through supply chain. The information visibility enables businesses to manage their operations more effective. Visibility of information across supply chain as opposed to information from one supplier to customer provides for better management of supply chain.

4.4. Market Structures

E-commerce has driven a shift in market structures. The emerging electronic market provides opportunity for manufacturer to market directly to customers, eliminating need of traditional intermediaries. In the new environment, function and power shift among all members of the value chain – suppliers, manufacturers, retailers, and consumers – blurs the boundaries among players in traditional industry structures.

4.5. Uncertainty

The characteristics of uncertainty are dynamism, technological intensity, and change, which are all the characteristics of e-commerce environment. Dynamic environment, moreover technological intensity could generate uncertainty for decision makers. No longer can the businesses work like they used to do before.

5. Impact of E-Commerce on Organization

A surveys that conducted by Rutner et al. (2003) has revealed some facts about logistic system on e-commerce.

5.1. Logistic integration

The integrated logistic concept had been recognized within the organization, but not

adopted yet. Surprisingly, this finding had not change much from any of the previous Gustin surveys (1984, 1993, and 1995). With the growth of logistic knowledge and logistic information system (LIS) throughout industry, the assumption would be that more firms would have migrated through the various phases toward the full integration.

5.2. Electronic commerce and logistic

The surveys reported a high usage of e-commerce in company. However, many companies highly use one area of e-commerce (intranet) and little use of other portion. Another finding of the usage of e-commerce identifies that there appears to be a sequence or process that companies follow when adopting e-commerce. First, a company will have an internal intranet then followed by a sales oriented approach with the adoption of a sales Internet page(s). The relationship between e-commerce and logistic integration presents both interesting findings and opportunities to organizations. First, the results present a baseline for companies to benchmark their operations. Furthermore, the more advanced companies have tied their logistics operations with other portions of the firm to include e-commerce.

5.3. Enterprise resource planning (ERP) and logistics

E-commerce and ERP are becoming widely accepted business tools throughout the supply chain. Also, it appears that companies are at different levels of implementation and are not choosing to adopt all subsystems. Both e-commerce and ERP are directly related to the level logistic integration throughout the organization. The companies that integrate logistics appear to be more successful at implementing the more current systems of ERP and e-commerce.

6. Other Research

Kun et al (2008) examine the impact of logistics capability and logistics outsourcing on firm performance in an e-commerce market environment. It is revealed that logistics capability to be positively related to firm performance in the e-commerce market. However, counter-intuitively, logistics outsourcing and firm performance were not found to be positively linked. Further, the association between logistics capability and outsourcing was not supported. Finally, the interactive effect of logistics outsourcing on the relationship between logistics capability and firm performance was not sustained.

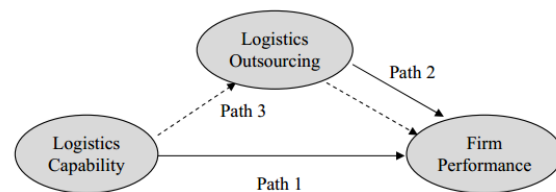


Figure 1. Illustrative conceptual model of relationships

Their study finds that logistics capability is critical for superior firm performance in e-commerce. However, firms should avoid logistics outsourcing if performance is predicated on competitive advantage due to internally strong logistics capability and competencies.

Ramanathan (2010) explore how the relationships between logistics performance and customer loyalty in e-commerce are affected by risk characteristics of products and efficiencies of the websites. Efficiency is interpreted as the ability of the websites to achieve good ratings in terms of operational factors and customer loyalty, while risk is defined in terms of price and ambiguity of products. The results show that efficiency is a significant moderator of the impact of logistics performance on customer loyalty. Since efficient e-commerce websites could better convert their logistics performance into customer loyalty, website managers should ensure that goods ordered via their website reaches customers by ensuring high levels of

logistics performance. This would necessitate adequate arrangements of various logistics functions (warehousing, order-picking, transportation, etc.) either in-house or outsourced.

Jiao et al. (2003) elaborate framework for re-engineering business model for e-logistics. The framework based on business process re-engineering (BPR), emphasizing the re-engineering of business models for e-logistics through value chain mapping and analysis. There are two important ideas with respect to the customer, which the customer must become the center of everything the business does, and customers drive the entire business systems. The road map of re-engineering is presented on below figure:

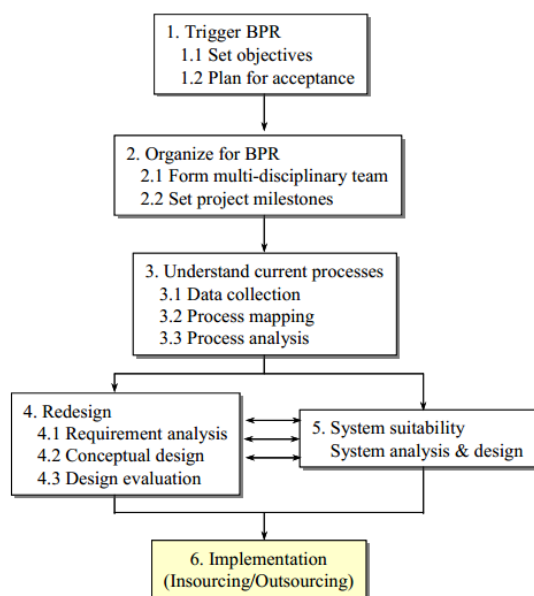


Figure 2. A BPR-based roadmap of information systems planning for e-logistics

The framework has successfully implemented on SSM Virtual fab. The BPR not only enables a systematic approach to e-logistics implementation, but also helps the organization understand the core competency, leverage its businesses, and align the integration of information systems with the organizational objectives.

Ying et al (2005) said that 3PL vendor in e-commerce environment is a professional logistics company getting profit by taking charge of part or whole logistics in the supply chain of a focal enterprise. By building up virtual private logistics subsystem (VPL) with a multi-agent system, a 3PL vendor could integrate its logistics business process with the business process of the supply chain members, making the logistics flow and the logistics information flow seamlessly connected with the financing flow and trading flow of the supply chain. The 3PL vendor would keep the stability of its own business process while providing customized services to the supply chain members.

Rutner et al (2003) investigate some issue related to increasing information requirement in E-commerce environment, which enables the integration of logistics information systems (LIS) and supply chain information systems in many companies. Thus, the implementation of EC and ERP systems improves both the access to and linkages among diverse types of information that are important to the logistics function. If current trends in logistics and information systems integration persist, the level of system complexity will increase, as more and more inter-enterprise functionality is added. As such, it will be to strengthen and tighten the working relationships between the two functions—i.e., information systems will need to support logistics, and vice versa.

Weber et al (2009) compare the energy use in e-commerce and traditional retail systems of electronic product. The major differences between the traditional retail model and the e-commerce model are the transportation from the warehouses to the retail store or the distribution center, data center energy usage, individual vs. bulk packaging, and the transportation, from the store or distribution center to the consumer, often called the “last mile” of delivery. These differences vary in energy usage and intensity. Overall, e-commerce had about 30% lower energy consumption and CO2 emissions compared to traditional retail.

Leung et al (2000) inquire the air cargo industry network, which has e-commerce as an enabler. The air cargo industry can be transformed into one that can provide customized services to individual shippers at the cost level of mass production, which the key component is the setting up of a third-party e-commerce community network. A framework proposed for such network extends the traditional business-to-business (B2B) e-commerce to e-commerce at the industry level.

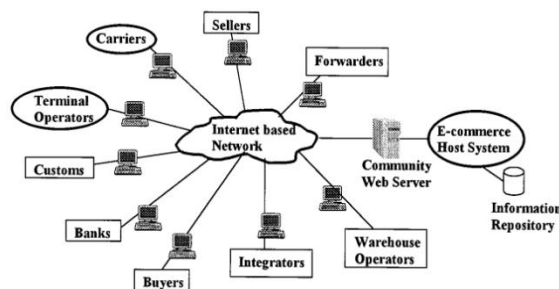


Figure-3. Schematic framework of logistics community network

The proposed framework provides a virtual market for agents of the air cargo industry, enabling them to develop and engage in logistics integration. It also facilitates tracking and tracing, and minimizes unnecessary travel and inventory costs—thus achieving Supply Chain Management (SCM) at the industry level. It is a virtual integration platform, facilitating innovative products and processes in the air cargo industry and motivates the re-engineering of business processes in the air cargo industry.

7. Conclusion

Considering the growing importance of outsourcing and information technology, the logistics supply chain is poised to become an important element of 21st century operations paradigm incorporating the perspectives of virtual enterprises and the Internet-enabled supply chain management. The complication of logistic in supply chain system will need and encourage more researches in this area.

8. References

1. Susan L. Golicic, Donna F. Davis, Teresa M. McCarthy, John T. Mentzer, "The impact of e-commerce on supply chain relationships," *International Journal of Physical Distribution & Logistics Management*, vol. 32, issue 10, pp 851-871, 2002.
2. Rajshekhar Javalgi, Rosemary Ramsey, "Strategic issues of e-commerce as an alternative global distribution system," *International Marketing Review*, vol. 18, issue 4, pp.376-391, 2001.
3. Ramakrishnan Ramanathan, "The moderating roles of risk and efficiency on the relationship between logistics performance and customer loyalty in e-commerce," *Transportation Research Part E: Logistics and Transportation Review*, vol. 46, issue 6, pp. 950-962, 2010.
4. Jay Joong-Kun Cho, John Ozment, Harry Sink, "Logistics capability, logistics outsourcing and firm performance in an e-commerce market," *International Journal of Physical Distribution & Logistics Management*, vol. 38, issue 5, pp.336-359, 2008.
5. Elayne Coakes and Jim Coakes, "BPR for Developing Information Systems — a case study," in proceeding of: *Software Quality and Productivity: Theory, practice and training*, 1995, pp 45-49
6. Wang Ying and Sang Dayong, "Multi-agent framework for third party logistics in E-commerce," *Expert Systems with Applications*, vol. 29, issue 2, pp. 431-436, 2005.
7. C.L., Weber, C.T. Hendrickson, H.S., Matthews, A. Nagengast, R. Nealer, P. Jaramilo, "Life cycle comparison of traditional retail and e-commerce logistics for electronic products: A case study of buy.com," in *IEEE International Symposium on Sustainable Systems and Technology*, 2009, pp. 1-6
8. Leung, L.C., W. Cheung and Y.V. Hui, "A Framework for a Logistics E-Commerce Community Network: The Hong Kong Air Cargo Industry," *IEEE Transactions on Systems, Man, and Cybernetics - Part A: Systems and Humans*, Vol. 30, issue. 4, pp. 446-455, 2001
9. S.M. Rutner, B.J. Gibson, S.R., Williams, "The impacts of the integrated logistics systems on electronic commerce and enterprise resource planning systems," *Transportation Research Part E: Logistics and Transportation Review*, vol. 39, issue 2, pp. 83-93, 2003.
10. A. Gunasekaran, J. Sarkis, "Research and applications in e-commerce and third-party logistics management," *International Journal of Production Economics*, vol. 113, issue 1, pp. 123-126, 2008.