

The Importance of E-business in Supply Chain

Milićević Nikola, Leković Sonja

Ekonomski fakultet Subotica, Subotica, Srbija
milicevic.nikola@ef.uns.ac.rs; sonjalekovic@ef.uns.ac.rs

Abstract - In order to meet the needs and requirements of final customers, market participants will work together, setting up various co-operative partnerships. They invest all their energy in the process of creating customer value to their buyers. As the result, they establish supply chains, through which synergy can be achieved. There are many processes directed towards the planning, organization and control of the smooth, continuous flow of products and services from suppliers to end customers. Among them, procurement, manufacturing and logistics activities take very important role. All these processes have been influenced by Information revolution, followed by the development and implementation of Internet technology. Internet technology is also available to end-customers, which enables the firms to directly communicate with them and to get the required information. By implementing these systems companies can optimize their activities, in addition to increase operational and cost efficiency. Also, it enables better information connections between participants, which improves the coordination of all processes in the chain. The aim of this paper is to indicate the benefits and the importance of the Internet and e-business in supply chain.

I. INTRODUCTION

Today, many companies establish special business chains to achieve their common objectives. Manufacturers, distributors, transporters, retailers and other participants, cooperate in order to satisfy the final customer, by offering appropriate product, or service with acceptable conditions. They form supply chains, through which they try to create the best mix of responsiveness and efficiency for the market being served. Their work and results depend on many factors, among which technology has a very important role. It enables process automation, standardization, and simplification, therefore enhancing process efficiency, organizational productivity, and effectiveness.

Computer technology and modern communication systems create a special environment for e-business. The spread of e-business has allowed many companies to build supply chains that have a competitive advantage in their markets. These companies are much more capable to react quickly to changes in market demand. Also, their business efficiency, which is becoming a central fact in many markets, is on a higher level.

To develop these advantages, individual companies and entire supply chains need to learn new behaviors and they need to enable these new behaviors with the use of e-business technology. Very important role in this process belongs to Internet technology, that has become one of the most cost effective mean of driving supply chain integration. There are various forms of e-Business applications, among which three categories have a special place – e-Commerce, e-Procurement, and e-Collaboration. e-Commerce helps a network of supply chain partners to identify and respond quickly to changing customer demand captured over the Internet. e-Procurement allows companies to use the Internet for procuring direct or indirect materials, as well as handling value-added services like transportation, warehousing, customs clearing, payment, quality validation, and documentation. e-Collaboration facilitates coordination of various decisions and activities beyond transactions among the supply chain partners over the Internet. With a use of these technologies, companies in their supply chains, not only can achieve higher process efficiency, but also can increase responsiveness, and therefore revenue-enhancing opportunities.

II. THE CONCEPT OF SUPPLY CHAIN MANAGEMENT

The term “supply chain management” arose in the late 1980s and came into widespread use in the 1990s. To that time, words as “logistics” and “operations management” were used instead. There are various definitions for supply chain, that change with the industry vertical and the context. Some of them are represented in the following table.

A supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. It encompasses the companies and the business activities needed to design, make, deliver, and use a product or service. The supply chain not only includes the manufacturer and suppliers, but also transporters, warehouses, retailers, and customers themselves. They all participate in activities from purchasing basic commodities to selling the final product to the end-customer, and also in recycling the used product. Material flows from a basic commodity (such as a bauxite mine as a source of aluminium ore) to the finished product (such as a can of cola) (Harrison A., Van Hoek R, 2008., p.6.).

Table 1.: Definitions of supply chain

Definitions	Source
“A supply chain is a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers.”	Ganeshan and Harrison: “ <i>An Introduction to Supply Chain Management</i> ”, Penn State University, 1995.
“A supply chain is the alignment of firms that bring products or services to market.”	Lambert, Stock, and Ellram: “ <i>Fundamentals of Logistics Management</i> “, McGraw-Hill, 1998.
“The systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole.”	Mentzer, DeWitt, Deebler, Min, Nix, Smith, and Zacharia: “ <i>Defining Supply Chain Management</i> ”, Journal of Business Logistics, 2001.
“Supply chain management is the coordination of production, inventory, location, and transportation among the participants in a supply chain to achieve the best mix of responsiveness and efficiency for the market being served.”	Hugos M.: “ <i>Essentials of Supply Chain Management</i> ”, John Wiley & Sons, 2003.
“A supply chain encompasses all activities associated with the flow and transformation of goods from the raw material stage (extraction), through to the end user, as well as the associated information flows.”	Chopra, S., Meindl, P.: “ <i>Supply chain management: Strategy, Planning, and Operation</i> ”, New Jersey: Pearson Education, 2004.
“A supply chain is a network of partners who collectively convert basic commodity (upstream) into a finished product (downstream) that is valued by end-customer, and who manage returns at each stage.”	Harrison A., Van Hoek R.: “ <i>Logistics Management and Strategy: Competing through the supply chain</i> ”, Prentice Hall, 2008.

On this flow, there are two ends, the demand end and the supply end. The demand end of the supply chain models elements of the supply chain where the demand originates. Examples of the demand end are stores, a Web-storefront, or customers. This end can be also called the downstream. The supply end of a supply chain

represents the sources of supply, such as suppliers’ warehouses or a factory. These represent the supply chain elements that provide supplies to address the demand generated at the other end of the supply chain. This end is called the upstream (Sehgal V. 2009.)

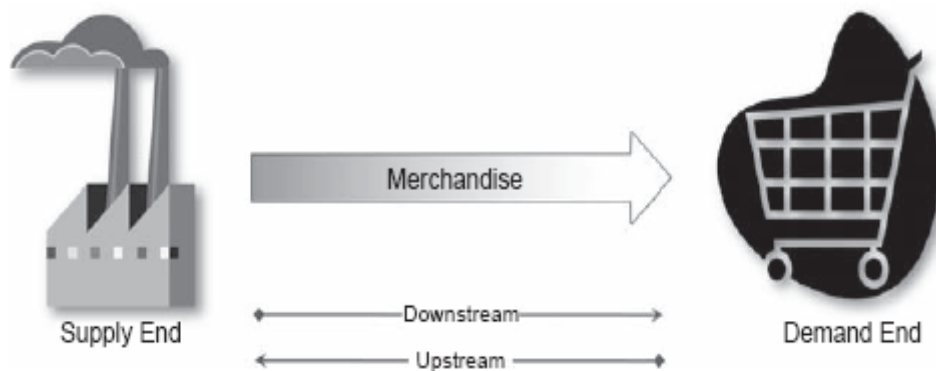


Figure 1.: Demand and Supply Ends of a Supply Chain (Sehgal V. 2009., p.7.)

Demand flows from downstream nodes to the upstream nodes in a supply chain network, while the supplies flow from the upstream nodes to the downstream nodes. The core problem in almost every supply chain is

to balance the balancing the demand and the supply end. In order to solve his problem, companies in any supply chain must make decisions individually and collectively regarding their actions in five areas: (Hugos M., 2003.)

- production - this activity includes the creation of master production schedules that take into account plant capacities, workload balancing, quality control, and equipment maintenance; it refers to the capacity of a supply chain to make and store products; the fundamental decision that managers face when making production decisions is how to resolve the trade-off between responsiveness and efficiency, by managing capacity, the more excess capacity that exists, the less efficient the operation becomes.
- inventory - the primary purpose of inventory is to act as a buffer against uncertainty in the supply chain; It enables a company to support its customer service, logistic or manufacturing activities in situations where purchase or manufacture of the items is not able to satisfy demand; lack of satisfaction could arise either because the speed of purchasing or manufacturing is too protracted, or because the appropriate quantities cannot be provided without stocks; inventory management is the activity which organizes the availability of items to the customers;
- location - it refers to the geographical sitting of supply chain facilities and includes the decisions related to which activities should be performed in each facility; when making location decisions, managers need to consider a range of factors that relate to a given location including the cost of facilities, the cost of labor, skills available in the workforce, infrastructure conditions, taxes and tariffs, and proximity to suppliers and customers; once these decisions are made they determine the possible paths available for product to flow through for delivery to the final consumer.
- transportation - material distribution is a core supply chain function in most business operations; in the manufacturing industry, it is the movement of raw materials from the vendors' warehouses to factories, and of the finished goods from the factories to the distribution warehouses; in retail, such movements extend from vendors to the retailer's warehouses, and then to the stores.
- information - timely and accurate information holds the promise of better coordination and better decision making; with good information, people can make effective decisions about what to produce and how much, about where to locate inventory and how best to transport it.

The sum of these decisions will define the overall supply chain value. The value a supply chain generates is the difference between what the final product is worth to the customer and the effort the supply chain expends in filling the customers request (Chopra S, Meindl P., 2004.). In order to maximize that value, all participants together try to make improvements in both customer service levels and the internal operating efficient. Customer service at its most basic level means consistently high order fill rates,

high on-time delivery rates, and a very low rate of products returned by customers for whatever reason. Internal efficiency for organizations in a supply chain means that these organizations get an attractive rate of return on their investments in inventory and other assets and that they find ways to lower their operating and sales expenses (Hugos M., 2003.). If they work and cooperate together, they will achieve these goals much easier. So, it is very important for companies to be aware and to understand the roles that they play in their supply chains.

III. SUPPLY CHAIN INTEGRATION OVER THE INTERNET

Supply chain management (SCM) shifts the unit of analysis from a plant, a warehouse or a company to the entire supply chain (Pardalos P., Hearn D., 2005.p8). Since a supply chain typically spans over multiple companies, SCM particularly highlights the importance of cross-enterprise coordination – in the name of supply chain integration using Internet. It includes not only companies that produce goods, but also their suppliers, and their suppliers' suppliers. Chain management means relationship among partners and the processes that connect them. The number of primary and secondary suppliers could be large. Together, this extended multi-tier supply chain (the chain of primary, secondary and tertiary suppliers) constitutes a crucial aspect of the industrial infrastructure of the economy (Laudon, Traver, 2010. p. 12-11). Supply chain management refers to wide variety of activities combined with Internet technology that is used to coordinate partners in procurement method.

e-Business applications in supply chain management for SME is divided in three classes – e-Commerce, e-Procurement and e-Collaboration (Pardalos P., Hearn D., 2005.p8). e-Commerce goes beyond the Business-to-Consumer (B-to-C) interface to include the backend processing of transactions in the supply chain as well. Indeed, the Internet provides a natural setting to link supply chain partners for delivering a product or service in tight coordination. On the other hand, e-Procurement is the set of Internet applications by which buyers and sellers find each other and transact according to some pre-specified protocols, and involves private or/and public marketplaces. Since a typical manufacturing company needs to procure thousands of products from hundreds of suppliers, the Internet can help such a company manage the complexity of the procurement process.

e-Collaboration is the use of the Internet among business partners beyond transactions. Unlike e-Commerce or e-Procurement, whose functions are well defined, e-Collaboration exists in a variety of functions. Examples are different models of information sharing, collaborative decision-making, and product change management. Different models of eCollaboration is for information sharing, Collaborative planning and development of new product. *Information Sharing* as a part of eCollaboration in supply chain management that exist to share information to supply chain partners. On the other hand, *Collaborative Planning* use Internet for system architecture to implement collaborative decision making in cost effective way. Collaboration in developing of new product is used to deliver efficient and speed

demanded in new product development and product change management.

These implemented activities in supply chain management improve capacities of all partners in a chain. In this way supply chain management becomes a system of partners connected with Internet technology. Supply chain management as a system functions as a link of activities of buying, making, and moving products from suppliers to purchasing firms, as well as integrating the demand side off the business equation by including the order entry system in the process. For example, Hewlett-Packard has a Web-based order-driven chain management system either a customer placing an order online or the receipt of an order form a dealer (Laudon, Traver, 2010. p. 12-11). e-Collaboration uses digital Internet technology to permit partners to collaboratively design, develop, build, and manage products through supply chain.

IV. IMPACT OF E-BUSINESS ON SUPPLY CHAIN

The Internet plays a significant role in many supply chains and companies are using Internet to conduct a wide variety of supply chain transactions. Supply chain transactions that involve e-business include the flow of information, product, and funds. With Internet, companies can provide product information across supply chain, place orders with suppliers, fill and deliver orders to customers and allow them to place and track orders. The Internet is an electronic link that ties different entities, but it is neither the first nor the only electronic link. For example, EDI (Electronic Data Interchange) or VAN (Value Added Network) is another electronic link that preceded the Internet age. But the Internet has many more advantages. It is based on open standards and grants universal access to a wide audience (anytime, anywhere, anyone, almost) at a lower cost. Also, the Internet is much more efficient than a traditional three-tier distribution system in which finished goods flow from the plant to the manufacturer's warehouse, then to the distributor's warehouse, the wholesaler's warehouse, the retailer's warehouse, and finally to its stores. In the process, logistics cost accumulates due to additional handling, multiple handoffs, document processing, transportation, warehousing, and excessive inventories throughout the supply chain. So, inefficiency in information flow can result in many costs, measured by millions of dollars, in material flows. In the case of the grocery industry, for example, this inefficiency previously resulted in over 120 days' supply of inventory and \$30 billion of unnecessary cost (Pardalos P., Hearn D., 2005.).

E-business influences supply chain operations in many ways. It has great impacts on responsiveness, which primarily affects a company's ability to grow and protect revenue, and on efficiency, which primarily affects a company's costs. An e-business allows a firm or supply chain to exploit the following responsiveness, and therefore revenue-enhancing, opportunities (Chopra S, Meindl P., 2004.p.529.):

- direct sales to customers – an e-business allows manufacturers and other members of the supply chain that do not have direct contact with customers in traditional channels to enhance

revenues by bypassing intermediaries and selling directly to customers, thereby collecting the intermediaries incremental revenue;

- twenty-four-hour access from any location – an e-business can attract customers who may not be able to place orders during regular business hours because an e-business is always open; for example the order at Dell Computers can be placed anytime;
- wider product portfolio and information aggregation – with e-business firms can offer a very large selection of products that would be unrealistic in a brick-and-mortar store;
- personalization/customization – the internet offers an e-business the ability to use personal information to intelligently guide each customer's buying experience and increase sales; for example, some e-business use information on birthdays and other events provided by customers to send reminders and purchase recommendations;
- faster time to market – new products can be introduced much faster with Internet than with a use of physical channels;
- price and service discrimination – an e-business can price discriminate, meaning they can alter prices based on the characteristics of individual customers to enhance their own revenues; the ability to ask different customer segments to pay different prices allows a firm to increase revenues compared to a situation where a firm charges a single price to all customers;
- efficient funds transfer – an e-business can enhance revenues by speeding up collection;
- lower stock out levels – e-business can greatly increase the speed with which information on customer demand is disseminated throughout the supply chain, giving rise to more accurate forecasts and significantly decreasing the negative aspects of the bullwhip effect;
- convinced/automated processes – e-business can increase the ease with which one does business.

Beside the increase of responsiveness, e-business has great impact on costs. It can lower inventory levels and inventory cost by improving supply chain coordination and creating a better match between supply and demand. E-business can aggregate inventories far from customer because most customers are willing to wait for delivery of on-line orders. It also influences the facility, transportation and information costs. An e-business can reduce network facility costs by centralizing operations, thereby decreasing the number of facilities required. The transportation costs will be increased if a firm can put its product in a form that can be downloaded. An e-business can share information throughout the supply chain to improve coordination. It also may be used to share planning and forecasting information within the supply chain, further improving coordination. Supply chain

management refers to wide variety of activities combined with Internet technology that is used to coordinate partners in procurement method.

V. CONCLUSION

Synonyms for supply chain management in previous years were logistics and operation management. But supply chain management is far more than that, it contains more complex operations and concepts. Supply chain management contains an cooperation between manufacturer, supplier, transporter, warehouses, retailers, and consumer. E-business application for supply chain management can be divided in three classes eCommerce, eProcurement and eCollaboration. Importance of eCommerce in supply chain management means using Internet to provide coordination in delivery of products and services to consumer. Supply chain transactions that involve e-business include the flow of information, product, and funds. E-business influences supply chain operation by having impacts on

responsiveness, which primarily affects a company's ability to grow and protect revenue, and on efficiency, which primarily affects a company's costs. Besides the increase of responsiveness, e-business lowers inventory levels and inventory cost by improving supply chain coordination and creating a better match between supply and demand.

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