

SUPPLY CHAIN MODELS IN THE LITHUANIAN E-COMMERCE

Vida Davidavičienė¹, Ieva Meidutė²

^{1,2}*Vilnius Gediminas Technical University, Faculty of Business Management,
Saulėtekio ave. 11, LT-10223 Vilnius, Lithuania*
Email: ¹*vida.davidaviciene@vgtu.lt*, ²*ieva.meidute@vgtu.lt*

Abstract. Supply chain management has got into the horizons of scientific research two decades ago, but just recently issues of the virtual supply chain management, supply chain in e-commerce and e-logistics solutions became the topics of scientific research. This was caused by rapid development of information and communication technologies (ICT) which have the decisive influence on the competitiveness of a modern organization. Increasing turnover of e-commerce in the world points out the significance of research of the e-commerce web sites evaluation, design solutions, quality assurance, consumers' behaviour on the web, and the factors influencing behaviour of consumers. Anyway, not much research issues analyses supply chain within e-commerce models. These circumstances frame the topicality of this subject. The present article analyses virtual supply chain. The objective of the paper is to identify supply chain models within e-commerce websites. Survey results, which are presented in the article, lead to the deeper study of the Lithuanian practices in this area. Methods of systematic analysis, comparison, and survey in a form of structured questionnaire are employed.

Keywords: supply chain in e-commerce, e-commerce, Internet, virtual supply chain.

Jel classification: M31, M39, O32, O33, P21, P23.

1. Introduction

Supply chain management topics have gained particular attention in the last two decades. In the scientific literature, the supply chain, the development and management of its system, and the study of its elements, have been discussed by such authors as Christopher, Towill (2001), Zimmer (2000, 2002), Gunasekaran *et al.* (2008), Bayraktara *et. al* (2010), Caniels, Gelderman (2007), Kim, Kim (2009), Gunasekaran, Ngai (2004), Pereira (2009), Closs *et al.* (2005), Amoozad-Khalili *et al.* (2010), Sezen (2008), You, Grossman (2008), Chenglin, Xinxin (2009), Cai-feng (2009), Lia *et al.* (2006), Lin (2009) and others. Recently, much attention has been paid to the virtual supply chains in e-commerce that coordinate logistics operations in the e-space. Such topics as the integration of the supply chain processes in the e-commerce, the ensuring of the accessibility of the information and etc., have been

revised in the recent scientific studies (Juttner *et al.* 2007; Gunasekaran *et al.* 2008; Selim, Ozkarahan 2008; Kavaliauskas 2008; Hoong *et al.* 2008; Cai-feng 2009; Mangin *et al.* 2009; Soroor *et al.* 2009; Kim, Kim 2009; Davidavičienė *et al.* 2009; Wieranga, Soethoud 2010; Davidavičienė, Meidutė 2011; Meidutė *et al.* 2012).

Considering the specificity of the information age, the present article analyses the e-commerce as a reason of the supply chain transformation, which has affected not only the processes of the company's business organization but all the participants of the supply system: from the raw material sources to the end-users. The present article analyses the supply chains of the Lithuanian companies engaged in e-commerce, paying particular attention to the fact that the e-commerce, covering the overall system of the processes and functions, and enabling consumers to purchase products and services directly from the supplier via the programs and the Internet, is a part of the e-business, which covers not only buying and selling but the processes from the product development, production and design to the self-service, after-sales and inquires and analysis, allowing the buyer to analyse and modify the buying process.

The present article aims at analysing the strategies of the Lithuanian companies in the e-commerce, and identifying the most-used supply chain models.

Research methodology includes the systematic analysis and the survey. The methods of comparison, structured questionnaire, and data analysis were employed.

2. The supply chain in the information age

Since the industrial economy has been replaced by the knowledge economy, the supply chain has become one of the most analysed fields in the e-business solutions; however, it should be noted that supply chain research does not receive much attention. In order to carry out a proper research, the basic principles, which could be applied to both traditional and e-business, should be taken into consideration. According to Freser (2000), the companies could get the maximum benefit from the e-commerce by shortening the chain of intermediaries. Most companies receive the resources not directly from the manufacturers but through the intermediaries engaged in the distribution of resources and information. This process involves a relatively long chain of intermediaries. The introduction of the e-commerce model would enable small trading companies to shorten the chain of intermediaries, or buy products directly from the manufacturer (Dirker *et al.* 2008). The reduction of the number of the intermediaries could positively affect both the price of the product and the quality of the supply (Wieranga, Soethoud 2010; Reiner, Trcka 2004). The company would be able to select the items required from the greater range of the products than the intermediaries, who are usually confined to the products of a few manufacturers only, offer. This could be particularly useful to the companies which buy not the final product but its separate components (the resources), and create the value added individually, considering the needs of the buyers. Thus, the company purchases a wide range of the products from the different manufacturers;

whereas the limited range of products of a few manufacturers only, offered by the intermediaries, minimizes the company's opportunity to offer a potential buyer a combination of the components required.

Considering the company's possibilities to reduce the number of the intermediaries in the supply chain, it should be taken into account that the opportunities of the reduction of the reserves are significantly limited. According to Kannan and Tan (2005), it becomes possible to reduce the reserves because of the employment of the electronic information transmission and processing facilities, minimising the time between placing an order and completing it, and the ability to promptly correct order conditions. The opportunities mentioned could be implemented in the companies; however, as Mangin *et al.* (2009) has claimed, when reducing the number of the intermediaries and buying products directly from the manufacturer, who is being relatively far according to geographical point of view, the optimal order size (considering delivery costs, which are not affected by the e-commerce since the products could not be delivered in digital form) is usually higher than buying from a local agent. The company should have had limited possibilities to minimise the reserves, and, moreover, such economic costs-saving component should have had minimal impact on the evaluation of the e-commerce benefits.

The reduction of costs, as well as the number of the intermediaries, related to the process of placing an order has a real impact on retail companies operating on the basis of the e-commerce model (Aslanertik 2005; Anderson; Weitz 2007; Wieranga, Soethoul 2010). Such method of costs saving should be treated in two ways: on the one hand, the minimisation of the number of the intermediaries would result in a difference between the costs related to placing an order using traditional ordering means and the means of the e-commerce, which is large enough to have a real impact on a company's general expenses; on the other hand, the order, which is placed using the means of the e-channels, would require a minimum cost from the manufacturer, regardless of the distance between the buyer and the seller, therefore, the communication with geographically distant suppliers does not cause the company financial difficulties but leads to its real cost savings.

The attention should also be drawn to the fact that in the case of the purchase of the products from the local agent (i.e., located in the same geographical area), the economies of scale remain but its value decreases since the communication with the intermediary in the same geographical area does not require high costs (e.g., local phone calls are cheap compared to international ones, in addition, the meetings with the intermediary could be easily organised, and etc.); therefore, the costs related to the implementation of the business-to-business model should be evaluated: they should not exceed the expected benefits. When making the decision related to the number of the intermediaries, the fact that any intermediary results in additional overhead expenses should be considered; however, there are situations, in which the intermediaries could be useful and the refusal of their service would lead to the increase in costs (Mangin *et al.* 2009); therefore, when considering the costs on the basis of the e-commerce, the intermediary's functions in the distribu-

tion channel, as well as the overhead costs depending on that, should be taken into account.

Modern business cannot exist without information technologies that have also changed supply chain management: the users do not need to meet with the manufacturer as everything could be performed remotely, i.e., using the e-commerce systems (Davidavičienė, Meidutė 2011; Meidutė *et al.* 2012). Purchases could be made in the most convenient time, and the payments could be made using e-banking. E-business has established the basis for all participants of the supply chains to use the same information. Connected to a single system, they could see each other's actions and plan their operations immediately. Heffes (2001) has divided the e-commerce into sales and purchases: business-to-consumer (B2C) includes sales whereas business-to-business (B2B), covering electronic data interchange (EDI), includes both purchases and sales. Nowadays, many companies are searching for the solutions, and finding such ones that suit both types of transactions. The companies, selling the products to the consumers through the retailers, increase their sales and expand the distribution channels by implementing B2C Web portals in order to accept orders directly from the customer, thus, increasing the efficiency and ensuring customer satisfaction. According to Van der Vorst *et al.* (2002), Davidavičienė and Tolvaišas (2011), intense and effective information sharing between the companies as well as the fast response to changes in the market of the e-business are extremely important. As Holweg (2005) has pointed out, accurate information reduces the decision-making uncertainty, minimises stock levels and shortens response time to changes in the demand. A new supply chain structure excluding B2B model (B2BB2B2B2C) is the result of the modern e-commerce. The companies specialises in the areas that they know the best whereas the management of other operations is delegated to third parties. Market dynamics leads to dynamic supply chain configurations. The absence of 1:1 partnership is the main difference of the supply chain management. The new model of e-business allows suppliers choosing in the global market.

3. E-commerce situation in Lithuania

Analysing the situation in Lithuania, it could be pointed out that the e-commerce has crossed the initial stage, i.e., the usual methods of payments (e.g., payment orders) are supplemented by the new payment options. It should also be noted that the range of the e-shops has expanded, i.e., nowadays, not only food, cosmetics, clothing, furniture, books and sporting goods but innovative high-tech products are available to purchase online. The data provided by the Department of Statistics has also confirmed the fact of the e-commerce reactivation: in comparison to 2009, online purchases have increased by 2% in 2010, and by 1% over the period from 2010 to 2011. Considering the e-commerce volume index, the increase of 2% has been noticed in 2009 in comparison to 2008, and a 10% positive change has been noticed in 2010 in comparison to 2009.

In 2009, 44% of the country’s companies used e-channels for purchases and sales. In 2010, the number of companies buying over the Internet has reached 51%, which is slightly higher than in 2009; however, banking and financial services (95%), as well as the interaction with public authorities (98%), still form a major area of the use of the Internet (Figure 1).

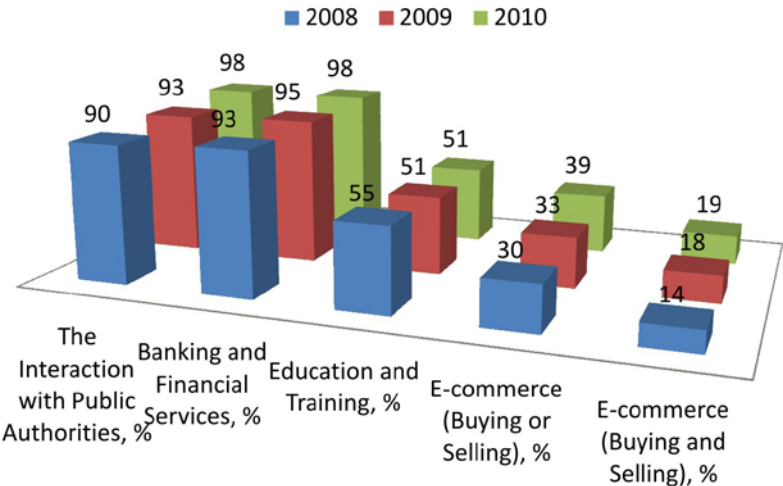


Fig. 1. Purposes of the Internet Usage of the Companies (www.stat.gov.lt)

Considering the current e-commerce situation in Lithuania, it could be stated that this area of activities is progressing. In order to identify the supply chain models used in the Lithuanian e-commerce, the research should be carried out.

4. Supply chain models in the e-commerce

The research of the supply chain in e-commerce was carried out in 2012, February – April. It was aimed at analysing the Lithuanian e-shops. There were analysed 30 Lithuanian companies having e-shops. The list of evaluation criteria was composed according to the website quality evaluation criteria suggested by N. Guseva (2010) (see Table 1). The list of the criteria was extended as the researched was aimed at not only evaluating the quality of the e-shops but analysing the models of the supply chain in the Lithuanian e-commerce.

According to the results of the survey, 43% of the companies surveyed have only e-shops, whereas the major part of the e-market is occupied by the companies both having physical shops and developing their business in the e-market (57%). The reason of such distribution of the results lies in the habits of the consumers, as people still prefer buying products after they have seen them live; therefore, the number of the companies holding the e-shops only is low.

Table 1. The List of the Evaluation Criteria of the Supply Chains of the E-shops (Composed by the Authors)

The Group of the Observation Criterion	The Criteria for the Group
Shop Characteristics	The company; web address, the name of the physical shop
	E-shop
	Physical shop
	The category of the shop
Product	The range
	The price
Delivery	Order fulfilment time
	The methods of delivery
	Product delivery ranges
	Shipping costs
Payment	Methods of payment
After-Sales Service	The number of service points
	The dislocation of the service points
	Warranty time
	Terms of repayment
Other	Warehouses
	Product supplement
	Supply chain level
	Purchase process

The analysis of the product delivery to the end-users has shown that the customers of the Lithuanian e-shops are offered six delivery methods (Fig. 2). Courier delivery service, when the customer could get the product during the period of 5 hours (or the next day after ordering), is the most cited online way of delivery. 43% of the respondents are using the services provided by AB Lietuvos Paštas. This method is popular as Lithuania has more than 300 post offices belonging to AB Lietuvos Paštas where the goods can be collected or sent by the registered mail, which allows tracking the items. The service mentioned is particularly important to the customers purchasing the product online for the first time and, thus, lacking trust in the e-shop. Other companies offer collecting items directly from the store salons (21%) or warehouses (11%).

The survey has shown that the largest share (38%) of the courier deliveries is performed by DPD. This company is one of the leading providers of parcel services in the European and international markets. Parcels are delivered to customers in two intervals: 8AM - 2PM and 2PM - 4PM; thus, the customer could choose the most convenient order presentation time. DPD also offers cash collection service; what is more, the parcels are delivered on Saturdays too, which is particularly convenient for the customers working from 8AM to 5PM as they could order parcel delivery from door to door (which is available from 10AM to 2PM). 14% of the

respondents use UNIPAK courier service. 9% of the respondents choose the courier service provided by the e-shops and AB Lietuvos Paštas. The rest 5% of the respondents rely on other courier services, such as VENIPAC and Lex System. The delivery price of approx. 83% of the e-shops depends on the order price. Only 17% of the e-shops offer free shipping for the small parcels under 1 kg.

E-shops offer 9 methods of payment for items (Fig. 3). The most popular payment options are: order payment through the billing or e-banking system and payment in cash, e.g., directly to the courier.

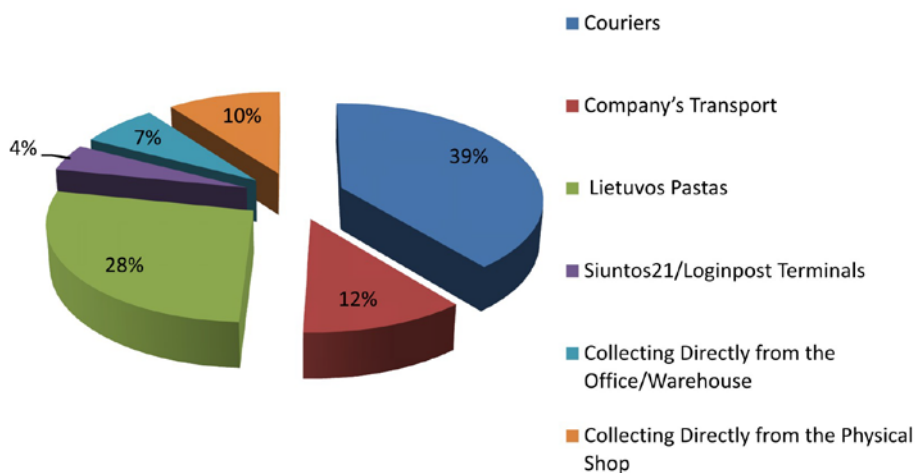


Fig. 2. The Distribution of the Product Delivery Methods

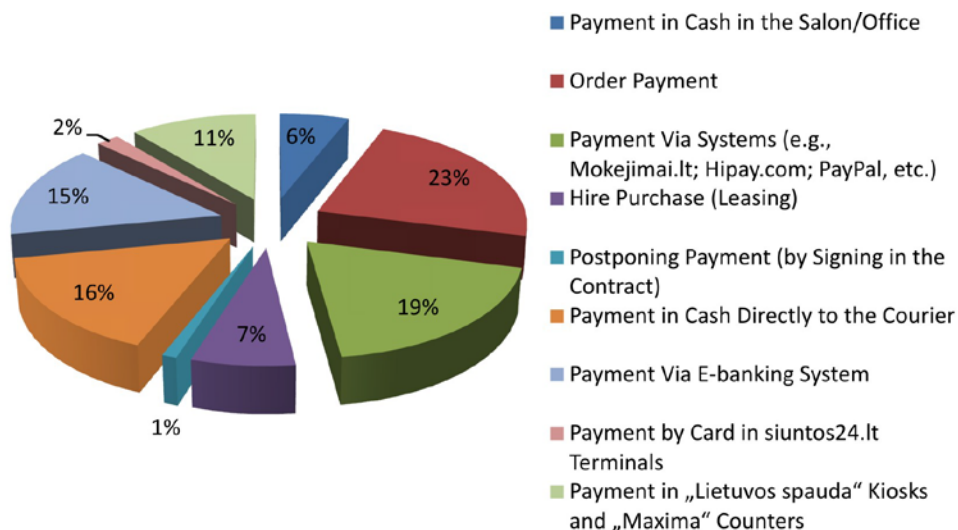


Fig. 3. The Distribution of Payment Options in E-shops

The analysis of the companies operating in the e-market has shown that the prices in physical shops and e-shops are the same (30%); however, there are cases when the prices in the e-shops are 10–15% lower (27%). Considering the fact that the delivery of the products purchased online is free only when purchasing them for a relatively high price, it could be stated that the prices are the same both in the physical shops and e-shops. The lower price could be offered by the e-shops (e.g., pigu.lt) which have reduced the number of the intermediaries in the supply chain; moreover, such companies buy products in large quantities directly from the manufacturers, who are usually located far geographically.

E-shops guarantee that the products purchased reach the customer within 1–2 (27%) or 1–3 (34%) weekdays. The products reach the customer within 1–3 days when they are delivered by a courier (61%) or using Lithuanian postal service (43%). However, the survey has shown that the customer may have to wait for the products for 5–7 weekdays (26%) and, sometimes, even for more than 14 weekdays. Only 3% of the shops operating in the e-market (e.g., florists) could deliver the product within 1.5-2 hours.

Nowadays, the Lithuanian e-shopping service network is relatively extensive. The range of the products of the e-shops is supplemented 1–2 times a week (66%), every 3 weeks (14%), or more than once a month (13%). The results of the survey have shown that the supply chain has not reach the top, or the zero, level; thus, product delivery to the customer could be delayed. Due to the lack of the products in the stock, the customer has to wait for approx. 5 days; therefore, e-shopping attracts the customers less.

The products are delivered to the customers of the e-shops by a two-level supply chain (63%). 27% of the companies operating in the e-market apply a one-level supply chain, purchasing the goods from the wholesalers. 10% of the e-shops have a zero-level supply chain as they purchase the goods directly from the manufacturers: this supply chain level creates the greatest competitive advantage (Fig. 4).

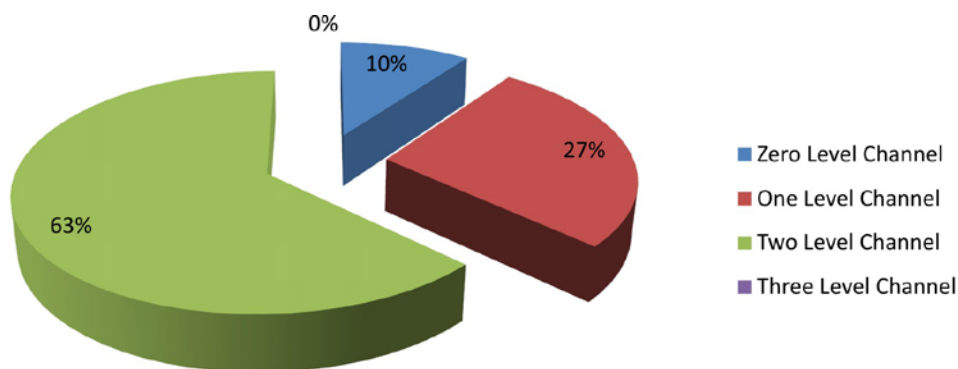


Fig. 4. The Distribution of the Levels of the Distribution Channels

It was estimated that the products reach the customers of the Lithuanian e-shops through a two-level supply chain (63%). 27% of the companies operating in the e-market has a one-level supply chain as the purchase the goods from the wholesalers. 10% of the e-shops, purchasing the goods directly from the manufacturer, has a zero-level supply chain. In Lithuania, the supply chain of the e-shops is not the top, or the zero, level one. The presentation of the goods to the customer is usually delayed because of the absence of the goods in the stock; thus, the customer has to wait for approx. 5 days, which lowers the attractiveness of the e-shopping.

The analysis of the survey results has shown that e-shops are becoming popular in Lithuania, thus, their supply systems require reorganisation in order to make them more customer-oriented.

5. Conclusions

E-business is changing the form of the supply chain. The supply system was operating as a chain before: the supplier provided raw materials to the manufacturer; next, the manufacturer provided the product produced to the seller and, finally, the seller delivered the product the end-user. The modern supply chain has grown into a network, in which all the interdependent participants are sharing common information. Moreover, the time required for product ordering and delivery is minimal, thus, the product reaches the end-user faster.

The analysis of the Lithuanian e-commerce solutions has shown that the traditional commerce is still more popular, as 57% of the companies are holding e-shops as a supplement to the traditional business. Most of the e-shops are trying to ensure the minimization of the product waiting factor, since it is particularly important to the supply chain management. It was estimated that the most common one- and two-level supply chain models usually influences a delivery time growth. Therefore, in order to avoid such growth, the reorganization of the existing systems is required.

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