E-Commerce in Supply Chain Management: its Introduction and Prospects in the Light Industry

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Abstract **- The research deals with current trends of e-commerce in supply chain management through the example of light industry. It is shown that one of the current trends in supply chain management is human labor reduction and almost complete automation of warehouse and transport operations. The practice of domestic online stores in e-commerce is regarded. It has been revealed that for domestic stores there is a lag in using innovative means. This is explained by the small volume of sales. The introduction of innovations, which include business analytics, mobile technologies and applications, omni channel logistics, the use of electric vehicles, autonomous vehicles and drones, the use of cloud computing technologies, e-commerce, automatic identification and data collection, 3D printing, has not become popular in domestic online stores.**

Keywords *-e-commerce, supply chain management, payment systems, delivery, warehouse automation.*

1. Introduction

The use of e-commerce to manage business processes in modern economy is not something new. The digital transformation of the industry has led to the emergence of such concepts as Industry 4.0, Smart Manufacturing, Digital Manufacturing, Internet of Manufacturing and Open Manufacturing [1,2]. In turn, these concepts have led to fundamental changes in the logistics industry, particularly in the supply chain management. The concept of "supply chain management" is quite extensional. It includes some definitions that were used earlier. They are ECR (Efficient Customer Response) and DRP (Distribution Resource Planning). Supply chain management refers to coordinating, planning and controlling of procurement, production and supply of products and services. The introduction of SCM in the enterprise requires a number of significant changes: creation of a unified information space within the company, automation of the processes and analysis of the received information. Supply chain management is an integrated and systematic approach that requires simultaneous consideration of many supply and sales operations. Therefore, there is a need for further study of the problems related to the formation of complex supply chains, the creation of new technologies for managing chains in international business environment, as well as the definition of further development prospects. At the same time, as our country is a country with an economy in transition, the introduction of such technologies is an urgent task since we have not accumulated the relevant experience and the corresponding technologies have not been developed.

2. Literature review

The term "supply chain management" (SCM – Supply Chain Management) appeared in 1982. The development of this concept and its active use in practice in Western countries dates back to the second half of the 1990s. At the present stage of the economy development, supply chain management is regarded in the context of e-commerce. According to e Marketer, sales through e-commerce in the world in 2018 increased by 23.5%

compared with 2017 and made up about $ 2.84 trillion (11.9% of the total retail sales). By 2021, global Internet sales are expected to be $ 4.9 trillion [3]. Today, e-commerce is a major factor in the economy development [4]. Summing up the empirical research in the use of e-commerce when forming complex supply chains, we can say that the use of e-commerce has shifted the center of the logistics system from retailers to consumers. In this sphere there are two groups of organizational decisions: regulation of operational processes (automation of receiving and processing orders, electronic document flow, sales accounting, etc.) and optimization of further processes (demand forecasting, calculation of optimal delivery schemes, sales analysis and planning) [5-10]. Ref. [5] discusses practical aspects of e-commerce in supply chain management [4]. In their study they examine the global practice of its implementation and the corresponding models and methods. They show that the activities of typical logistics companies from North America, Europe and the Asia-Pacific region are impossible without big data analysis technologies, deployment of smart sensors in equipment and production lines, the introduction of cloud technologies, as well as the end-to-end automation and integration of production and management processes into a single information system. At the same time, SCM is not only designed for large corporations having production units in different regions and working with a large number of distributors in the markets of many countries. This statement is true, however, even if the company owns several units (or even one unit) and works with a small number of permanent distributors and suppliers, the use of SCM solutions can significantly reduce costs and bring the company real profit [6]. Since the market economy appeared in our country not so long ago and the market for integrated supply chain management services started to form in the second half of the 2000s, the Russian market for integrated supply chain management services is characterized by strong fragmentation, lack of consistency and underdevelopment [8]. In Russia a relatively low level of market development is also observed because small companies mainly provide simple services, such as transportation, storage and cargo handling. It can be expected that in the near future in Russia the demand for system services from foreign and large domestic companies will increase. Therefore, we should expect an increase in the competition between providers of transport and storage services in the Russian market. The use of e-commerce to manage supply chains at the light industry enterprises was considered in [9]. In his study he showed that the use of modern logistic methods when distributing goods at knitwear enterprises is the determining factor that ensures sustainable economic development of enterprises; and the significance of distribution systems increases with the concentration of orders for the supply of products [11]. The literature review allows us to conclude that for historical reasons Russia is lagging behind in terms of the use of e-commerce in supply chain management. It means that the problem is not sufficiently developed for the countries with transition economies. This fact helped us to formulate the purpose of our research. The purpose of our research is to determine the role of e-commerce in supply chain management in the context of international business conditions and its restructuring taking into account the specifics of logistics solutions in terms of globalization and competition through the example of light industry.

3. Research methods

The information base for the research is the data presented in the publications of practitioners and market experts. The study of the role of e-commerce in supply chain management in the Russian market and its development prospects is based on analysis, synthesis and generalization methods.

3.1. Research results

It should be noted that the problem of supply chain management in the light industry is complex and it should be considered along with the following business processes: demand forecasting based on big data analysis, search for suppliers and automation of cargo transportation, robotic automation of warehouse and transportation activities. This area is characterized by changes in supply chain management caused by modern innovations. Table 1 shows how global innovation affects supply chains.

Table1. Impact of e-commerce and innovations on supply chains

Impact	The use in commercial activities	Trial logistics projects
high	Business analytics, mobile technologies, big data technologies, robotic automation of warehouses and electric cars	autonomous vehicles and drones
Medium	Internet of things, automatic identification and data collection	Smart production
Low	Cloud computing technologies	

The main innovation and e-commerce trends, affecting supply chain management are:

- miniaturization of electronics, which is the basis for the development of such technologies as automatic identification and data collection, radio frequency identification, robotics, communication between machines. This affects the elements of the supply chain management system. Namely, automatic or radio frequency identification is used to collect, analyze and manage data during the transportation process throughout the entire supply chain.
- The Internet of Things is a network of objects with artificial intelligence that are automatically organized. They exchange information and data, as well as allocate resources for different actions in various conditions. At the same time, the Internet of Things reduces human involvement in production and logistics processes. In practice, the concept of the Internet of Things is to track the status of assets, equipment, vehicles, cargo, real-time work of people in any part of the supply chain. It analyzes "bottlenecks" in the supply chain and its overall efficiency. This contributes to business forecasting and optimizes costs. Appropriate monitoring sensors and cargo chipping makes it possible to fully track and plan the route of products.
- Nowadays e-commerce is the basis for organizing and forecasting sales. It allows automatic processing of both large and small orders and it monitors stock reserves based on the demand level. At the same time, business analysts suggest the use of methods, technologies, systems, practices and programs that analyze important business information in order to help the company management better understand the market and their own business, as well as make timely management decisions. Business analytics underlies such concepts as "Smart Factory", "Big Data", "Smart Data" and "Smart Logistics". E-commerce tools make the supply processes transparent: at any time the customer can track the goods using a mobile phone application, evaluate consumer experience by rating it and so on. The concept of transparency is ensured through automatic identification and data collection, embedded systems and mobile applications.
- 3D printing technology is used to obtain individual parts and components, as well as customized spare parts. This eliminates the need to maintain large warehouses for various parts and components. They can be replaced with virtual warehouses containing computer data on the necessary parts.
- the use of autonomous vehicles means that there are independent navigation systems. In logistics, such technologies can be used for courier delivery of parcels to consumers, as well as for autonomous motor transportation of goods. The usefulness of such innovations is to increase the security of supplies, as well as to reduce the delivery cost in the future.
- Omni channel logistics provides for the use of all available logistical channels and communications in sales, their absolute integration, the same prices and range, any payment method in any sales channel, a single database of customers and their preferences. Channels of customer interaction include offline retail shops, service terminals, websites, mobile applications, social networks, e-mails, etc.

Insufficiently developed legal framework and imperfection of information security are the main obstacles in the development of e-commerce business in the Russian Federation. In addition, e-commerce development in the light industry is hampered by some psychological factors: the management of the enterprise is not ready to do business in a new form, lack of experience in using such technologies.

At the same time, light industry enterprises mainly fulfill large contracts and the goods are sold either through online shops or small retail shops.

Let us consider what e-commerce tools are used by the most popular online shops of light industry

goods. At the present stage of development the most common form of sales of light industry goods is online sales (Table 2).

Table2. E-commerce tools used by the most popular online shops

Online shop	https://www.lamoda.ru/	https://www.forward-sport.ru/	https://www.kupivip.ru/	https://www.next.com.ru
International express delivery	+	+		
Own express delivery service	+	+	+	
Postal services		+	+	+
Self-delivery	+		+	+
Own transport	+	+	+	+
The use of payment systems	+	+	+	+
The use of CRM –systems	-	-	-	-
Chipping of goods	-	-	-	-
Automation of warehouses	+	-	-	-
Demand forecasting based on big data	-	-	-	-

According to Google Analytics, the location of goods providers mainly in the capital of the country and several regional centers is one of the main features of the organization of goods delivery systems in e-commerce in Russia. Such location allows them to use various types of public transport. In fact, most online stores can use postal services and transport, including railway. Based on the above-mentioned information, we can single out several main features of supply chain management for domestic online stores.

According to Google Analytics, domestic online stores are characterized by the fact that their customers are concentrated in the area next to the shop or sometimes in regional centers. That is most of the customers live in the area next to this store and there are practically no customers from rural areas. At the same time, most customers are not wholesale buyers, they are fragmented and the average purchase price is low. Delivery time is another important factor in organizing the delivery of goods in e-commerce. In some online stores, it ranged from one day to 30 days, and the average value of this indicator was 6 days. In this case, the delivery time quite often increases due to the fact the goods offered in the online store list are temporary out of stock. A significant number of online stores do not have special warehouses for storing goods and keep them directly in the office of the online. The ability of an online store to manage the delivery can also be affected by the chosen delivery method: by means of engaged transport and specialized courier services or on its own. In fact, all online stores do not have their own delivery service and use the services of existing public and (or) special delivery systems, which act as the so-called "third" party to fulfill orders. Sometimes several counterparties are involved in the delivery process (in case of the use of multi-modal transport scheme). The quality of the delivery in such systems cannot be considered high, because in fact domestic online stores do not consolidate small shipments to the same geographical areas, but send individual purchases. One of the reasons for this may be the fact that the range of goods presented in online stores is adapted for small shipments. It should also be noted that the customers themselves, as a rule, try to consolidate purchases, ordering together several goods or a relatively big number of goods. Domestic online stores do not actually use any finished goods warehouses or distribution centers of the enterprises producing goods that are sold in this online store. As a result, they can't create a flexible system for placing stocks of goods and decentralized order processing by manufacturers (in this case acting as supply planners).

4. Discussion

From the perspective of international supply management, it is important to review all possible supply strategies. For example, they can be improved by using the concepts of Single Sourcing (minimum number of suppliers), Global Sourcing or Eine Quelle Versorgung (sole supplier), production-synchronous procurement, Just-in-time, Zuliefer integration (integration of suppliers in the development of production). When building global supply chains all solutions are reduced to the following:

- changing consumer needs and the emergence of new expectations;
- Network economy;
- Globalization and complexity of logistics;
- Environmental instability;
- System sustainability;

- Growing risks.

The formation of e-commerce systems is based on modern software, accelerated development of information technologies and reach of dispersed consumers, as well as the creation of e-commerce infrastructure for the delivery of goods and payments. As the studies have shown, the main problem of supply chain management of domestic enterprises is the lack of a supply management strategy. Supply management is not referred to as a complex problem. The introduction of individual elements is observed. That is, there are only individual signs of supply chain management: functions of planning, fulfillment and control of order; information exchange between counterparties and a focus company. The information exchange goal is to coordinate efforts to meet the demand and minimize costs, computerize processes, as well as to expand the supply chain – respond to customer needs from the moment of their formation to the disposal of products [12-15].

Domestic e-commerce enterprises do not develop a comprehensive management strategy to manage supply chains, since the goods are delivered from larger warehouses and the store's customers are mainly concentrated in a small area [16, 17]. Thus, a general concept of supply chain management, a combination of functions and processes are not developed; the extent and range of outsourcing is not determined; there are no concepts of stock management, information management, distribution and cost management, transportation. That is, domestic online stores have a mediating role in the purchase and delivery of goods from multinational online platforms. That is why the use of e-commerce tools is often impractical for them. In this regard, we should take into account the experience of leading foreign companies, which restructured their supply chains to deliver finished goods and services to customers as quickly as possible. Thus, the most successful supply chains are characterized by the following:

- High delivery speed and low costs;
- Flexible response to market structure changes;
- take into account the interests of all participants of the supply chain.

Some leading companies implemented joint projects with their partners to improve the procedure, establish technical standards and invest in common logistics infrastructure. For example, in the early 90s of the 20th century US clothing companies took the Quick Response initiative; consumer retailers in Europe and the United States widely promoted a campaign called Efficient Consumer Response, while the US grocery manufacturers introduced the Efficient Food service Response program. The above-mentioned companies and manufacturers relied on the speed of activities and cost effectiveness, which are popular goals in supply chain management. An interesting fact is that the orientation of the companies changed along with the economic cycles. At the time of rapid development managers focused on maximizing speed and when the economy was slowing down, they tried to minimize operating costs. This is proved by the last global crisis [16, 17].

5. Conclusions

Ensuring the delivery of goods ordered by customers of a particular e-commerce enterprise is one of the most difficult tasks in organizing e-commerce systems. At the same time, the practice of selling goods is lagging behind the world trends. Due to low sales of domestic online stores, the following is observed:

- Relatively small customer reach: as a rule, online stores are located in large cities and do not cover rural residents;
- Lack of specialized warehouses and modern automation tools;

- Lack of demand forecasting, not using of big data processing systems and CRM-systems;
- Not using of finished goods warehouses or distribution centers of enterprises producing goods that are sold in this online store;
- Lack of clear supply chain management strategies, both traditional and using e-commerce tools [18, 19].

The introduction of innovations, which include business analytics, mobile technologies and applications, the use of electric vehicles, omnichannel logistics, the use of autonomous vehicles and drones, cloud computing technologies, e-commerce, automatic identification and data collection, 3D printing, has not become popular with domestic online stores.

It is obvious that to improve efficiency most companies should look for innovations. As a rule, the innovations appearing in this sphere are the result of direct customer requests (reactive model) rather than proactive innovation activities of companies.

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