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Retail Trade as an Agenda-Setting Factor for the Strategic Management of Supply Chains

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Abstract— **The study discusses the impact of effective supply chain management on retail volumes. The features of the logistics development in the Russian Federation are considered. The dependence of the volume of retail commodities (including food products) of the Russian Federation over the past few years on the Logistics Performance Index (LPI) has been presented, and the data obtained have been compared with the survey data on the impact of logistics efficiency on consumer choice. Based on the results of the study, it was found that in Russia there is a direct correlation between retail volumes and Logistic Competence, which is one of Logistics Performance Index components. According to the results of a telephone survey of 158 respondents randomly selected from all regions of the Russian Federation, it was found that at the "customer - commercial enterprise" level, supply chain management efficiency does not affect sales volumes while supply chain inefficiency reduces sales volumes of individual manufacturers. Measures for improving supply chain management at commercial enterprises have been proposed. A mechanism for applying the strategy of integrated logistics outsourcing by a retail trade network has been presented.**

Keywords— *Supply Chain Management, commercial enterprise, retail, Logistics Performance Index (LPI), logistics service outsourcing*

1. Introduction

Supply Chain Management (SCM) is a modern scientific strategy for establishing relationships between enterprises and ensuring customer-focused approach of businesses. The main reason for the introduction of the logistics chain management concept is the desire to increase enterprise competitiveness. At the same time, competitive advantages of supply chains include reduced costs or quality improvement in relation to goods (services) provided to the end consumer.

The evolution of the SCM concept has become a reflection of global economic trends; today the use of an integrated approach to supply chain management makes it possible to more fully satisfy consumer needs and contributes to the goals of a commercial enterprise. Under the conditions of relentless competition in the consumer goods market, the issues of improving supply chains and increasing their efficiency are of particular importance. An integrated approach increases the efficiency of all enterprises within the supply chain.

The problem of supply chain efficiency is one of the most relevant and extensively studied research topics. The concept of SCM addresses the problems of improving supply chain management at each stage (planning, procurement, warehousing, delivery), as well as in the process of supply and storage control, etc.

A supply chain of a commercial enterprise is a large-scale, multi-vector and complex feedback system, which is determined by consumer demand. Despite a significant number of influence factors, a supply chain of a commercial enterprise is being constantly changed and modified, which makes it difficult to be evaluated [5]. When evaluating supply chain management, it is important to ensure the interaction between the marketing, logistics and financial supply chains of the commercial enterprise.

The use of SCM in retail ensures increased profitability by reducing total costs in the supply chain and increasing sales volumes of goods and end-to-end

management at all stages of the supply chain. At the same time, significant volumes of goods, their wide range, transit time and shelf life, far-reaching lines of communications, the importance of taking into account storage conditions and shelf life of goods, as well as the introduction of new retail formats, determine the relevance of the study on the efficiency of supply chains.

The practical implementation of this approach requires the development of theory and appropriate tools for the adaptation of supply chain management in retail business.

Commercial activity is a set of interconnected elements; therefore, the introduction of effective logistics business processes at commercial enterprises will contribute to the effective creation of supply chains of goods and increase enterprise income. Thus, the solution of the problems of the management of logistics business processes is a relevant issue.

2. Literature review

Supply chains are significantly different from traditional supply chains. Thus, this fact should be considered in supply chain management. The identification and classification of these differences is an integral part of the rational supply chain formation and effective supply chain service [1]. These features include [2, 3]:

- seasonality (in terms of demand and supply);
- safety (food products are perishable commodities; thus, product safety issues are of primary importance);
- high demand volatility (demand dependence on a number of independent factors);
- the need for special conditions for the transportation and storage of certain types of goods [12];
- impact on the environment (the industry has a significant environmental impact associated with its extensive use of water, land and energy resources).

These features make it possible to determine the requirements for the effective product movement in the supply chain, as well as to develop the description of the general supply chain structure in retail business. At the same time, any retailer is characterized by the use of several supply chains depending on the type of goods. Mutual trust and communication increase supply chain efficiency. In particular, this applies to the supply of food products [11]. Retailers are supply chain drivers as

they control most operations in the supply chain, organize deliveries in anticipation of consumer demand [16].

In different countries, the development of supply chains took place in different ways due to the influence of various factors (income level, urbanization, food supplies, available infrastructure, and trade policy). However, the development of supply chains in both developed and developing countries is characterized by similar trends [4]. In Asian countries, there is a general tendency towards greater food demand, rising food prices, increased scale and influence of companies, primarily in retail businesses [5]. The criterion for optimizing activities in such supply chains is, mainly, increased profit [6].

On the other hand, global trends in supply chains are [13]:

- the increasing role of IT technology to manage all business processes of the supply chain;
- the criterion for supply chain optimization is a combination of efficiency and flexibility;
- the increased importance of "environmental friendliness" of products and the company "green" image drives up the demand for certain types of goods, which makes the company decrease its "environmental friendliness" in order to increase the overall profitability of suppliers [14];
- increased importance of key competencies;
- increased importance of synergies and partnerships within the supply chain.

The development of logistics in the Russian Federation is characterized by the following features [17]:

- formation of a unified transportation system;
- providing the majority of settlements with basic land transport communications;
- increase in freight traffic and through traffic across the Russian Federation and a decrease in the GDP cargo capacity.

The global modern industry development trend focused on the "Industry 4.0" concept has changed the development of supply chains. "Supply Chain 4.0" is developed based on the Internet of things, robotics, analytics and big data, which are aimed at improving productivity and customer satisfaction. Digital Logistics, Digital Supply Chain, Smart Supply Chain, Cold/Cool Supply Chain, Socially responsible Supply Chain, Green Supply Chain have been developed in the framework of this concept [15].

Several supply chain management models have been developed: Supply Chain Operations Reference Model (SCOR) and Global Supply Chain Forum (GSCF). The SCOR model includes five basic business processes:

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Plan, Source, Make, Deliver, and Return; it considers the activities directly related to the material flow and does not take into account sales of goods, marketing strategies, research and development of technologies, some elements of after-sales customer service. The model combines three modern management concepts: Business Process Reengineering, Benchmarking and Best Practice. The GSCF model distinguishes the following business processes: Customer Relationship Management – CRM, Customer Service Management – CSM, Demand Management – DM, Order Fulfillment – FM, Manufacturing Flow Management –MFM, Supplier Relationship Management – SRM, Product Development and Commercialization – PDC, Returns Management – RM. In the GSCF model, business processes are interrelated; each stage of the supply chain includes information exchange, supply chain optimization, increase of economic efficiency, improvement of services, etc. [7].

Profitability in retail supply chains is increased through [8]:

- improving supply chain planning by using information technologies, improving mutual communication, synchronizing business processes, improving planning at all stages of the supply chain, and reducing delivery times [8];

- improving the quality of operations management through continuous supply chain monitoring, timely detection of deviations and failures in the supply chain [9];

- reducing marketing and logistics costs by eliminating inefficient business processes [10].

Thus, the organization of material, financial, and information flows is the basis for the formation of an effective supply chain. It has been recognized that optimization of supply chains increases their efficiency.

2.2   Setting objectives

Food and non-food retail requires a well-coordinated operation of the logistics system and supply chain management. At the same time, the impact of effective supply chain management on retail volumes, both at the state level and from the consumer point of view, has not been determined. Manufacturers are dependent on the effectiveness of supply chain management due to high competition.

In the view of this, the impact of the effective retail

supply chain management is of scientific interest as retail (especially food retail) is a factor that ensures national security and shapes sales volumes regardless of consumer preferences and demand for goods [3].

The purpose of the research is to determine the dependence of retail volumes (both in general and in terms of individual goods) on the level of logistics development in the country.

The research objectives are:

- to determie the impact of effective supply chain management on retail volumes;

- to determine consumer tolerance to interruptions in the supply of certain products and the impact of supply interruptions on sales volumes and deferred demand for these products;

- to compare the data obtained for the Russian Federation with similar data from other countries;

- to analyze the results to develop improvements in retail supply chains.

3.   Methods and materials

3.1   Research context

Logistical efficiency is determined by the Logistics Performance Index (LPI) index, which was developed by the World Bank. The index includes the following indicators: Customs, Infrastructure, International shipments, Logistics competence, Tracking & tracing, Timeliness [18]. This is a biennial index that is based on surveys of local logistics operators, international forwarding companies and express delivery services.

On the other hand, scientific literature does not provide any data that determine the dependence of local demand on logistical efficiency.

3.2   Research hypothesis

The volume of retail trade directly depends on the effectiveness of supply chain management (both at the state level and at the level of "customer-commercial enterprise"); in other words, improved supply chain management increases retail sales.

3.3   Research factors

The dynamics of the LPI and retail trade volumes in the Russian Federation for the period 2007-2018 (it should be clarified that the index is calculated by the World Bank every other year; thus, we use the most recent data), as well as the survey data have been considered. The World Bank data [18] and the statistical data of the

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Federal State Statistics Service of the Russian Federation [19] have been used.

3.4   Research methods

The research methods include the construction of a statistical relationship between the LPI and retail trade volumes in the Russian Federation for the period 2007-2018, as well as a comparison of the data obtained with the data of a survey on the impact of supply chain management efficiency on consumer choice.

The study involves:

- determining the correlation between the LPI and the retail trade volume in the Russian Federation for the period 2007-2018, as well as determining the adequacy and practical suitability of the constructed model;

- a telephone survey of 158 customers from all regions of the Russian Federation on their tolerance to interruptions in the supply of certain products and the impact of supply interruptions on sales volumes and deferred demand for these products The study is based on one-stage sampling. The first stage involved the total population of the country. The number of respondents from each region was selected in proportion to the total number of residents living in the region. The selection was performed in a random systematic manner. Recruitment was conducted based on the Computer-Assisted Telephone Interviewing (CATI) method. Randomly dialed respondents were invited to participate in an online survey. At the first stage of the survey, respondents were asked to describe their behavior if the product they plan to buy is out of stock (answer options included: purchase of another similar product in the store; no purchase at all; going to another store). The second stage of the survey was aimed at finding out how long customers will give preference to a new product or whether they will revive old preferences in case of resumption of supplies. The questionnaire is based on our own developments.

The survey results and generalized data obtained are presented below.

The feature of the survey analysis is that the respondents were divided into groups by age.

4.   Results

Table 1 shows the dynamics of the Logistics Performance Index (LPI) and the data on the retail

trade turnover of the Russian Federation by years.

Table 1. Dynamics of the Logistics Performance Index (LPI) [18] and the data on the retail trade turnover of the Russian Federation [19] by years

Year	LPI	Customs	Infrastructure	International marine transportation	Logistical efficiency	Tracking	Timeliness	Retail trade volume, million roubles
2018	2.76	2.42	2.78	2.64	2.75	2.65	3.31	31579 371.8
2016	2.57	2.01	2.43	2.45	2.76	2.62	3.15	28240 884.9
2014	2.69	2.2	2.59	2.64	2.74	2.85	3.14	26356 237.3
2012	2.58	2.04	2.45	2.59	2.65	2.76	3.02	21394 526.2
2010	2.61	2.15	2.38	2.72	2.51	2.6	3.23	16512 047.0
2007	2.37	1.94	2.23	2.48	2.46	2.17	2.94	10868 976.4

Graphical dependencies have been constructed based on the data presented in the table (Figure 1).
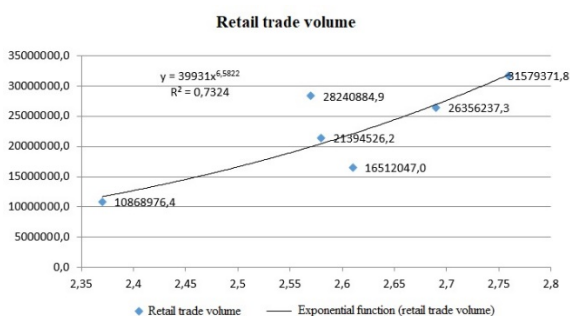

Figure 1. Graphical dependencies of retail trade volumes in the Russian Federation on the Logistics Performance Index

Based on the data presented in the table, the dependencies of retail trade volumes in the Russian Federation on the Logistics Performance Index have been constructed; the highest determination coefficient $R^2 = 0.7324$ is observed in the power-law dependence of $y = 39931x^{6.5822}$. At the same time, the

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determination coefficient R2= 0.7266 was obtained for the exponential dependence, and 0.68 - for the linear dependence. In general, it can be concluded that there is a direct relationship between these indicators.

Futhermore, there is a direct relationship between the volume of retail trade in the Russian Federation and the component of the Logistics Performance Index, namely Logistic Competence (Figure 2).
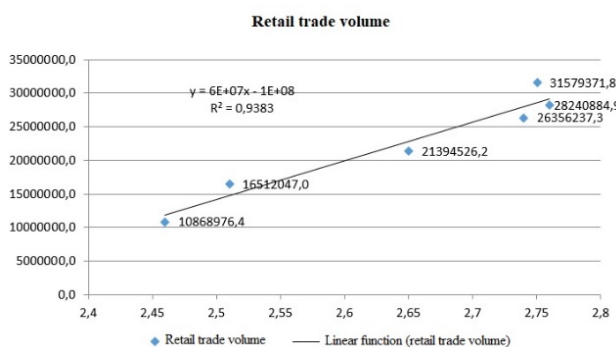

Figure 2. Graphical dependencies of the volume of retail trade in the Russian Federation on the component of the Logistics Performance Index, namely Logistic Competence.

A linear relationship has been constructed for this indicator: y = 6E + 07x - 1E + 08, the determination coefficient is R^2 = 0.9383; this indicates the direct dependence of retail trade volumes on the infrastructure in the Russian Federation.

Thus, we can conclude that the research hypothesis has been confirmed in terms of the dependence of retail trade on the effective supply chain management at the state level.

The next stage of the study was a telephone survey of 158 respondents. The results of the survey are presented in Table 2.

Table 2. Generalized survey data

Age group/Indicator	20-30	30-40	40-50	50-60	60-70	Over 70
What do you do if the product you want to buy is out of stock?						
Total number of respondents in the age group	32	38	44	19	17	8
purchase a similar product in the store	15	19	21	11	9	8
do not purchase anything at all	2	5	4	1	1	0
make a purchase in another store	15	12	19	7	7	0
How long will you give preference to a new product? Will you revive old preferences in case of resumption of supplies?						
No more than a few days (up to a week)	2	1	2	0	2	0
No more than a month	5	1	2	2	1	1
I have not thought about it; not sure that I will revive my previous preferences.	25	31	40	17	15	7

In general, it has been found that the respondents of all age groups will either buy a similar product or go to another store. In an increasingly competitive climate, the vast majority of respondents get a wide range of different products, and they do not often have preferred goods. Rationalization of consumer behavior negatively affects the sales of individual manufacturers in case of interruptions in the supply of goods. In this regard, we can conclude that at the "customer-commercial enterprise" level, there is no correlation between the supply chain management efficiency and sales volumes while supply chain inefficiencies decrease sales volumes of individual manufacturers.

5. Discussion

In fact, the results obtained in the study are consistent with global research findings that demonstrate a direct relationship between sales volumes and the effectiveness of supply chain management [20]. Researchers also focus on the fact that continuous and increased sales of a commercial company are a consequence of customer satisfaction [21] At the present stage of the sales technology development, effective logistics companies that ensure timely delivery [22] and the return of goods [23] are of particular importance.

Thus, the transfer of certain functions to outsourcing is a global trend which indicates an increase in the efficiency of the enterprise. The market will move from centralized logistics facilities covering the whole country to regional centers. Centralized logistics and

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physical distribution facilities operate in the Russian Federation; thus, the gradual development of regional logistics centers is likely to focus on the places of concentrated potential demand that are outside the availability of distribution services [24].

At the same time, there is no research on the impact of supply chain effectiveness on the increase in manufacturer's sales rather than a commercial company. In general, based on the survey results, we can draw a preliminary conclusion that the consumer will immediately switch their attention to another product and develop new preferences for the goods in a month.

In this case, it is feasible to develop a logistics service market, in particular outsourcing of logistics services. The choice of such a supply chain management strategy makes it possible to rationalize interaction with suppliers, customers, and intermediaries; increase the frequency of use of electronic communications systems; improve mechanization, automation and technical and technological development of warehouse facilities; and reduce logistics costs.

Outsourcing is beneficial for commercial enterprises due to the following reasons:

1. A decrease in the share of capital investment.
2. The focus of a retail commercial enterprise on its primary activity.
3. Logistics cost saving.
4. "Delegation" of liability.
5. Increased flexibility.
6. Consolidated shipment of goods which makes it easier to accept goods in stores;
7. In the case of outsourcing, supply chain is monitored by the outsourcer. This reduces the likelihood of a supply disruption, as well as the retailer's costs associated with supply disruptions.
8. The contractor has a team of highly qualified specialists and is experienced in implementing similar projects; the contractor constantly improves services and looks for opportunities to apply the best technologies and solutions.

Logistics outsourcing helps a retailer increase profits and reduce costs associated with the management of supply chains. The reduction takes place as there are no costs related to transportation, safety, warehousing, operation of vehicles, personnel maintenance, etc.

However, today most retailers consider outsourcing as a means of reducing their own costs rather than a means of optimizing supply chains; therefore, it is not advisable to completely switch to outsourcing.

This is mainly associated with the insufficient level of logistics services. Therefore, logistics companies should contribute to the development of outsourcing and increase demand for this type of activity, providing commercial enterprises with quality services. Thus, the feasibility of introducing logistics outsourcing in a commercial company is due to improved logistics services and increased flexibility.

The main requirements of commercial companies to the logistics supply chain component management include:
- the degree of the logistics infrastructure development;
- communication with manufacturers and suppliers of goods at all stages of supply chain management;
- sufficiently competent personnel;
- integrated information system;
- the ability to efficiently perform integrated logistics services (warehousing, transportation, quality control of goods, clearance of goods and payments);
- an integrated system for tracking the supply of goods at the stage of order placement, transportation, storage, quality control, etc.).

At the same time, it is conceivable that a retailer will lose control of the supply chain with the complete transfer of logistics operations to outsourcing. Therefore, at a commercial enterprise, it is important to create and properly organize a logistics control department focused on the logistics system management, as well as the coordination of parameters between functional departments (purchase volume, delivery time, range of goods and priority of individual brands, quality level and the scope of services provided by logistics companies).

The application of the integrated logistics outsourcing strategy by a retail trade network is shown in Fig. 3.
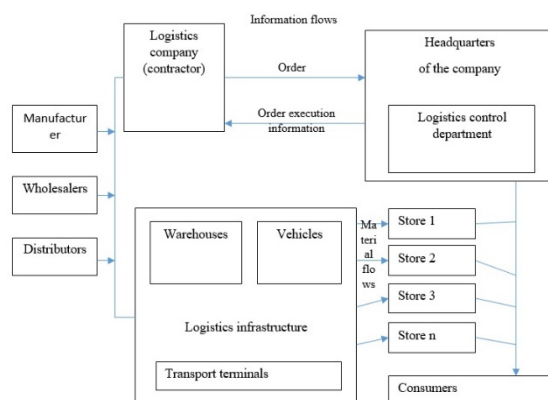

Figure 3. Application of the integrated logistics outsourcing strategy by a retail trade network

Outsourcing as the basic strategy of supply chain management involves the use of exclusively external resources to improve the efficiency of supply chains. In

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this case, the liaison with all intermediaries, customers, suppliers, and other contractors is brought to the forefront.

6.   Conclusions

The study discusses the importance of effective supply chain management to ensure retail sales, as well as its influence on retail volumes. It has been found that the effectiveness of supply chains determines the sales volumes of a commercial company. In scientific literature, there is no research on the impact of supply chain effectiveness on the increase in manufacturer's sales.

The study allowed us to conclude that:

- there is a direct relationship between the volume of retail trade in the Russian Federation and the component of the Logistics Performance Index, namely Logistic Competence (Figure 2);

- there is no research on the impact of supply chain effectiveness on the increase in manufacturer's sales rather than a commercial company. In general, based on the survey results, we can draw a preliminary conclusion that the consumer will immediately switch their attention to another product and develop new preferences for the goods in a month.

Outsourcing of logistics services is a solution to the problem of improving the efficiency of supply chain management.

Outsourcing in logistics management is one of the modern business models, which ensures increased retailer competitiveness, but at the same time depends on the national business specifics.

The transfer of supply chain management to outsourcing is aimed at improving business manageability, reducing costs and increasing the effectiveness of supply chain management.

Logistics decision-making requires a comparison of outsourcing costs and company sales costs taking into account break-even points and the volume of sales.

In general, the assessment of the appropriateness of transferring supply chain management to outsourcing is carried out from the perspective of strategic management, the possibility of outsourcing, financial prospects and improvement within the enterprise.

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