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Faculty of Transport, Management and Logistics
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MASTER THESIS

(EXPLANATORY NOTES)

OF GRADUATE OF ACADEMIC DEGREE

«MASTER»

THEME: ***«Automation of furniture supply chain management system»***

Speciality 073 «Management»

Educational and Professional Program «Global Logistics and Supply Chain Management»

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Kyiv 2021

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
НАЦІОНАЛЬНИЙ АВІАЦІЙНИЙ УНІВЕРСИТЕТ
Факультет транспорту, менеджменту і логістики
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(ПОЯСНЮВАЛЬНА ЗАПИСКА)

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Academic degree Master

Speciality 073 «Management»

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APPROVED
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TASK

FOR COMPLETION THE MASTER THESIS OF GRADUATE

Halyna L. Klevaka
(surname and name)

1. Theme of the master thesis: «Automation of furniture supply chain management system» was approved by the Rector Directive №2051/ст. of September 29, 2021.
2. Term performance of thesis: from October 04, 2021 to January 02, 2022.
3. Date of submission work to graduation department: December 13, 2021.
4. Initial data required for writing the thesis: general and statistical information about furniture market in Ukraine, information of the company LLC «Moidodyr», production and financial indicators of the company LLC «Moidodyr», literary sources on logistics and customer service, Internet source.
5. Content of the explanatory notes: introduction, the essence of the concept of "supply chain management"; how supply chain automation is changing the market; the benefits of supply chain automation; analysis of the Ukrainian furniture market; analysis of the activity of LLC «Moidodyr» in the Ukrainian market; identification the main problems and prospects for the development of the furniture market in Ukraine; develop the conceptual principles of furniture supply chain management; develop recommendations for introduction of drones for inventory of material resources; calculation of the economic effect of the proposed measures; conclusions and appendix.
6. List of obligatory graphic matters: tables, charts, graphs, diagrams illustrating the current state of problems and methods of their solution.

7. Calendar schedule:

№	Assignment	Deadline for completion	Mark on completion
1	2	3	4
1.	Study and analysis of scientific articles, literary sources, normative legal documents, preparation of the first version of the introduction and the theoretical chapter	04.10.21-28.10.21	Done
2.	Collection of statistical data, timing, detection of weaknesses, preparation of the first version of the analytical chapter	29.10.21-15.11.21	Done
3.	Development of project proposals and their organizational and economic substantiation, preparation of the first version of the project chapter and conclusions. Editing the first versions of maser thesis	16.11.21-03.12.21	Done
4.	Preparing the final version of the master thesis, checking by standards inspector	04.12.21-09.12.21	Done
5.	Approval for a work with supervisor, getting of the report of the supervisor, getting internal and external reviews, transcript of academic record	10.12.21-12.12.21	Done
6.	Submission work to Logistics Department	13.12.21	Done

Graduate_____
(signature)

Supervisor of the master thesis _____
(signature)

8. Consultants of difference chapters of work:

Chapter	Consultant (position, surname and name)	Date, signature	
		The task was given	The task was accepted
Chapter 1	Associate Professor, Karpun O.V.	04.10.21	04.10.21
Chapter 2	Associate Professor, Karpun O.V.	29.10.21	29.10.21
Chapter 3	Associate Professor, Karpun O.V.	16.11.21	16.11.21

9. Given date of the task October 04, 2021.

Supervisor of the master thesis: _____ Karpun O.V.
(signature of supervisor) (surname and name)

Task accepted for completion: _____ Klevaka H.L.
(signature of graduate) (surname and name)

ABSTRACT

The explanatory notes to the master thesis «Automation of furniture supply chain management system» comprises of 106 pages, 21 figures, 10 tables, 3 appendixes, 83 references.

KEY WORDS: SUPPLY CHAIN MANAGEMENT, FURNITURE COMPANY, FURNITURE MARKET, FURNITURE SUPPLY CHAIN MANAGEMENT, AUTOMATION, DRONES

The purpose of the research is to study and generalize theoretical approaches, as well as to develop practical recommendations for the automation of furniture supply chain management system.

The subject of the investigation is the modern technologies automation of furniture supply chain management system.

The object of the research is is the Ukrainian furniture market, as well as the business process of the furniture company «Moidodyr».

Methods of research are scientific inquiry, empirical, analysis and synthesis, modeling, expert assessments, extrapolation of time series.

Materials of the thesis are recommended for use during scientific research, in the educational process and in the practical work of specialists of logistics departments.

CONTENTS

NOTATION

ERP – Enterprise Resource Planning;

NPV – Net Present Value;

RFID – Radio Frequency IDentification;

SCE – Supply Chain Execution;

SCM – Supply Chain Management;

SCP – Supply Chain Planning;

SWOT – Strengths, Weaknesses, Opportunities, Threats;

VAT – Value Added Tax.

INTRODUCTION

Management of logistics business processes in the enterprise is an integral part of logistics, which is inextricably linked with the mechanism and quality of management in the enterprise itself. The future of the company depends on the construction and implementation of business processes.

The problems of the theory of logistics definition and its direct connection with business processes have been studied in their works by scientists, including M. Porter and M. Auckland. M. Auckland, in turn, highlighted his idea to consider logistics as a business process consisting of three local business functions, such as supply, production support, physical distribution. In turn, M. Porter defines the logistics process as an integrated interaction of business processes that go beyond several traditional divisions of the enterprise. The purpose of the presented theory is to simplify, unify and optimize the business process as a whole, rather than individual business functions.

Logistics business process – an interconnected set of operations and functions that translate the resources of the enterprise (in the management of goods and related flows) in the result set by the logistics strategy of the firm. That is, logistics business processes are processes that focus on planning, movement of materials, procurement, production and delivery of goods to consumers.

Understanding the combination of logistics and business processes has created a stable hypothesis of significant strengthening in practice, if the determination and modeling of business processes is carried out on the basis of structuring the activities of enterprises on a logistical basis. Business process modeling is a process reflection (usually graphic) of the enterprise's activity so that in the future these processes can be analyzed and improved.

With the help of innovation, the necessary competitiveness is achieved, crisis situations are prevented and overcome.

In a market economy, the furniture industry, as well as companies in other industries, feels its severe external influence. However, it should be emphasized that the domestic economy has competitive products of domestic industrial enterprises. High-quality upholstered and cabinet furniture has long been appreciated abroad. The current period can be described as a period of accumulation of threats, so it is advisable to identify features of both macro and microenvironment, which have a significant impact on the activities of the furniture industry.

Today, furniture production is an industry that is developing, gradually reaching the European level of quality and design. Therefore, it is extremely attractive to operators and, accordingly, has a dynamic to increase the number of competitors.

Today, the Ukrainian furniture market is estimated at 330 million US dollars. The analysis of the furniture market shows that consumers increasingly prefer domestic manufacturers in their choice. The decline in interest in imported furniture is primarily due to declining purchasing power. It is also worth noting that the Ukrainian furniture market is not deprived of shadow production, which is focused on the middle and cheap segment. Today the shadow furniture market in Ukraine is 35%.

More than 3,000 furniture manufacturers are engaged in furniture production in Ukraine. Among them: large furniture factories that produce furniture in series, medium-sized enterprises working on individual orders and small, of which about 30% – micro-enterprises.

Globalization and the new internet-based capabilities of ready informational networking among companies impose and enable new value-added structures known as bot-tom-up economy. The structure and process related nature of the bottom-up economy is dramatically different from the top-down economy of the past in that it follows a logic of cooperation among smaller, locally based value-added units flexibly combining to form larger structures to generate complex products and services. This is referred to as open production by production managers and suggests that new technical opportunities might give rise to structural changes also in the logistics sector in future.

From the angle of small and medium-size furniture companies the challenge is to be able to forge ties of cooperation with other service providers quickly and with as little input of resources as possible in a situation in which the cooperative business processes must be handled efficiently with the aim of providing joint services in the market. The present stock of software used by small and medium-size furniture companies systematically supports isolated internal functions and is not made for easy and quick integration with the software applications of complementary partners in the value-added process.

Innovative, co-operation-supporting and multitenant cooperation-enabling cloud services, resp. hold out the promise of new opportunities for the short-term establishment and termination of ties of cooperation without the need or risk of investment associated with conventional software applications. Meanwhile the integration issue between cooperation partners on the IT level can essentially be cleared up by the usage of the same cloud software installation.

The problem at present is less that of the availability of the suitable cloud services than the introduction of new approaches for the shared use of software

Some of furniture enterprises would be able to cooperate at lower costs and in a shorter time by using multi-tenant cooperation-enabling cloud services. How-ever, a part of furniture enterprises does not know about the advantaged and capabilities of cloud services. They need an external suggestion to get know about cloud computing and an external support for the implementation of cloud services in their own companies.

The digital age is disrupting traditional customer service models – new customer touchpoints are appearing the world over at breakneck speed and against a backdrop of rising expectations.

In this thesis, we outline our perspective on the formation of complex logistics customer service of the furniture companies in the digital environment.

A few years ago, digital customer service for Ukrainian businesses was at an early stage of study and research. At the same time, most businesses lack qualified digital customer service professionals who can use it practically effectively. They had

only the information and practical skills targeted at social networks, as well as the techniques for choosing the right e-commerce sales channel.

In recent years, most companies have started to increase their digital applications. Businesses began to view digital customer service as a lever of growth and a source of competitive advantage.

Digital customer service (or digital marketing) is marketing that engages with customers and business partners using digital information and communication technologies and electronic devices.

There is a view that digital customer service is a type of marketing activity that, through digital channels, allows digital methods to interact with target market segments in virtual and real environments. In other words, it is modern marketing, which is characterized by a duality because of its hybrid nature: some of the functions are performed online and some are offline.

The digital marketing system must fulfill the same goals, objectives and functions as the traditional marketing system, while at the same time, the methodological basis and means of achieving marketing tactical and strategic goals are fundamentally changing.

Digital marketing promotes:

– increasing of conversion – when the image accompanies advertising;

– increasing the number of visitors to website of a company – existing and potential consumer users, when there is a video or animated video on the homepage;

– enhancing the company's image and reputation – when it offers free photo and video sharing services;

– increasing sales of specific products and sales in general – when the company is present on social networks and has blogs that are run by company executives and its best professionals.

Digital marketing uses Internet marketing technologies, mobile technologies, cloud technologies, business analytics based on digital technologies, social media, namely:

– contextual advertising;

– Big Date technologies – large volumes of data;

– retargeting;

– mobile marketing;

– Email;

– viral marketing;

– real-time bidding,

– social media marketing;

– social media optimization;

– search engine optimization;

– and all kinds of online media resources.

Therefore, the use of digital marketing in modern conditions is becoming necessary and effective. According to the main advantages of using digital marketing are that:

– a wider target audience is aware of the brand, which is buyers willing to pay money for the product; attracting their attention through communication and networking;

– buyers find out the information about a product in a very short time, and the sooner they find out, the sooner they will buy;

– through the use of various channels to disseminate information about your brand that will literally "blindfold" and crash into the memory of the audience, the chances of choosing your products at the time of purchase increase;

– begin to learn about the product, study it more closely, look at it, advise it to friends;

– digital marketing costs less than regular advertising;

– the results of a marketing campaign can be measured, analyzed, then concluded and corrected.

A customer service reformation is taking place. It’s radical, it’s far-reaching and it’s being driven by customers. The digital age has transformed the way customers shop and share their experiences. Today, customers are driving the buying process

using websites, blogs, vlogs and social platforms. By the time they enter a store or become visible in the sales funnel, they know what they want to buy and how much they want to pay. It doesn't stop there. Once the sale is closed, customers use those same channels to join forces and name and shame those that disappoint.

On the face of it, it seems a concerning development for businesses. But there's a bright side to these changes. New channels and technologies open up fresh opportunities that can make a company stand out from the rest of the crowd. Opportunities to build an ongoing dialogue with customers. Opportunities to learn from customers and to increase the relevance of products and services. So it's time for every business to start seeking and fostering enduring relationships with their customers – a relationship that goes far beyond the initial sale.

All this determines the relevance of the chosen topic of the research.

Thus, the purpose of the research is to study and generalize theoretical approaches, as well as to develop practical recommendations for the automation of furniture supply chain management system.

The object of the research is the Ukrainian furniture market, as well as the business process of the furniture company «Moidodyr».

The subject of the investigation is the modern technologies automation of furniture supply chain management system.

Scientific innovations:

– conceptual principles of furniture supply chain management automation;

– implementation of drones for inventory of material resources for furniture company.

To achieve this goal, the following tasks were set:

– to explore the essence of the concept of "supply chain management";

– to research how supply chain automation is changing the market;

– to research the benefits of supply chain automation;

– to analyze the Ukrainian furniture market;

– to analyze the activity of LLC «Moidodyr» in the Ukrainian market;

– to identify the shortcomings in the existing supply chain management system of "Moidodyr";

– to develop the conceptual principles of furniture supply chain management automation;

– to provide recommendations for introduction of drones for inventory of material resources;

– to calculate the economic effect of the proposed solutions.

During the writing the thesis were used the materials of internal reporting of the enterprise, data of statistical directories and materials of practicing specialists in the field of logistics and management, placed in periodicals, monographs, textbooks and electronic sources, etc.

CHAPTER 1
THEORETICAL PRINCIPLES OF AUTOMATION OF SUPPLY CHAIN MANAGEMENT SYSTEM

1.1 The essence of the concept of "supply chain management"

The development of integration processes in the economy and their departure from the main economic links along the lines of interaction with business partners in the field of supply and marketing of finished products led to the concept of integrated logistics, or supply chain logistics. Accordingly, in the management of integrated logistics developed the concept of "supply chain management".

The term "supply chain management" was proposed by a system integrator – i2 Technologies and consulting company "Arthur Andersen" in the early 1980s. [1] The emergence of the concept of the same name (supply chain management – SCM) is associated with the publication of K. Oliver and M. Weber's "Supply chain management: Logistics Catches up with Strategy" in London in 1982

Initially, supply chain management was identified with integrated logistics. For example, D. Bauersocks and J. Kloss remain in this position and consider the relevant aspects of logistics and supply chain management almost as synonyms, believing that "logistics integration goes beyond intra-firm coordination of supply processes, logistics and physical distribution, extending to suppliers and consumers "[2].

The interaction of functional areas of business logistics and their relationship with the business environment emphasizes the term "integrated supply chain". Its content is characterized by consistently built: supply chain, intra-production chain and supply chain of the enterprise. From the point of view of the system organization of logistics, an integrated supply chain is first of all a set of economic entities: suppliers, producers, consumers and intermediaries who are in economic relations and united by participation in a single reproductive cycle of goods (services).

As the concept of supply chain management develops, there is a division of conceptual and semantic categories and individual terms between logistics and SCM. But the definition of the European Logistics Association, SCM – supply chain management – is an integrated approach to business, reveals the fundamental principles of management in the logistics chain, such as functional strategies, organizational structure, decision-making methods, resource management, implementation of supporting functions, systems and procedures [3].

In the process of evolution, the conceptual apparatus of the concept of supply chain management has changed significantly. In the 1980s, countries with developed economies in many industries experienced a situation in which traditional business management methods, working to save current costs, have almost exhausted their resources. To maintain competitiveness, new approaches have emerged, one of which has been the concept of supply chain management. She put forward and substantiated the idea of coordinating the flow of materials and finished products not only within one firm, but also in a number of firms that interact in business.

Mastering the concept and formation of supply chain management practices is determined by the transition from business relations management to logistics chain management, in particular, from supply chain economic relations management to integrated supply chain management. This is evidenced by the fact that "economic relations are subject to the general logic of the logistics process, expressed by a sequence of stages of interaction – from finding partners to fulfilling contractual obligations and meeting the interests of each of them" [4]. Foreign companies were the first to master the practice, they really realized that effective supply chain management is the next step they need to take to increase their competitiveness.

To date, the development of the concept of supply chain management has affected four stages.

Stage I. Origin of SCM theory (1980s)

At this stage in the development of the concept of "supply chain management" was rather a new fashionable term, in its content did not differ much from the concept of "logistics". The concept of SCM at that time was similar to the expanded

interpretation of integrated logistics and was almost completely defined by it. Regarding the relationship between the two concepts, D. Waters noted that "it is more a matter of semantics than real differences ... both terms refer to the same function" [5].

The logic of the interpretation of the concept of supply chain management at that time can be formulated as follows. Business entities form a supply chain, through which passes a through flow of material, which is the object of supply chain management in order to optimize the parameters of the flow at the outlet. To achieve a common goal, all actors in the chain act in coordination. Promotion of material flow throughout the chain begins to be carried out with minimal costs due to improving the value of the parameters of the system as a whole.

Thus, supply chain management implied the use of a logistics approach to coordinate the actions of all parts of the system, that is, in fact, the concept of logistics was in demand for business organization in the production and commercial sphere.

Stage II. Separation of SCM theory from logistics (first half of the 1990s). The concept of supply chain management was defined as an independent scientific idea in the 1990s. At this time, the theory of supply chain management is being separated, and independent theoretical research in this and related fields of knowledge is beginning to develop. Attempts are made to identify the essence and content of supply chain management as a science, as well as areas of application of the concept in practice. With the emergence of the ideology of SCM is the division of logistics and SCM as independent terms, as well as conceptual and semantic categories. There is a need to systematize the applied concepts and definitions of logistics and supply chain management. The search for a reasonable organization of the basic vocabulary of logistics and SCM, which would define the classes of interrelated concepts and take into account all the diverse and heterogeneous set of terms used in these areas of knowledge. For the same interpretation of basic terms and concepts, the problem of standardization of terminology in logistics and SCM, which is dealt with by several

foreign organizations, including the European Logistics Association and the Council of Supply Chain Management Professionals.

Stage III. Formation of the classical concept of SCM (second half of the 1990s – early 2000s). At the stage of formation of the classical concept, the difference between integrated logistics and supply chain management was already clearly marked. The former coordinating role of logistics and end-to-end material flow management in the supply chain is becoming the prerogative of SCM, and the functions of controlling and coordinating material flow management are also enshrined in the concept of "supply chain management". Logistics is interpreted as a functional controlling and optimization of all activities related to the movement of goods, ie the focus shifts to operational activities (transportation, warehousing, cargo handling, transshipment, etc.), as well as the location of logistics and production facilities [6] .

The rapid development of the concept has required serious applied research in various fields and in various regional markets. Accumulated theoretical knowledge and practical experience were the basis for the formation of training courses in the new discipline. At this stage, the ideology of supply chain management begins to develop as an independent concept and as a functional area of management, commerce, marketing and logistics. The main areas of research focus on the processes of integration and the formation of strategic partnerships, as well as the use of a process approach, the study of the main functions of companies in terms of business processes. Particular attention was paid to the development of processes to ensure the synchronization of trade flows, as well as the intensification of communications between units and information coordination.

Stage IV. The current stage of development of SCM theory (mid-2000s and beyond). There is an even more in-depth study of supply chain management both as a concept and as a functional area of activity, as well as the adaptation of the concept to different markets. The concept of SCM is aimed at solving the problems of integrated management of functional areas of logistics and coordination of the logistics process of the company. The accumulated practical experience is analyzed and required by

companies to increase their competitiveness. Particular attention is paid to the development of information technology with the use of engineering tools based on the application of the ideology of supply chain management in real time. Supply chain management practices focus on in-house planning and resource optimization and are key to building long-term focus company relationships with supply chain participants. All this requires further development of research in SCM-related areas to create new relevant concepts.

Currently, supply chain management as a concept of SCM is one of the effective ways to increase profits and market share and is actively implemented in the economies of industrialized countries. Many large companies, including Russian ones, are mastering the principles of SCM as a new business ideology. Ensuring and developing the strategic advantages of logistics both abroad and in our country is facilitated by national coordinating bodies – the European Logistics Association and the Council of Professionals in the field of supply chain management. In the Russian Federation, the following coordinators are currently: the National Logistics Association of Russia (UFO), the National Supply Chain Council.

The purpose of these organizations is to:

– develop proposals and additions to the laws and regulations of the Russian Federation in the part relating to logistics, as currently in our country there is no legislation in the field of logistics;

– remove barriers to tax, customs and transport legislation of the Russian Federation that hinder the effective use of the strategic potential of logistics;

– to form integrated logistics systems covering various spheres of business, to create interregional and international integrated logistics transport, trade and information systems.

The National Logistics Association of Russia is a non-governmental organization founded by the State University – Higher School of Economics (HSE), the Russian Association of Business Education and the Association of Freight Forwarders of St. Petersburg. The mission of UFOs is to establish and strengthen logistics in Russia as a new scientific and practical direction that contributes to the

socio-economic development of economic entities, industries and the country as a whole, as well as improving the welfare of citizens. Among the main tasks of the organization are:

– analysis of foreign theoretical research and practical experience in the field of logistics in order to adapt and implement them in Russia;

– development of proposals and amendments to legislative and regulatory acts of the Russian Federation in the part relating to logistics;

– coordination of activities of enterprises, organizations and institutions engaged in research in the field of design, construction and operation of logistics systems; exchange of best practices in the application of logistics developments in the Russian Federation and abroad.

Supply chain management is a relatively new area. It reflects the concepts of integrated business planning, which have been followed by logistics experts and practitioners since the 1950s. Today, integrated planning has become a reality with the development of information technology, but most companies still lack the knowledge on how to apply and adapt new analytical tools to achieve these goals. Regarding the term SCM (Supply Chain Management) – supply chain management, so far among specialists in logistics and general management there is no consensus on the definition of this concept. Many view SCM from an operational perspective, understanding SCM as material flows. Others see SCM as a management concept, and finally, others mean SCM implementing this concept in an enterprise. Here are the most popular definitions of SCM.

SCM is a set of approaches that helps to effectively integrate suppliers, manufacturers, distributors and vendors. SCM, taking into account customer service requirements, allows you to ensure the availability of the right product at the right time in the right place at minimal cost.

The supply chain is a set of links interconnected by information, cash and commodity flows. The supply chain begins with the purchase of raw materials from suppliers and ends with the sale of finished goods and services to the customer. Some

links may well belong to one organization, others – to customers, suppliers, distributors. Thus, the supply chain usually includes several organizations.

Rapid market development, increased competition, the need to improve the quality of customer service, pose new challenges for companies. To remain competitive and enhance its strengths, the modern enterprise needs to optimize all value creation processes – from raw material supply to end-user service. To solve these problems, company management also turns to SCM solutions.

Supply chain management includes the following steps:

1. Planning.

This process clarifies the sources of supply, generalizes and prioritizes consumer demand, plans stocks, determines the requirements for the distribution system, as well as production, supply of raw materials and finished products.

2. Purchase.

This category identifies key elements of supply management, evaluation and selection of suppliers, quality control of supplies, contracting with suppliers. Also included are processes related to the receipt of materials, such as: acquisition, receipt, transportation, similar control, holding (storage until posting) and arrival. It is important to note that actions to manage the supply of goods and services must meet planned or current demand.

3. Production.

This process includes the production, implementation and management of structural elements of make, provide control over technological change, management of production capacity (equipment, buildings, etc.), production cycles, production quality, schedule of production changes, etc. Specific production procedures are also defined: actual production procedures and cycles, quality control, packaging, storage and production. All components of the process of processing the input product into finished products must meet the planned or current demand.

4.Delivery.

This process consists of order management, warehousing and transportation. Order management includes creating and registering orders, generating value,

selecting product configurations, and creating and maintaining a customer base, along with maintaining a database of products and prices. Warehouse management involves a set of actions for the selection and assembly, packaging, creating a special packaging-label for the customer and shipment of goods. The infrastructure of transportation and delivery management is determined by the rules of management of channels and orders, regulation of goods flows for delivery and quality management of delivery.

5. Return.

In the context of this process, the structural elements of product returns (defective, redundant, requiring repair) from purchase to production and delivery are determined: determining the status of the product, its placement, request for return authorization, return schedule, destruction and recycling These processes also include certain elements of after-sales service.

SCM processes can also be divided into two major groups: Supply Chain Planning (SCP) and Supply Chain Execution (SCE). SCP includes strategic supply chain planning or business processes in its individual units. SCE – implementation of plans and operational management of supply chain units, such as transport or warehousing.

Supply chain management optimization is designed to solve the following tasks:

1) shortening the planning cycle and increasing the planning horizon by obtaining reliable and timely information;

2) cost optimization through the ability to identify strategic counterparties, the optimal choice of purchased products and their suppliers, support interaction with them in real time;

3) reduction of production costs through the optimization of product flows and the operational organization of information exchange between contractors;

4) reduction of warehousing costs by bringing production volumes in line with demand. This task corresponds to the concept of Just-In-Time supply management;

5) improving the quality of customer service is achieved through efficiency and flexibility of the supply process.

Thus, SCM is a process of organizing the planning, execution and control of flows of raw materials, work in progress, finished products, as well as providing efficient and fast service by obtaining up-to-date information on the movement of goods. SCM solves the tasks of coordination, planning and management of supply, production, warehousing and delivery of goods and services.

Supply chain management – planning, creating and controlling the flow of information and materials in the supply chain in order to meet customer needs with maximum efficiency. Logistics – the science and practice of supply chain management.

A supply chain is a sequence of processes and information that delivers products or services from suppliers, through production, and distributors directly to the consumer.

Supply chain management – planning, creating and controlling the flow of information and materials in the supply chain in order to meet customer needs with maximum efficiency. Logistics – the science and practice of supply chain management.

A supply chain is a sequence of processes and information that delivers products or services from suppliers, through production, and distributors directly to the consumer.

Defining the supply chain is key in logistics. There are external and internal supply chains:

1. Internal supply chain – consists of different divisions of the company, begins in the supply department (procurement) and ends with the customer service department.

2. External supply chain – a network of organizations involved in the processing of materials, raw materials and information into products and services consuming products and services.

Supply Chain Management (SCM) refers to the management of the entire value chain, from the supplier and manufacturer to the retailer and end user. SCM has three

main objectives: to reduce inventory, increase transaction speed through real-time data exchange, and increase sales by more efficiently meeting customer requirements.

Contractors used to be responsible for SCM's work, but now it is increasingly returning to the corporation's network. With the emergence of sophisticated, interconnected supply channels and supply chains, it is becoming increasingly important to provide this opportunity to everyone involved in all parts of the chain, both inside and outside the organization – from employees to customers, suppliers and business partners. all over the world.

Although many companies have already adapted the supply chain "just in time" and invested in the optimization of business processes throughout the system, there is still significant potential for the development of more responsive, efficient, integrated and cost-effective supply chains. There is still a need to minimize inventory maintenance costs and optimize the flow of products from suppliers, through production, to customers. In a highly competitive market, data must be transparent enough for everyone to understand, process, and act with, and flexible enough to enable employees to respond instantly to changing conditions and unexpected challenges.

Microsoft Business Analytics gives people the information they need, in a familiar format, to master every link in the supply chain. Microsoft Business Analytics provides timely information to help maintain optimal inventory levels, optimize order processing, automate product planning, expedite shipments, and quickly meet the changing needs of any partner.

The flow of material and information means occurs as a continuous movement of products – material goods through successive phases of transformation, transportation, warehousing, handling, etc., up to the final recipients of these goods, ie consumers or investors, and are not always continuous. Often, for technical and organizational reasons, it is not possible to ensure the continuity of traffic flows between individual economic entities. Sometimes it is not recommended to synchronize movements (deliveries), which would make it impossible to break. This causes a situation where there are breaks in the movement, which in turn cause the

emergence of stocks. In figures below all the main phases of the movement of material goods are given, in which any sequence of realization of logistic functions can be defined as a logistic chain.

Supply chain management is a process of planning, organization, accounting, control, analysis, regulation, aimed at achieving the strategic goals of supply chain participants. The combination of general management functions and special management functions in logistics (cost management, service quality management, etc.) forms a complex controlling function that ensures the achievement of logistics coordination in supply chains.

Supply chains are a set of consistently interacting suppliers and consumers: each consumer becomes a supplier to subsequent customers – this continues until the finished product reaches the final consumer. The supply chain has in its structure a focus company, suppliers, consumers, as well as involved in the interaction of channel intermediaries. The focus company is a key link in the supply chain, which determines the configuration of the chain and the characteristics of the interaction of participants.

Depending on the number of links, there are three levels of complexity of supply chains:

1) direct supply chain;

2) expanded supply chain;

3) maximum supply chain.

The direct supply chain consists of a focus (central) company (usually a manufacturing or trading company), a supplier and a buyer / consumer involved in the external and (or) internal flow of products, services, finance, information. In this case, as a rule, the focus company determines the structure of the supply chain and relationship management with business partners (Fig. 1.1).

The extended supply chain additionally includes suppliers and consumers of the second level (Fig. 1.2).

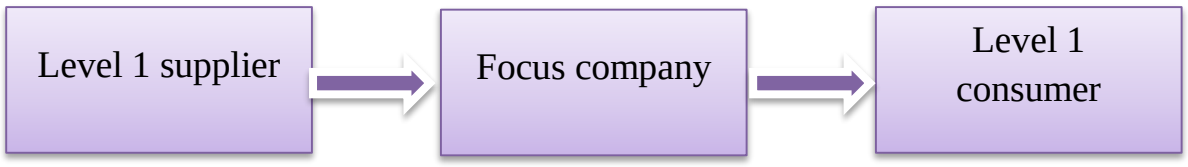

Figure 1.1 – Direct supply chain

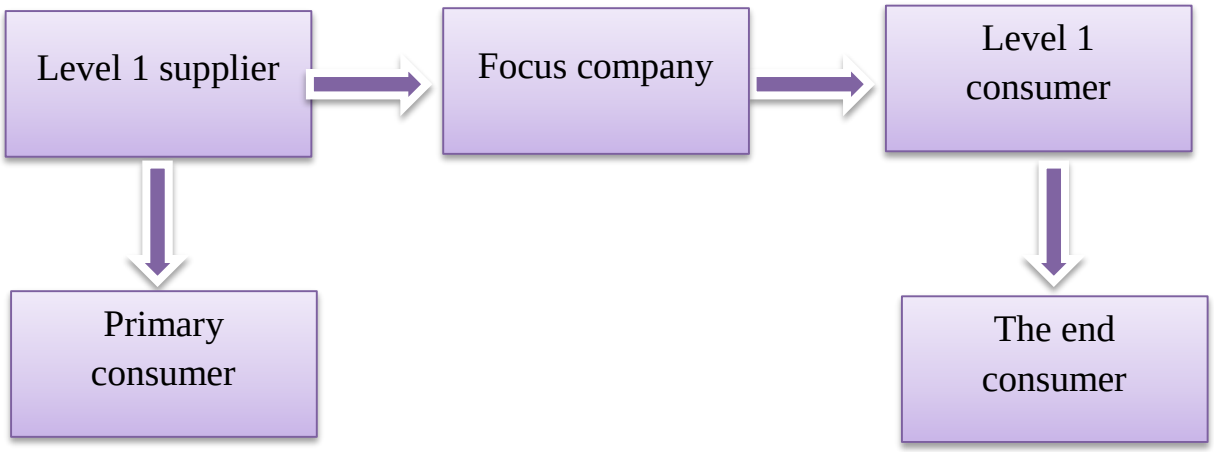

Figure 1.2 – Extended supply chain

Maximum supply chain is presented in Fig. 1.3.

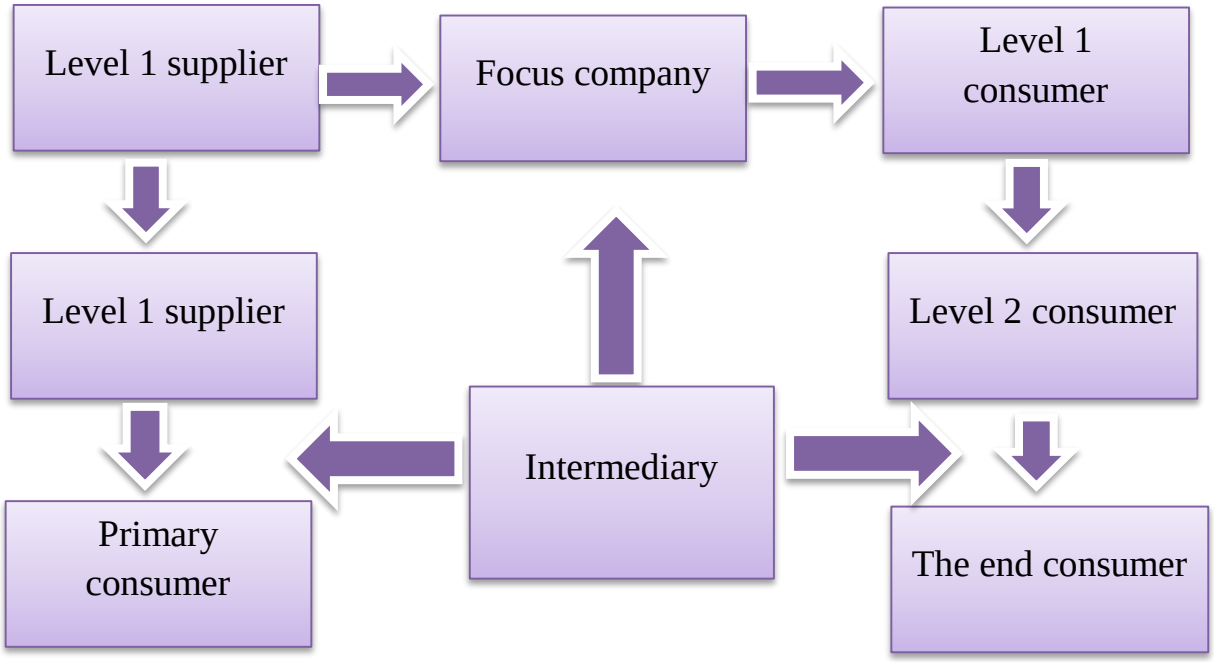

Figure 1.3 – Maximum supply chain

The maximum supply chain consists of the focus company and all its business partners on the left (up to suppliers of raw materials and natural resources), which determine the resources of the focus company – at the "entrance" and distribution network on the right – up to end (individual) consumers, and also different types of intermediaries.

The evolution of the SCM concept has reflected current changes in character doing business and therefore occupies an important place in the research of a number of scientists. Logistics business process – an interconnected set of operations and functions that translate the resources of the enterprise (in the management of goods and related flows) in the result set by the logistics strategy of the firm. That is, logistics business processes are processes that focus on planning the movement of materials, procurement, production and delivery of goods to consumers [16].

In the literature there are different views on the periodization of development SCM concept. Thus, the first stage of evolution (1980s) is associated with the emergence of concepts of supply chain management and value creation and the use of these concepts in logistics. The result was coordination and harmonization of the flow of raw materials and finished products with suppliers.

In the second stage (1990s – early 2000s) study of the Japanese experience companies, development of management technologies (deliveries "on time", integrated quality management, etc.) and the emergence of new information technologies and systems for company management (enterprise resource planning, customer relationship management, etc.) led to the introduction of the SCM concept in the activities of leading companies. Even in 2000, supply chain management is not yet has become a widely accepted concept [14].

The third stage in the evolution of the SCM concept (early 2000s – our time) is characterized by the following major trends:

– expanding the use of SCM in the activities of an increasing number of companies in economically developed countries;

– active development of network forms of business organization;

It is important to consider these trends in detail.

Expanding the use of SCM in the activities of a growing number of companies economically developed countries. The most important milestones of the first decade XXI century in the field of SCM steel [13]:

– formation of a special type of thinking that considers the activities of the enterprise in the relationship and interdependence with its supply chain. Transforming SCM from a concept supported by a narrow circle of scientists and company leaders into common practice for most companies. Appearance planted supply chain management director;

– wide application of the system of indicators used to assess the effectiveness of the supply chain;

– transfer of the concepts of "lean production" and "six sigma" from the enterprise level to the level of interaction in the supply chain;

– transformation of risk management in the supply chain from a little-known concept into a practical tool for doing business;

– widespread practice of relocating production to foreign countries (offshoring) and outsourcing of some business functions (outsourcing). For many companies, the share of value added / value has fallen to 15… 25%, and the virtual supply chain has become a reality;

– strengthening the geopolitical and economic influence of China as a leader global supplier and consumer market;

– high market consolidation of supply chain management software. Companies specializing in the production of narrow-profile software such as warehouse management, planning production schedule, etc., were pushed out of the market, and the main trend was the development of custom software;

– forming an understanding of the need to achieve transparency in the activities of all participants in the supply chain;

– increase in the dynamics of prices for goods and their availability and the associated increase in the strategic importance of supply functions.

Active development of network forms of business organization.

In the near future, linear supply chains will be replaced by networks of specialized organizations that interact with each other via the Internet. This specialization allows companies to focus on key activities and therefore take an active part in various networks business partners.

Networks are the fundamental material from which new organizations are built and will be built [14]. They are able to form and spread along the main streets and dead ends of the global economy, as they rely on information power provided by the new technological paradigm.

The emergence of new network forms of business organization is associated primarily with the crisis of the old vertically integrated form of oligopolistic big business, typical of industrial society.

It should be noted that in their time, vertically integrated organizational structures had a number of advantages. First, they independently controlled the entire value chain. For example, Ford G. had its own wool factory, which was used to make upholstery for seats, General Motors made paint for cars, and media moguls owned paper mills. It ruled out supply disruptions and provided full information transparency. Second, companies earned extra profits and could cut costs by throughout the supply chain. However, vertically integrated giant companies carried high transaction costs for management, so in modern conditions they are have become less effective than other forms of organization.

1.2 How supply chain automation is changing the market

When the term automation comes up, most people experience a brief sci-fi laden slideshow in their heads. It’s the year 2021, humanoid robots take to the streets disrupting life as we know it and clashing with their old human masters. Lucky for us, when it comes to the world of supply chain automation, robots are more about increasing efficiency and less the whole enslaving humanity angle.

It’s no secret that demand for flexible, accurate and nimble supply chain logistics is on the rise. As consumer and client bases continue to grow at rapid rates, supply chains will need to adapt to larger, more complex methods of information and product transportation. However, there are many time-consuming processes that go along with managing a successful supply chain.

Supply Chain Automation trends are presented in Fig. 1.4.

Figure 1.4 – Supply Chain Automation trends

Here is where automation steps in. Time-wasting processes can fall into automated workflows, and human employees can spend more time forecasting, analyzing trend data and developing relationships with clients.

With so many benefits to adopting automation, it may come as a surprise that a recent BCI study shows that nearly 63% of companies do not use technology to monitor their supply chain performance.

In this article, we will discuss why to adopt, why not to adopt and how the trends in automation are affecting supply chain management around the world.

Key Takeaways:

– by the end of the year, only 17% of companies will be out of the supply chain automation loop – compared to 40% four years ago;

– optimized supply chains generally have 15% overall costs, less than 50% inventory holdings, and a faster cash-to-cash cycle by nearly three times compared to under-optimized supply chains;

– a recent report shows that 65% of e-commerce operations will leverage automated robots within their fulfillment practices;

– automated storage and retrieval systems can increase accuracy in orders by up to 99%;

– manually traveling to and picking an order can account for more than 50% of picking time;

– automation increases the efficiency and accuracy of mundane tasks, but human employees are still very necessary for higher-level planning and relationship formation.

Manufacturing and assembly providers create products that travel down the supply chain. These products go to warehouses where they are organized and stored, and then they make their way to their final destinations where clients receive them. All the while, vital data related to the supply chain's performance is gathered and studied by professionals in order to further optimize the chain as a whole.

Much like a complex living organism, you wouldn't expect all of these processes to be controlled manually. Imagine having to section off a portion of your conscious mind to command your stomach to digest or your lungs to process each individual molecule of oxygen. You would end up standing still all day every day focusing on keeping yourself alive. Luckily, your body has already adopted widespread automation of vital tasks to give your mind room to work on the rest.

Supply chain automation seeks to accomplish the same thing. There are processes like picking and packing that gobble up valuable time employees could spend on higher-level tasks that require a human touch.

We spoke to Lisa Anderson, the founder and president of LMA Consulting Group Inc., about her thoughts on automation in the supply chain. "Automation is

coming, whether or not we get on board. To thrive in today's Amazon-impacted business environment, customers expect rapid deliveries, 24/7 accessibility, last minute changes and easy returns with innovative service options such as Amazon Key In-Car Delivery. To meet these ever-increasing expectations while increasing profitability and cash flow, executives are looking to technology such as robotics, IoT, artificial intelligence, automation equipment and predictive analytics to accomplish these objectives."

Supply chains run into snags all the time. Preventing them or dealing with them before they arise are preferable ways to handle the situation. However, if employees are stuck spending their time on mundane tasks, it can be hard to see them coming.

If there is one universal truth about shipping, it is that customers want their products as soon as possible. Now that we live in the world of Amazon, customers expect quick and accurate delivery with stellar service should any problems arise.

According to a recent survey, nearly 20% of operations identified fluctuating customer demand as the biggest challenge they face. This number is only expected to rise, and consumer demand shows no signs of slowing down anytime soon.

Regardless of where you stand, the global economy has been quite chaotic recently. Not only are all of the normal processes in a supply chain much more difficult on a worldwide scale, but there are a wide array of regulations an operation has to follow when working globally.

A supply chain needs to be very agile and able to quickly conform to changing global requirements. When the future is as uncertain as it is in the current international market, you need to be able to change direction quickly.

Right now, there is already an overwhelming number of options available when considering the order and delivery channels for your supply chain to leverage. A supply chain must have the ability to organize orders coming in from a wide array of channels without slowing down.

Possessing enough data visibility is another critical part of this issue. You need to be completely in tune with how your supply chain works in order to find the best possible channel to serve your operation's needs.

1.3 The benefits of supply chain automation

The times we live in are exciting and new, but also dangerous for those that are not ready to adopt new technologies. Those that have proved ready are benefiting greatly from the embrace of technology, and significantly within supply chain. There is a standard definition of automation in the supply chain: anything that can be handled via today's computer systems can be automated. This includes and is not limited to billing, generation of bills of lading, compliance reports and even movements throughout a factory or warehouse floor.

Automation has allowed supply chain operations within companies to perform tasks with minimal human intervention or interaction. Automation methods vary significantly in size, functionality, dexterity, intelligence and cost, from robotic process automation to flying vehicles with artificial intelligence.

Traditionally, automation and robots have been deployed for executing routine and repetitive tasks, requiring complex programming for implementation, while lacking the agility to easily adjust operations. As the automation technologies have become more sophisticated, set up times are decreasing, requiring less supervision and are allowing for the smooth integration and transformation of legacy supply chain systems.

The phases within traditional supply chain systems all acted as autonomous phases that had minimal visibility into the other segments of the chain, whereas, with automation, the supply chain is streamlined from end-to-end, enabling all different piece of the chain to be managed in tandem as seen below (Fig. 1.5).

For starters, let's take our examples of problematic issues that many supply chains are dealing with right now:

Solving Problems With Robots

Let's go back and look at our first example of a common paint point many supply chains face. How does supply chain automation help with a ravenous customer base that demands speed, accuracy and stellar customer service?

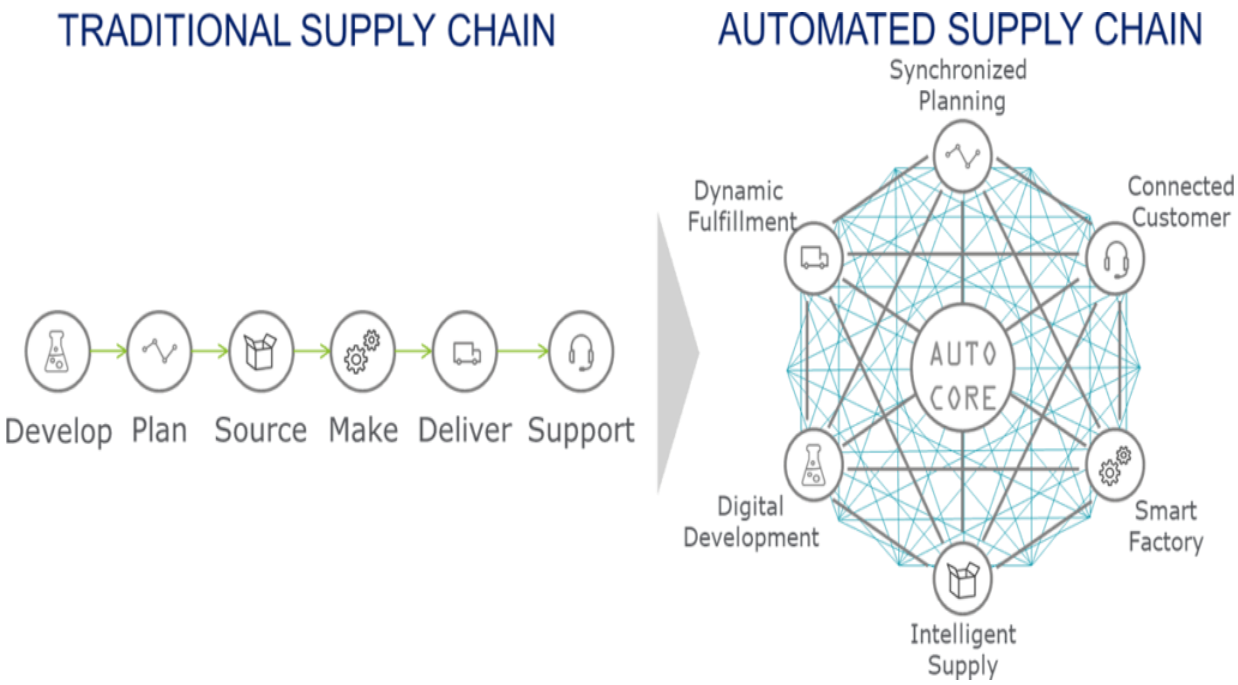

Figure 1.5 – Comparison of traditional supply chain and automated supply chain

Better Customer Service

Once a customer orders a specific product, its journey through the supply chain begins. However, there are a few bottlenecks where human labor lags behind what an automated warehouse can accomplish. For example, an employee receives a notification that a product has been ordered and that it needs a pickup. The employee in question would need to make their way to the product, find the correct object, pick it up and transfer it to be shipped out.

With supply chain automation, these tedious steps can be removed from the equation in a few ways. Automated warehouses have begun implementing small pick and pack robots that can quickly traverse a warehouse and find the correct object via SKU, UPC or even RFID in some cases. These warehousing robots are ready to go at a moment's notice and do not have to drop other tasks in order to grab the product they need to move. But there are even more (and less expensive) ways to implement automation in your warehouse.

For example, a Massachusetts-based company employs a different method that has radically increased its productivity. Instead of warehousing robots, a system of conveyors carries all products that need to be palletized above the warehouse floor to

their final destination to be shipped. Supply chain automation gives them the option to employ smart technology that can identify the number of products that need to be shipped and move them almost 75% of the way through their journey. Even simpler solutions make use of no hardware at all, simply optimizing the pick, pack and ship route so your workers don't take inefficient paths through the warehouse.

Outside of picking and packing, supply chain automation serves the customer in other ways, too. When an order is received, it automatically triggers the fulfillment process, while providing the customer with constant information on where their package is, when it should arrive and any other information they may need.

When you are feverishly refreshing your shipping status on Amazon to see when that fancy new TV is expected to arrive, you can thank automation for keeping you up to date.

Protecting Your Supply Chain

While I'm sure many of us wish this were true, no one can tell the future. Sure, we may be able to forecast and make some educated guesses, but surprises are always lurking around every corner. Sudden difficulties can damage an entire supply chain depending on what they affect. These types of problems can range from a bad storm knocking power out in an important area, fire at a manufacturer or something more mundane.

Damage from disaster can be mitigated, but speed has everything to do with it. An employee may receive a notification about a problem with a manufacturer and be able to forward it to the necessary people, but time is already being wasted.

Supply chain automation can put systems into place that immediately react to adverse conditions. If there is a problem at a manufacturing plant, an automated system could instantly place orders for integral equipment or parts from another partner without having to run the request up the normal chain of command. Suddenly, your supply chain is saving you hundreds of thousands of dollars when those critical parts (that your system's already ordered) jump in price after word of the slow-down reaches the rest of the world.

Not only are you eliminating the need for a team that monitors and reacts to situations like this, but you are also ahead of the game at the same time.

Keep Up With Shipping Demands

Warehouses are integral parts of any supply chain, but the transportation of goods and data is equally vital. We'll go into some of the more radical trends beginning to take off later in the article, but for now, we can focus on some less intrusive automation that affects the transportation leg of a supply chain.

Trucking plays a vital role in how a supply chain functions; people actually want to receive the products they pay for after all. Many small to medium enterprises till rely on outdated methods when managing transportation aspects their supply chains, and while it may work for them, they could reach new heights with a little bit of automation.

Instead of employees spending time figuring out the optimal way to pack a truck, plan the most efficient route, report transit status to clients and connect the right truckers to the right shipments, supply chain automation can streamline it all. A little bit of supply chain automation can go a long way: A recent study shows that nearly 25% of supply chain professionals report delivery costs as one of their top issues.

Supply chain automation can take the entire transportation process and streamline it with the hopes of cutting down on delivery costs. Without the need for a complex team to figure out trucking details, employees can spend time on other more pressing issues while your automation keys in the best routes and automatically reports to your consumers.

Automating the supply chain process could primarily drive value through indirect and direct operating cost reduction and through increasing revenue potential. In addition, there are major benefits that companies can reap by choosing to automate their supply chain processes such as:

Decreasing operating costs

Supply chain automation helps in the reduction of labor costs, inventory, warehousing, and overhead costs associated with inventory storage, including rent, labor and energy costs.

Increasing productivity

By optimizing current resources, enabling around the clock work, companies can gain up to 20 percent more productivity in areas that have been automated.

Increasing Volume

For manufacturers, automation allows for the increase of the volume of products that can be produced. The technology will allow for the incorporation of the skills of trained workers with the accuracy of automated equipment, hence, increasing productivity.

Improving accuracy

Automation can reduce errors associated with manual processes, which in turn, helps plan cost control through providing accurate, real-time information on inventory levels.

Improving time savings

Through streamlining business processes, supply chain automation boosts time savings by reducing the time associated with implementing labor intensive tasks like accounting, saving manufacturers immense amount of time and money.

Integrating with large suppliers

The ability to integrate systems with that of large suppliers is one of the major advantages of automating a supply chain, as it enables a strong foundation of which permits more visibility between partners.

Improving compliance

Automation can assist organizations with complying with industry standards through standardizing pricing, products and vendors.

While automating tasks is a much more convenient and efficient way to manage a supply chain and does provide immense benefits, managers and leaders within an organization may prefer to be able to track specific actions and outputs. For that reason, many automation solutions provide a comprehensive & customizable

dashboards that give leaders visibility into all the necessary data and processes, and that is why Enterprise Resource Planning (ERP) is key to an automation project.

ERP software's allow for the automation and integration of core business processes. Some of these processes include scheduling operation, inventory records, customer orders and financial data. That said, ERP software's can drive huge improvements in terms of the efficiency and productivity of any organization, which includes distribution, manufacturing, finance, reporting and analysis. Automation was a luxury, but now it is a necessity for companies to survive in this competitive environments.

1.4 Chapter summary

In the process of studying the theoretical foundations of logistics business process management in enterprises, it was concluded that they are inextricably linked with the nature and features of logistics development. Because logistics, which is an integrated, interdisciplinary science, provides an opportunity to predict sales volumes, the cost of promoting them to the customer – the consumer, the timing of payments for shipped products, etc., as well as assess the direction and strength of business factors. – environment. We have an analysis of the main trends in world logistics. It may surprise someone, but most of these trends are observed in Ukraine.

Business process modeling is a process reflection of the company's activities so that in the future these processes can be analyzed and improved

Development of innovative projects to improve the quality of logistics services can reduce the overall costs of the enterprise. That gives the chance on the basis of the analysis of market tendencies to carry out planning of innovative activity of the enterprise. Innovative logistics innovations become effective if they are backed up by decisions and concrete actions. Innovative activity is aimed at the practical use of scientific, scientific and technical results and intellectual potential in order to obtain a

new or improved product, method of production and meet the needs of society in competitive goods and services, as well as additional research and development. aimed at improving social services.

Supply Chain Management Concept (SCM) is a modern scientific direction of the organization of relations between enterprises and ensuring the customer orientation of modern business. At the initial stage of its formation, SCM was interpreted as a supplement to logistics, but today it is an independent scientific discipline that includes logistics as an important component.

Automation has allowed supply chain operations within companies to perform tasks with minimal human intervention or interaction. Automation methods vary significantly in size, functionality, dexterity, intelligence and cost, from robotic process automation to flying vehicles with artificial intelligence.

CHAPTER 2
RESEARCH OF FURNITURE SUPPLY CHAIN MANAGEMENT CAPABILITIES

2.1 Analysis of the furniture market of Ukraine and identification of the main trends in its development

Today, furniture production is a developing industry, gradually reaching the European level of quality and design. Therefore, it is extremely attractive to operators and, accordingly, has a dynamic to increase the number of competitors.

Today, the Ukrainian furniture market is estimated at $ 330 million. Analysis of the furniture market shows that consumers are increasingly choosing domestic manufacturers. The decline in interest in imported furniture is primarily due to declining purchasing power. It is also worth noting that the Ukrainian furniture market is not deprived of shadow production, which is focused on the middle and cheap segment. Today the shadow furniture market in Ukraine is 35%.

Today in Ukraine there are more than 3,000 furniture manufacturers. Among them there are large furniture factories that produce furniture in series, medium-sized enterprises working on individual orders and small, of which about 30% – micro-enterprises.

Today the furniture market in Ukraine has its leaders (Fig. 2.1). A significant share of the market is occupied by such companies as: "Enran", MERX, "Sterkh", LIVS, "Gerbor", "Kitchens of Ukraine", "Ekmi-mebel" and others. Competitive advantage is given to enterprises that sell their products not only on the Ukrainian market, but also abroad. With the widespread use of online resources, the furniture market has partially moved into the online space. The most popular online furniture stores in Ukraine are: "Sofas for nirvana", "Fine furniture", "Furniture", "Oak", "Sofino", "Furniture", "Stool" and others.

According to the State Statistics Service, from 2013 to 2017 the dynamics of furniture production in Ukraine is unstable. Sales of furniture in physical terms tended to decrease, while in monetary terms since 2016 there has been an increase. Which is primarily due to the price factor.

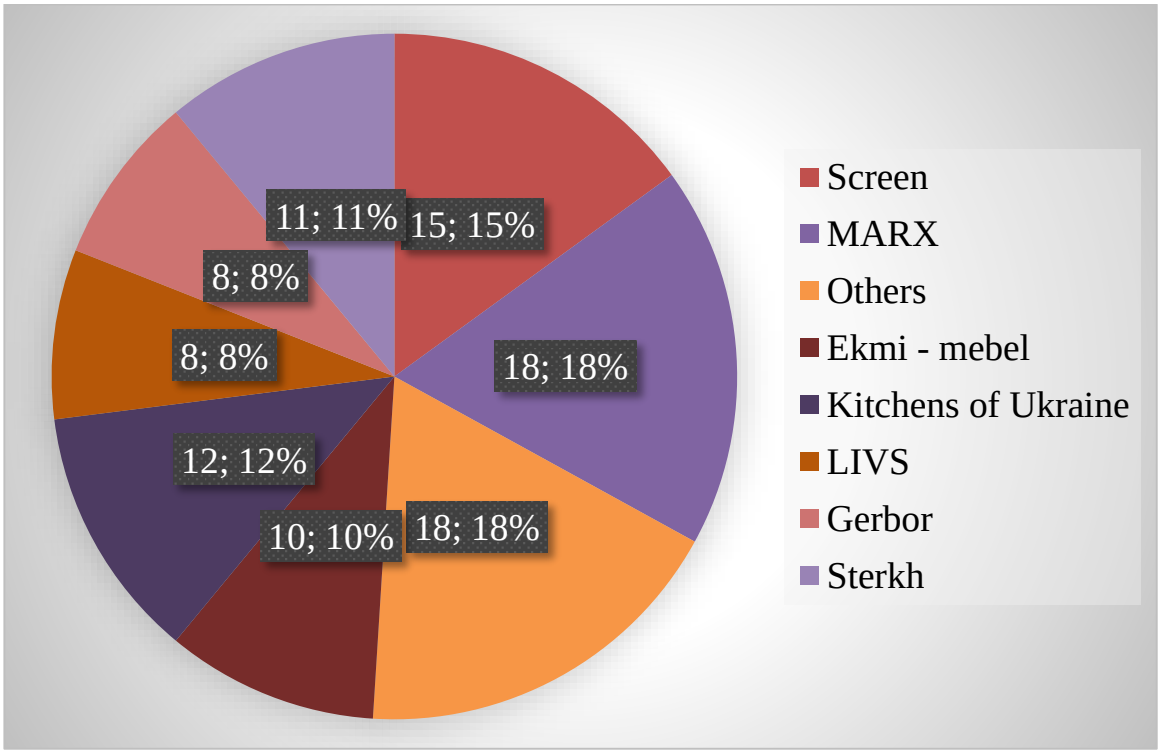

Figure 2.1 – Positions of furniture companies in the Ukrainian market

The largest sales of furniture in 2021 took place in Odessa, Dnipropetrovsk, Lviv, Kharkiv, Kyiv regions (about 64.2%).

As the production of furniture is closely related to the market of woodworking and wood products, we consider it necessary to analyze the number of forestry and logging entities. The corresponding data are given in Table 2.1.

From the table. 1 shows that during the study period (2014-2021), the number of forestry and logging entities in 2021, compared to 2014 increased by 1.7%, and the number of enterprises on the contrary – decreased [15].

State support for forestry will not only improve furniture production, but also contribute to the partial solution of employment problems in forestry [16].

Table 2.1 – Number of forestry and logging entities in Ukraine for 2014-2021 (units)

№	Years	Total	Of them persons-entrepreneurs
1	2	3	4
1	2014	3315	2449
2	2015	2451	1517
3	2016	2476	1574
4	2017	2664	1671
5	2018	3405	2439
6	2019	3672	2706
7	2020	3501	2642
8	2021	3371	2422
9	2021 p. a in% until 2014	107,7	98,9

The main problems of the woodworking industry analysts include the reduction of logging in Ukraine (by 2.5% in 2021) and rising prices for major types of unprocessed wood.

According to the Ukrainian Universal Exchange, the cost of plywood raw materials from alder ranged from 1260 UAH / m3 to 1320 UAH / m3, and from birch – from 1280 UAH / m3 to 1400 UAH. / m3. Raw materials for pine chipboard are sold for 380-500 UAH. / m3, and from birch for 460-470 UAH. / m3.

The real estate market plays an equally important role in the development of the Ukrainian furniture market. According to the State Statistics Service of Ukraine, in Ukraine the rate of housing in operation in 2021. increased by 9% compared to 2019. There is a direct link between real estate growth and furniture production. Given this, we should expect an increase in demand for household furniture and office furniture [17].

Regarding the export and import of furniture, we have the following situation. After the crisis of 2018, the growth rate of the domestic market in the period 2020-2021 increased by an average of 15% annually (Fig. 2.2).

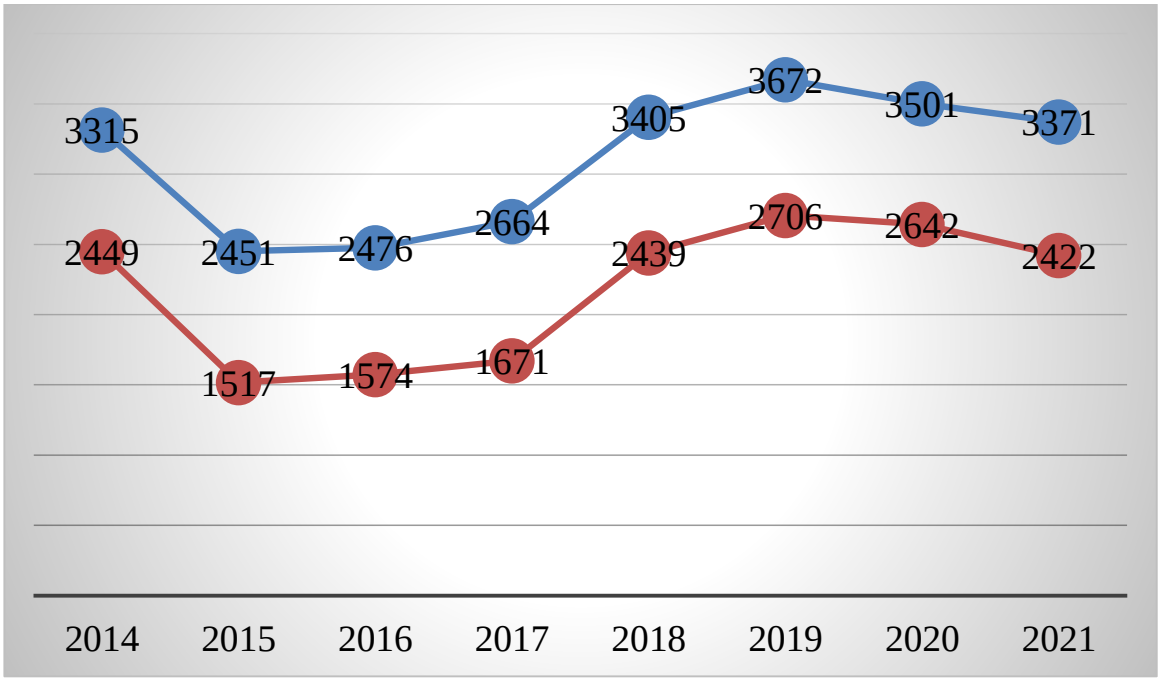

Figure 2.2 – Growth rates of production, exports and imports of furniture

Imports of furniture at the beginning of 2021 amounted to 257,009.1 thousand US dollars, which is 43% less than in 2021. The volume of furniture exports significantly exceeded imports and at the beginning of 2021 amounted to 542,322.6 thousand dollars. US, which is 36.5% more than in 2015. At the same time, the rate of change in exports, compared to 2014 decreased by 11%.

One of the reasons that influenced the state of exports is the difficult economic situation in the country, which prompted manufacturers to change the geography of Ukrainian furniture-importing countries and increase the flow of exports to EU countries [18].

Based on the results of the study, it was found that in the period 2014-2021, furniture production in Ukraine is characterized by unstable dynamics. The growth of furniture sales in value terms is mainly due to the growth of their sales prices.

Today in the furniture market, buyers mostly focus on furniture from Ukrainian manufacturers. A characteristic feature of the domestic furniture market is fierce competition, which is due to large capacity, frequent changes in the structure, the frequent emergence of new furniture manufacturers. The development of the furniture

market is significantly influenced by the wood processing market and the real estate market.

An important step towards increasing the export of Ukrainian furniture production for domestic industries is compliance with quality standards of EU standards. Increasing state funding will allow more Ukrainian companies to produce high-quality products and export them abroad.

Furniture market experts highlight the following trends in its development in Ukraine in 2021:

– the most active pace is the production of home furniture, while in the economy segment, the leading sales positions are occupied by Ukrainian manufacturers;

– the production of office furniture is developing rapidly, which contributes to the growing popularity of the use of office space design;

– emergence of multi-brand furniture hypermarkets;

– active growth in the popularity of online sales among most manufacturers;

– reorientation of domestic manufacturers from the same type of furniture to create unique proposals.

Among the main restraining factors in the development of furniture production in Ukraine, experts include:

– increasing the cost of raw materials and components;

– lack of qualified personnel;

– growth in the share of unsold products;

– additional costs in the form of storage and logistics costs;

– lack of financial and credit resources, as well as lack of investment.

According to the State Statistics Service, in the period 2014-2021, furniture production in Ukraine was characterized by unstable dynamics. Indicators of furniture sales in physical terms tended to decrease, while in monetary terms, since 2016, there has been some growth, which rather indicates the impact of rising prices for furniture.

Based on data on production, exports and imports, we can say that after the crisis of 2015, the growth rate of the domestic market in the period 2016-2021 increased by an average of 15% annually.

Demand for business furniture depends on the growth of existing businesses and the opening of new ones. It should be noted that in the period 2016-2021 the number of business entities in Ukraine increased by 8.3%, which was mainly due to an increase in the number of small entrepreneurs. Also, the production of office furniture in 2021 increased by 6.3% compared to 2018, and furniture for commercial enterprises – by 52%. This indicates the interest of Ukrainian business in the use of domestic furniture.

Fashion trends and world trends are a significant factor that has a significant impact on the level of demand in the furniture market. One of the global trends in the furniture industry is the increase in demand for home offices, libraries, tables, shelves and cabinets, due to the increase in the number of people working remotely. Analysts forecast 5-7% growth in global sales of the home office furniture segment by 2021.

Another global trend in the furniture industry is trends in the real estate market (small apartments) and demographic trends (small families of 2-3 people). As a result, there is an increase in demand for multifunctional, transformed furniture of small size.

According to market analysts, by 2021 online furniture sales will grow to 17-20%. Already today, furniture companies seek to establish a service that allows you to deliver and assemble furniture when buying online on the day of ordering.

Another global trend is the growth of sales in the segment of luxury furniture (both for home and office), the largest market of which is European.

It is also worth noting the growing global demand for environmentally friendly furniture, despite the fact that its cost is higher than conventional.

In the structure of the cost of furniture, the main components are raw materials, as well as the cost of development and implementation of models, wages, energy resources, logistics, advertising and overhead costs.

The main market influencing the production of furniture and wooden decorative components is the market of wood processing and production of wood products. The main problems of the woodworking industry analysts include the reduction of logging in Ukraine (by 2.5% in 2018) and rising prices for major types of unprocessed wood. According to the Ukrainian Universal Exchange, the cost of plywood raw materials from alder ranged from 1260 UAH. / M3 up to UAH 1320. / M3, and from birch – from 1280 UAH. / M3 up to UAH 1,400. / M3. Raw materials for pine chipboard are sold for 380-500 UAH. / M3, and from birch for 460-470 UAH. / M3.

According to experts, in the near future interruptions in the supply of lumber and other wood products are expected, due to the lack of effective organization of the purchase of raw wood at auction.

The real estate market plays a significant role in the development of the Ukrainian furniture market. According to the State Statistics Service, the rate of housing commissioning in Ukraine in 2021 increased by 9% compared to 2016 and amounted to 10.2 million m2. There is a direct link between real estate growth and furniture production, so demand for both residential and business furniture should also be expected to increase.

The growth rate of construction is associated with an increase in demand for design services. The most capacious segment is the market of services for the design and interior design of residential buildings and the public environment. The peculiarity of this market is that professional contacts between the designer, the client and the performer are carried out through the so-called "sarafan radio", on the recommendation of relatives or acquaintances.

In the Ukrainian market, interior design services are provided by design studios or private designers. Many of them provide a range of services, from architectural design to decoration, furniture design and landscaping, with the idea of a weak aesthetic level of the majority of designers.

An important direction in the development of the market of design services in Ukraine is the establishment of partnerships between designers and companies that provide services for the production of furniture. A characteristic feature is the

regional specifics of the work, as well as the clients themselves. The spread of prices for the same services is quite large.

Today there are more than 3,000 furniture companies in Ukraine. Among them: large furniture factories that produce furniture in series, medium-sized enterprises working on individual orders and small, of which about 30% – micro-enterprises. Large manufacturers have better equipment, which provides them with large, compared to medium and small enterprises, production volumes. At the same time, large manufacturers have less production flexibility and cannot respond quickly to changing tastes, styles and design trends. To a lesser extent, such manufacturers can satisfy individual requests, which are successfully carried out by medium and small businesses in the furniture industry.

To enter the more expensive segment of luxury furniture, some Ukrainian manufacturers assemble products using imported components, which, accordingly, affects the price.

The main lineup of players in the Ukrainian furniture market was formed from 1991 to 2000. A significant market share is occupied by Enran, MERX, Sterkh, LIVS, Herbor, Kukhni Ukrainy, Ekmi-mebli and others.

The main competitive advantages are possessed by the enterprises – leaders of the branch which work not only in the Ukrainian market, but also abroad. Small furniture stores and small factories are trying to resist large networks. The highest level of competition is observed among medium and small businesses in the furniture industry, which focus on the economy segment. There is also growing competition among online furniture stores. The most popular among them are: "Sofas for Nirvana", "Fine Furniture", "Furniture", "Oak", "Sofine", "Furniture", "Stool" and others. Among the ways to compete – improving the quality of products and services, different designs, lower prices, flexible system of discounts, as well as convenient production times.

Studies of the behavior of furniture buyers have revealed some features of consumer preferences. Buyers of furniture in the economy segment, choosing

furniture, first interested in its price, then pay attention to quality, appearance, and only then – its origin.

Buyers with high incomes, when choosing furniture are based not so much on their own aesthetic preferences, but on what furniture, which company or country of manufacture is prestigious in their social environment. Therefore, the priority in the structure of consumer preferences is, to a greater extent, the origin of furniture products, then equally design and quality, and finally – the price.

There is also a tendency to increase the interest of buyers in furniture made of natural materials, including solid wood. This material becomes the basis for various design solutions, which allows you to expand the possibilities of providing services and meet different requests.

Most consumers already have some idea of what furniture should be in terms of its design, quality of materials and accessories, construction, comfort, etc. All this forms in the minds of consumers a certain style of furniture. Today, the buyer, having researched the furniture market on the Internet, is able without the help of sellers, in appearance to determine the style of furniture. Most buyers in Ukraine on equal terms will prefer furniture of imported origin, as there is no clear, branded style in the domestic.

The following trends are revealed in the behavior of furniture buyers:

– more thoughtful decisions prevail at purchase;
– the value of the individual approach grows;
– the attitude to brands is formed;
– social media play an important role;
– the need for self-expression increases;
– individuality and creativity prevail over boasting and the desire to impress.

An important factor influencing the purchasing decision is also the availability of service and additional services.

The main trend in consumer preferences for both homeowners and public space owners is the growing need to attract the services of designers for interior design. This is due to the following factors:

– features of the room that do not allow the use of models available on the market;

– desire to individualize the space, make it different from the interiors of acquaintances, relatives, etc.

– the need or desire to use furniture that has design features other than standard;

– lack of time to search for information about fashion styles and furniture manufacturers;

– desire to make more rational use of space and financial resources for its design;

– ignorance of the features and characteristics of the materials from which the furniture is made;

– recommendations of acquaintances and relatives who used the services of designers, and were approved.

The designer usually works "in conjunction" with the architect and designer, the quality of work, which affects the results. In working with customers, the designer, first of all, focuses on the wishes of the end user. However, there are frequent cases of imposing the designer's idea on the client, careless attitude to customer needs, unwillingness to take into account psychological aspects when working with the client, neglect of details that contribute to maximum customer comfort. At the same time, customer dissatisfaction is often directed at the furniture manufacturer, which "undermines" his image.

Summing up, we can talk about the significant potential of the Ukrainian furniture market today and in the future. The development and differentiation of different spheres of human life, the introduction of new technologies in the global furniture industry will open new opportunities for domestic furniture manufacturers and promote the creation of new "niches". Increasing the interest of Western consumers in Ukrainian-made furniture will expand the possibilities of sales channels and will strengthen the position of domestic manufacturers in foreign markets.

2.2 Analysis of the activities of the company "Moidodyr" and its position in the market

Company "Moidodyr" sells its products, performs work, provides services and sells waste at prices and tariffs set independently or on a contractual basis and in accordance with current legislation of Ukraine.

Products of TM "Moidodyr" are characterized by high moisture resistance and strength of the structure, which are achieved through special technologies of ultraviolet painting in combination with the "classic" way of assembling furniture cabinets (beech shingles based on waterproof glue). These high requirements for the quality of production determined our choice of equipment for the factory, allowed us to reach the European level of quality and since 2015 to join the group of European companies "MDD Group".

The company is closely involved in the supply of goods and is completely dependent on suppliers of products sold.

The main indicators of "Moidodyr" trading activity for 2019 and 2020 are presented in Table 2.2.

As can be seen from Table 2.2, "Moidodyr" in 2021 compared to 2020 there is an increase in sales.

Revenue from sales of goods in 2021 increased compared to 2020 by 3210 thousand UAH, which was 43.66%. At the same time, the cost of production also increased in 2021 compared to 2020 by 2631 thousand UAH. which amounted to 43.42%. We can say that the increase in revenue and cost took place at the same pace. Gross profit in 2021 increased by 579 thousand UAH. which amounted to 44.78%, but commercial costs increased by 177 thousand UAH., which is 26.86%. Thus, the profit from sales increased by 402 thousand UAH, which is 63.41%.

Key performance indicators of "Moidodyr" are presented in Fig. 2.3.

Table 2.2 – The main indicators of "Moidodyr" trading activity for 2020 and 2021

№	Indexes	Years		Deviation	
		2020	2021	тис. грн	%
1	2	3	4	5	6
1	Revenue from the sale of logs. services (minus VAT)	7352	10562	3210	43,66
2	The cost of the levers provided	6059	8690	2631	43,42
3	Gross profit	1293	1872	579	44,78
4	Commercial costs	659	836	177	26,86
5	Profit from sales	634	1036	402	63,41

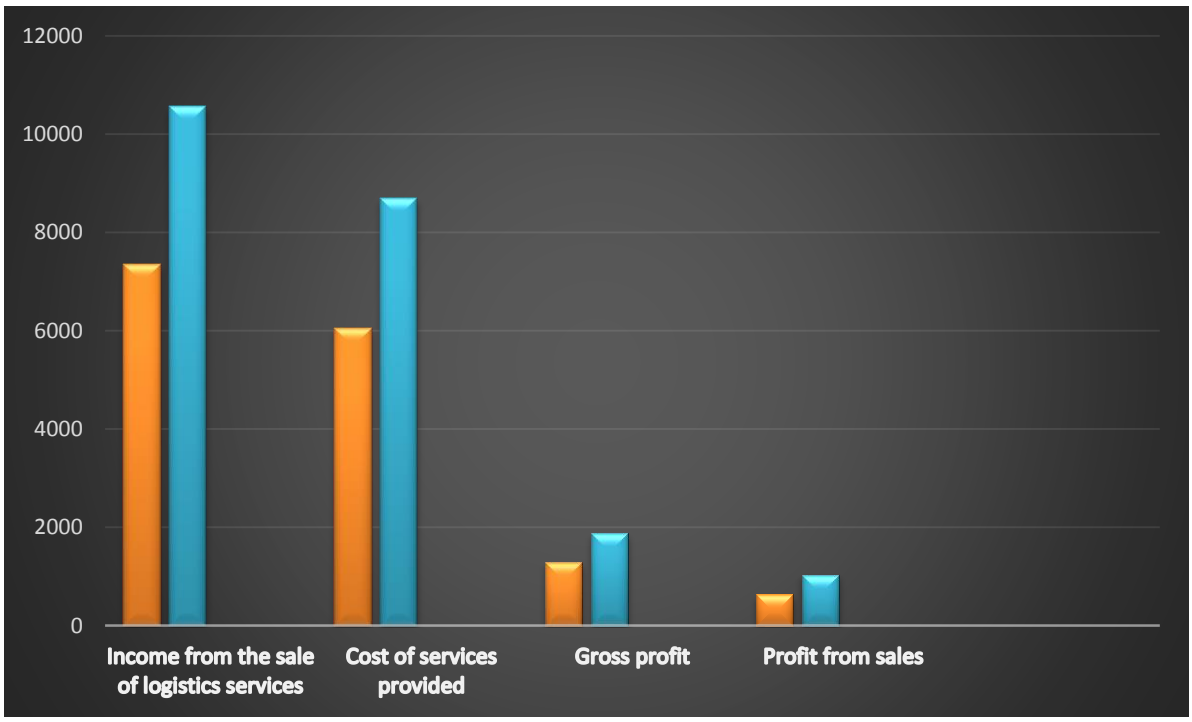

Figure 2.3 – Key performance indicators of "Moidodyr"

Consider the balance sheet of "Moidodyr" and identify the main trends in the value and structure of assets and liabilities of the organization. We present the data in Table 2.3.

Table 2.3 – Analysis of the structure and dynamics of the balance of "Moidodyr"

№	Asset balance sheet items	2020 рік		2021 рік		Changes, +/-	
		thousand UAH	in% to the balance sheet currency	thousand UAH	in% to the balance sheet currency	thousand UAH	in% to the balance sheet currency
1	2	3	4	5	6	7	8
2	Company assets						
3	Non-current assets	-	-	-	-	-	-
4	Current assets	864	100	1032	100	168	100
5	Currency balance – all	864	100	1032	100	168	-
6	Liabilities of the company						
7	Capital and reserves	137	15,86	70	6,78	-67	-39,88
8	Long-term liabilities	-	-	-	-	-	-
9	Short-term liabilities	727	84,14	962	93,22	235	139,88
10	Currency balance – all	864	100	1032	100	168	-

In 2021, compared to 2020, there is an increase in the liabilities of the balance sheet of Avant Logistic mainly due to the growth of borrowed funds, namely increased:

– accounts payable to suppliers and contractors by UAH 233 thousand, which is 35.14%, debt to the staff of the organization by UAH 3 thousand, which is 13.64%;

– arrears of taxes and fees decreased slightly by UAH 1,000. and this is 2.78% and the debt to state extra-budgetary funds remained unchanged – 6 thousand UAH. It is worth noting that "Moidodyr" does not have loans and credits with banks;

– there is a low independence of "Moidodyr" because the share of equity – 15.86% in 2019 and 6.78% in 2020. It is possible to trace the high impact of the use of borrowed funds, namely their share in 2019 – 84.14%, and in 2020 – 93.22%.

Consider and analyze the absolute change and growth rate of individual assets and liabilities of "Moidodyr". The data are presented in Table 2.4.

Table 2.4 – Analysis of the dynamics of assets (property) of the organization, thousand UAH

№	Indexes	At the beginning of the year	At the end of the year	Absolute change	Growth rate,%
1	2	3	4	5	6
2	Non-current assets of all	-	-	-	-
3	Current assets of all	7860	9570	1710	21,76
4	Accounts receivable (payments expected more than 12 months after the reporting date)	100	-	-100	-1
5	Funds	68	75	7	10,29
6	Balance	864	1032	168	19,44

Analyzing the structure and dynamics of the balance sheet of "Moidodyr", we can draw the following conclusions:

– the value of assets in 2021 compared to 2020 increased by 168 thousand UAH. which amounted to 19.44%. This indicates the stabilization of "Moidodyr".

– increase in the value of property by 168 thousand UAH. accompanied by internal changes in assets, namely in current assets: increased inventories by 171 thousand UAH. and this is 21.76%; the amount of funds increased by UAH 7,000. and this is 10.29%, and liquidated receivables in the amount of UAH 100 thousand;

According to the results of the analysis, the following conclusions can be drawn:

– the coefficient of autonomy, equal to 0.1586, is at a low level and below the normative 0.5. This means that not all liabilities of the company can be covered by its own funds, and a decrease in the ratio in 2020 by 0.0908 – 57.23% indicates a

decrease in financial independence and increase the risk of financial difficulties of "Moidodyr" related to guarantees of repayment of the obligations;

– the obtained debt ratios, equal to 5.3066 in 2019 and 13.7429 in 2020, significantly exceed the standard – 0.67. This means that "Moidodyr" does not have a sufficient margin of financial stability and is almost entirely dependent on external financial sources. The company is experiencing a deterioration in financial stability, as in 2020 this ratio increased by 8.4363, which amounted to 101.56%.

Avant Logistic's profitability analysis was conducted. Let's calculate and analyze the profitability of "Moidodyr" for 2020-2021.

Profitability of sales:

Рп2019 = 634000/7352000 * 100 = 8.6235.

Pp2020 = 1036000/10562000 * 100 = 9.8087.

Cost-effectiveness:

Genus 2019 = 634000/6059000 * 100 = 10.4638.

Genus2020 = 1036000/8690000 * 100 = 11.9217.

Return on total capital of the enterprise:

Rk2019 = 634000/864000 * 100 = 73.3796.

Pk2020 = 1036000/1032000 * 100 = 100.3876.

Return on equity:

Рск2019 = 634000/137000 * 100 = 462.7737.

Рск2020 = 1036000/70000 * 100 = 1480.

All results are presented in Table 2.5 and Fig. 2.4.

Based on the results of the analysis, we can draw the following conclusions:

– increase in the profitability of "Moidodyr" sales from 8.6235% in 2019 to 9.8087% in 2020, namely by 1.1852% indicates a decrease in the share of costs in the company's price and an increase in demand for services;

– increase in the profitability of "Moidodyr" from 10.4638% to 11.9217%, ie by 1.4579%, indicates an increase in cost recovery at the enterprise and efficiency;

Table 2.5 – Profitability indicators of the company "Moidodyr" for 2020-2021years

№	Characteristic	2020 рік	2021 рік	Deviation + /
1	2	3	4	5
1	Profitability of sales,%	8,6235	9,8087	1,1852
2	Cost-effectiveness	10,4638	11,9217	1,4579
3	Return on total capital,%	73,3796	100,3876	27,008
4	Return on equity,%	462,7737	1480	1017,2263

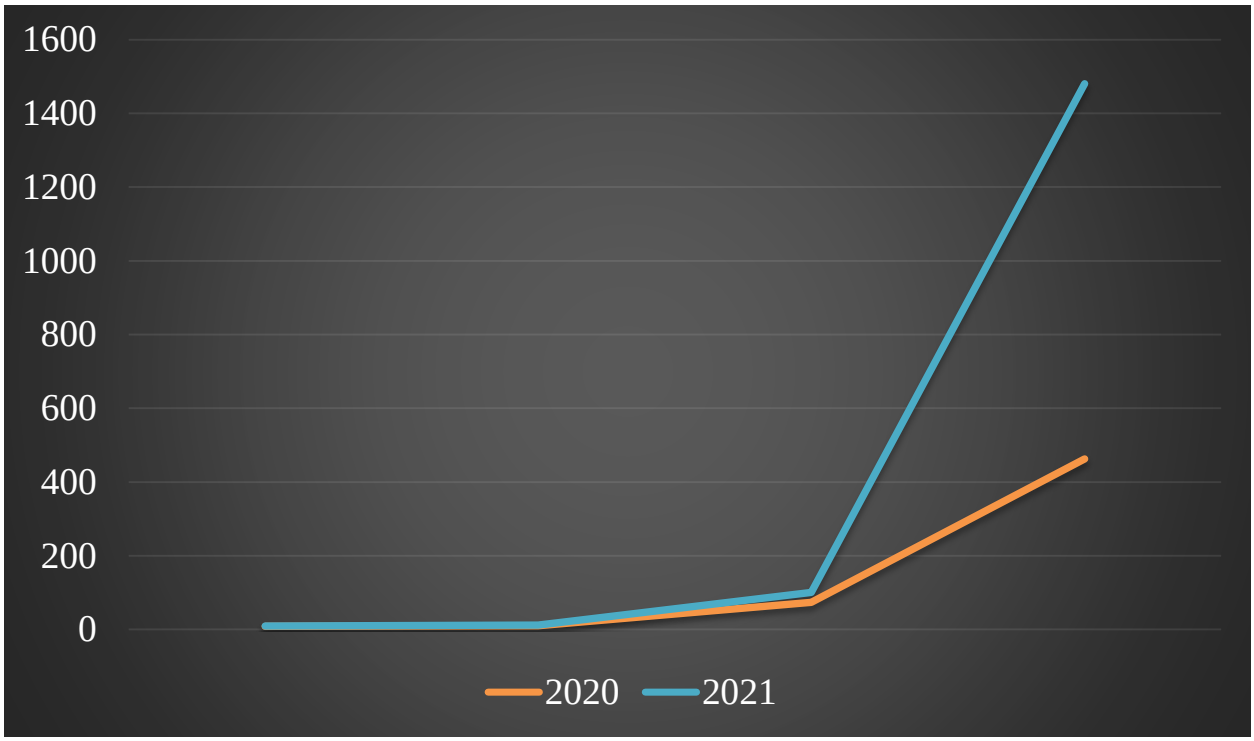

Figure 2.4 – Profitability indicators of "Moidodyr"for 2020-2021

– the growth of the return on total capital of "Moidodyr" from 73.3796% to 100.3876%, namely by 27.008%, indicates a very efficient use of enterprise capital and an increase in demand for services provided;

– the rate of return on equity at the beginning of the year is very high – 462.7737%, and in 2020 it grew by 1017.2263%. This speaks to the very efficient use of "Moidodyr" equity.

2.3 Identification of shortcomings in the existing supply chain management system of "Moidodyr"

The description of the issues identified in the business processes of the company "Moidodyr"should begin with a description of the problems associated with the work with the inventory. In turn, this is due to the fact that this group of problems can be classified as the organization of the inventory process. Problems that arise in the process of inventory often do not arise due to the absence or presence of the correct work of the company's specialists or customer errors.

These are the problems that are associated with high labor costs of specialists, the presence of errors in inventory, the human factor. Problems often arise due to the complexity of the work.

The following troubleshooting steps can be suggested:

1. Mandatory review of documentation and reporting of all goods and items available.

2. Pre-entered in the database positions that are always under control.

3. In the process of counting and entering into a single database, it is carried out by a qualified employee who does his job and works for the result.

4. The necessary indicator and prerequisite is the serviceability of the equipment that will be used for inventory.

It is also important for the inventory department to initiate a thorough inspection of contracts by the heads of all departments of the company.

At the stage of the company's business process, the following number of problems can be identified. Inconsistencies and discrepancies in the documents on the items of a particular product. Such problems often arise due to insufficient careful calculation of available positions and, accordingly, the design of documents and transfer them to a single database.

In contrast to the technique of inventory, which explains what and how to do in the process of its implementation, the methodology focuses on the sequence of

actions during the inventory of tangible assets. It regulates the organization, methods and ways to verify the actual availability of values and the state of calculations and aims to objectively conduct an inventory, ensure the efficiency of its results (by comparing and comparing data on actual residual values with accounting data), reliability of accounting data, efficiency and the effectiveness of inventory in ensuring the preservation of property in enterprises.

We can say that in terms of developing methods of inventory at the enterprise there are special devices that carry out the inventory is somewhat behind the modern technologies and market innovations. In particular, knowing that the company positions itself as a leader in the market of logistics services, must have a person who will control all the innovations and implementation of relevant technical equipment. The use of modern advanced technologies in the company will ensure high speed of necessary operations and reduce financial and labor costs, which will be a decisive factor in increasing the company's competitiveness and increasing profits, and most importantly – will solve the main problem. It is impossible to agree with the current provisions and instructions on conducting an inventory, which are based on the principle of their discreteness. In practice, inventories are carried out in certain periods of time (at least twice a year). With normal warehousing, if the system fails and has many differences, the number of inventories is becoming more frequent, which makes the work is not high quality – and workers are more nervous. But provided that the process of warehousing management is automated, it is almost impossible to carry out an inventory of tangible assets at a certain date with the closure of warehouses and the termination of any operations.

In this regard, in my opinion, the warehouse "Moidodyr" would need to carry out a continuous (permanent) inventory. This will allow for constant control over the preservation of inventory.

In developed countries, the method of conducting permanent inventories has been used for many years. In particular, when conducting a permanent inventory to check the actual availability of parts in the warehouse, to prevent and avoid errors using the method of random sampling. To control the warehouse of finished goods

warehouses selects certain parts, and his assistant compares their actual availability in the warehouse with the balances of stocks on the documents. If the data do not match, find out the reasons and identify the culprits responsible for the discrepancy. Based on the results of the random inspection, the control assistants submit a report to the warehouse inspector. The report reflects the number and size of errors, provides a description. If the number and size of errors cause concern to the controller, he orders to make a five percent sample of all stocks of tangible assets in stock. In cases where the sample reveals errors in excess of five percent, all actually available material values are subject to verification. Errors of less than five percent are considered normal.

In my opinion, companies also need to introduce permanent inventories of values.

In practice, there are cases when instead of two or more members of the commission (excluding materially responsible persons) the inventory is carried out by only one person or formally appointed by a commission of 6-8 people, but actually conducted by one or two members of the commission.

The quality of the inventory of values is also negatively affected by the practice of the so-called alternate rotation of members of the inventory commission without the participation of its full membership. This helps to hide shortcomings. Sometimes it is even the case that some members of the commission write down individual values to the description according to books or cards from the words of financially responsible persons, and this contributes to hiding shortcomings and adding values.

Therefore, for an objective inventory it is necessary to strengthen control over its implementation.

Improving the methodology should also be aimed at quickly determining the results of inventories. The generalization of the practice of this work gives grounds to highlight certain methodological shortcomings. In some cases, the accounting data is adjusted to the actual balances of values, which requires a comparison of accounting data with data of comparative information and acts on the results of the inventory of values. By comparing the accounting data with the data of comparative information,

acts on the results of the inventory of values check the correctness of the data on the balances of values at the time of inventory.

Practice shows that the current form of comparative information to determine the results of the inventory has shortcomings that reduce the efficiency of output. Thus, in particular, the form does not allow to display the results of resorting, the amount of natural sales and the final results. Therefore, in practice, when determining the results of inventories, it is necessary to compile additional comparative information, work offset re-sorting, determine the natural damage, which complicates the procedure for obtaining the results of inventories. To improve the methodology of deriving inventory results, it is advisable to supplement and introduce so-called drones.

The advantages of drones include the delivery of goods both to cities and to areas with underdeveloped transport infrastructure, often in rural areas, where there is no quality road connections. However, there are significant shortcomings, such as safety, the limited number of goods that a drone can deliver, the noise it generates, and low battery life.

Today, such large companies, and possibly in the future competitors of Avant logistic, as Amazon and Wal-Mart, are interested in using drones in warehouses. They clearly understand that this will significantly reduce the cost of inventory associated with finding the position of goods in the warehouse. According to a study by DroneScan, due to the ability to scan barcodes, drones can inventory in two days the stock of such a volume of goods in the warehouse without the involvement of additional staff, which could handle a team of 80 workers in three days using specialized storage equipment and scanning devices. In addition, it is possible to increase the height of storage of goods, thereby optimizing the size of storage space [34].

In the course of the research, a SWOT analysis was conducted to better understand the strengths and weaknesses of the company, which allowed to get acquainted with and expand the company's prospects (Table 2.6).

Table 2.6 – SWOT – analysis of the company "Moidodyr"

№	Strengths and weaknesses	Opportunities (O)	Threats (T)
1	2	3	4
2	-	1. Growth of solvent customers. 2. Development and study of new routes.	1. Changing the import and export policy of all countries; 2. Dependence on customers, competitors, investors; 3. Decrease in the company's profit due to the increase in the cost of services;
3	Strengths (S)	Field S-O	Field S-T
4	1. Guarantee of product quality. 2. A company with strong positions. 3. Wide range of services. 4. Satisfaction of individual requests. 5. Market demand services. 6. Convenient geographical location	Ability to organize logistics for the world in connection with the large capacity of the company and the availability of the necessary resources to perform these works.	With a high ability to serve customers, logistics are currently limited due to global quarantine
5	Weaknesses (W)	Field W-O	Field W-T
6	1. Profitability of the project; 2. Problems with the duration of warehousing. 3. The presence of errors in the inventory 4. The length of the organization of the inventory procedure. 5. "Force majeure" circumstances that delay delivery.	The growth of demand for perishable materials, thus the growth of aviation logistics;	Weakening of logistics may occur due to changes in national laws during and after the coronavirus.

In the table. 2.6 shows all aspects of the enterprise that need to be deepened, especially the weaknesses, which include:

– profitability of the project;

– problems with the duration of warehousing;

– the presence of errors in the inventory;

– the length of the organization of the inventory procedure;

– "Force majeure" circumstances that delay delivery.

2.4 Chapter summary

This chapter deals with the analysis of of the furniture market of Ukraine and identification of the main trends in its development.

The furniture market showed a positive growth. This was largely due to the increase in domestic production. One of the main trends today was the focus of mostly buyers on furniture from Ukrainian manufacturers. It was reflected the fact of increasing consumer confidence in domestic products. Today in Ukraine there are more than 3,000 furniture manufacturers. Among them there are large furniture factories that produce furniture in series, medium-sized enterprises working on individual orders and small.

The main competitive advantages, was noted, are possessed by the enterprises – leaders of the branch which work not only in the Ukrainian market, but also abroad. Small furniture stores and small industries are trying to resist large networks. The highest level of competition was observed among medium and small businesses in the furniture industry, which was focus on the economy segment.

After it we conducted an analysis of production, economic and logistics activities of the company «Moidodyr». The company «Moidodyr» is a factory, which has been producing bathroom furniture since 1999. The company «Moidodyr»

produce their furniture on the modern European equipment. The factory «Moidodyr» has high quality and modern design.

All research was focused on finding shortcomings in the existing supply chain management, identifying problem situations through a SWOT analysis of both internal and external environment of the company «Moidodyr».

It was concluded, that in modern conditions the most important criterion is the automation of the supply chain aimed at attracting and retaining the most profitable customers, personalization of customer relationships, which minimizes operational, administrative and other costs, as well as information support that could make the company «Moidodyr» more competitive.

CHAPTER 3
PROPOSALS FOR IMPROVING THE FURNITURE SUPPLY CHAIN MANAGEMENT

3.1 Conceptual principles of furniture supply chain management automation

Globalization of the world economy, characterized by sharp growth competition, the rapid aging of unique products and technologies, reveals growing influence on the functioning of modern enterprises in Ukraine. These trends force them to restructure their activities, develop intensively and introduce new information technologies. The penetration of communication technologies is creating a world of global competition, where rapid change is constantly happening and innovation is becoming more important than mass products.

The processes taking place in society stimulate the emergence of a new economy, where aggregate knowledge and exchange will prevail. In these conditions, the competitiveness and viability of the enterprise will depend not so much on the availability of material resources, but on the effectiveness of their organization and management, use and presence of advanced means of communication and cooperation with customers and partners, the availability of knowledge sharing technologies. It is clear that for enterprises there is a stable hierarchical organizational structure, which they have today does not allow them to adapt flexibly to change market conditions.

This issue is especially acute for large industrial enterprises, which are constantly looking for ways to develop and optimize their activities according to various criteria. But they are not always able to win in the competition, which requires extraordinary decisions and organizational changes. Thus, the high dynamism of modern business and the requirements of the fast adaptations to market needs dictate a new problem to managers. The essence of it is to develop ideas and

methods of organizing such enterprises and their systems managements that can change their organizational structure in real time and function depending on rapidly changing goals and resources.

The purpose of teaching the discipline: the formation of professional competencies design, management and evaluation of the effectiveness of the supply chain.

Tasks of researching: mastering the theoretical foundations of supply chain management; acquaintance with the main business processes in supply chains; acquiring skills in designing and planning supply chains; study of the basics of creating a single information space for supply chain participants; acquaintance with the criteria of quality and efficiency of functioning supply chains.

Supply chain – a new stage in the evolution of logistics management.

Prerequisites for the development of integrated management in logistics. Paradigms logistics and supply chain management: functional, resource, innovation. Complicating market relations in the supply chain from the standpoint of taking into account the time factor and customer-oriented business. The concept of supply chain and the need to manage it. The role and place of Ukrainian enterprises in global supply chains. Status, factors and trends in management supply chains in Ukraine. Subject, purpose, objectives of the discipline and its relationship with other disciplines.

Evolutionary development of conceptual approaches to management supply chains

The development of supply chain management has an objective basis.

In the 90's of the 20th century. clearly affected by three trends: the excess of supply over demand, globalization of markets and informatization of society. These trends have led to changes in strategies to ensure the competitiveness and profitability of the business.

D. Ivanov, V. Dybskaya and others give the following definition of the supply chain:

a) according to the objective approach, the supply chain is a connected structure of business units, which is united by the relationship "suppliers – focus (main)

company – consumers" in the process of creating and selling goods of value to the final consumer, in accordance with the requirements market;

b) according to the process approach, the supply chain is a sequence of flows and processes that take place between different counterparties (links) of the chain and are combined to meet the requirements of consumers in goods and services.

According to the analysis of the most common interpretations of the term "supply chain", almost all of them are based on the concept of flow and flow process.

On this basis, when considering supply chains, it is possible to identify two fundamental ones signs of a systemic nature: first, the supply chain must provide movement; secondly, the supply chain must be the subject of such a movement.

We are talking about material resources, intermediate and final finished products and services to which logistics operations are applied in order to promote them in temporal and spatial coordinates of the environment of the participants of the chains supplies.

Supply chains are determined by different content, direction of flow, number of links and levels of management. At the same time, the existence of supply chains expands the "traditional" concept of "delivery" – delivery, delivery, delivery by the seller to the buyer of goods under certain conditions.

D. Ivanov notes: “One of the key concepts in logistics is the concept of flow. Flows, in turn, are formed by supplies. The concept of "supply" plays a fundamental role in logistics. The whole history of inter-organizational development interaction of different enterprises is connected with deliveries ".

V. Shcherbakov expands the idea of this concept, formulating it as follows way: "… is a form of movement, which is based on the shipment of goods buyer for one document. When interacting with a limited number linearly ordered participants in the movement of goods, carrying out proofs products to the consumer, there is a supply chain, or logistics chain. The number of links, ie the length of the chain, determines the number of intermediaries between the source supplier and the end user.

Therefore, supply should be considered in the context of supply chain research as a set of functions and operations aimed at solving a number of important tasks of interaction of market relations – from reducing non-production costs and optimizing the use of resources to achieve strategic compliance with the requirements of consumers of a particular market segment.

By describing such functions and operations with further control of their parameters in the information system, the company gets the opportunity to more accurately describe their actions and respond quickly to changes in external and internal environments.

Based on the above, in this paper the term "delivery" is defined as an organized in time and space appropriate set of interdependent and interdependent functions / operations, which implements the task of transfer to full ownership or operational management of the supplier / seller in a certain term for a consumer / buyer of a product / service for its business using.

A clear idea of the concept of supply formulated in the work is given in Fig. 3.1 in the form of the famous S-model (The Order to Payment – Supply Chain S-model).

Based on the above, the supply chain is considered through the relations of its participants in space and time in the process of forming an integrated supply function from material resources to intermediate and final finished products, which, in turn, forms an integrated logistics flow from consumer order to product and financial flow.

The supply chain is a system S, the main components of which are: suppliers of raw materials R; production services of enterprise P; services, involved in the movement of goods from place of production to place of consumption Z, which are divided into own services of the enterprise Z and third-party organizations Z (wholesale Z1 and retailers Z2); consumption network C. All components of such a system are interconnected by direct and reverse material flows and relations in the form of information flows, ie the supply chain can be represented as a network S, the vertices of which are the elements (R, P, Z, C), and connections (i, j) between them correspond to material and information flows i, j {R, P, Z, C}.

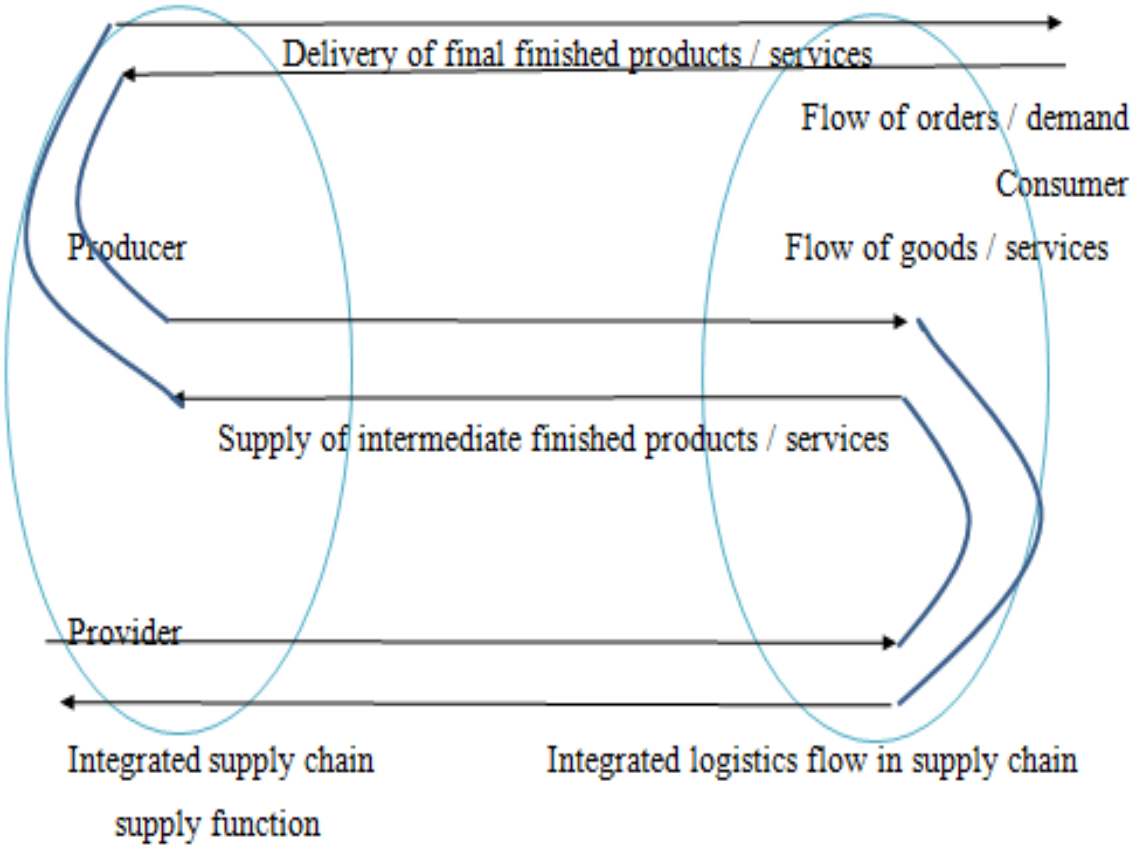

Figure 3.1 – S-model of the SCM

In this case, the supply chain reflects each individual operation in production and delivery of the final product, starting with suppliers R (R R), which produce materials for the supplier of a particular company R (R R), and ending with third-party organizations – its consumers Z, involved in sales products.

Based on the above ideas and abstract algebraic By definition, a supply chain can be represented as a system S = (N, A) that consists of a set of clearly ordered elements N = {n1, n2,…, nN} and their relationship A = {[(n1, n2) (a1,…, aN)],…, [(nN – 1, nN) (a N – 1,…, aN)],…, [(n1, nN) (a1,…, aN)]}, where {R, P, Z, C} N, between which certain function ni (bi) in accordance with the purpose of the bi-th element (i = 1, N) – obtaining and sale of the necessary goods or services. The main problem of such a system is the regulation and coordination of processes and operations in the relationship between elements.

The above approach to establishing the basic concepts that define the essence of the supply chain, approximates its consideration as a "complete" system. Him parts are individual systems (subsystems), properties and connections that are needed to achieve the appropriate goal with certain incentives.

The properties of the supply chain as a whole are defined as its properties elements (subsystems) and the nature of the relationship between them.

Representation of the supply chain as a "complete" system allows for a wide but complete boundaries of its allocation, which are subject to study. Yes the problem has to do with a fairly wide range of other research objects, which necessitates an iterative assessment of appropriate alternative solutions – determining the behavior of the supply chain in a variety of conditions.

Taking the position of O. Yerokhina, according to which the descriptive definition of the system should draw a clearer line between its systemic and non-systemic elements, on the one hand, the study of the supply chain should provide for its representation as a "system in general", and on the other – the representation of this chain with positions of the constructive (functional) approach according to which such research based on the general principles of separation of the system from the environment as an appropriate streaming process: the establishment of "inputs", "outputs", processor, goals and functions.

Based on the above, the basis for establishing the concept of supply chain, which meets the requirements of descriptive definition of the system, is the concept of totality, relationship and whole. This allows us to define the supply chain as "systems in general":

Supply chain is an interconnected and interacting expedient set of objects and connections between them, forming an organizational and economic system that can change its structure if preserved main functions: planning, management and control of flow processes, their elements and resources in certain temporal and spatial parameters of the environment of interaction of all participants in the movement of goods from the supplier of material resources to the manufacturer of the final finished

product and its final consumer in order to providing them with greater competitiveness and progressive development.

Market development certainly determines the development of enterprises that are on it function. The object of research of modern problems of risk management in

logistics activity selected the company " Moydodir ", which is active operates and develops in the market of furniture products of Ukraine.

The purpose of the study is considered appropriate to analyze the current state

development of the furniture industry of Ukraine and the risks inherent in it.

Research shows that despite the fact that the furniture market in Ukraine quite young, he has already gone through several stages of his formation. Until 1987 developed only the segment of household furniture products, furniture for organizations and enterprises were ordered according to plan. In general, the range of furniture included 30 units of products produced by domestic producers (up to 80%).

The quality of such furniture was low, but the price remained affordable.

Purchasing quality goods has become a problem for consumers, exports and imports were regulated exclusively by the state, which greatly complicated the purchase foreign furniture [52].

Between 1987 and 1991, government regulation became softer, and the opportunity to visit foreign countries allowed manufacturers to analyze European range, its quality and pricing policy.

In the crisis of 1992-1996, the production of Ukrainian furniture fell, but on private and foreign companies began to appear on the market, forming new ones trends and formed the bulk of furniture production. In other words, began the gradual formation of new operators in the furniture market, which operated both on the basis of old plants and created new facilities.

Until 2008-2009, the situation in the domestic furniture industry was stable progressive. In the post-crisis period of 2009-2010 growth continued.

Furniture is a product of long use, so its production is characterized a number of features, namely [42]:

– complex production cycle, which is influenced by technology;

– a long period of launching new models;

– high quality requirements;

– warranty and post-warranty service;

– high competition;

– a long period of selection and purchase;

– depreciation of durable goods.

One of the key factors influencing the furniture market is the income of the population one or another region, as well as the amount of money that the buyer is willing to spend on the furniture. Furniture of Ukrainian production differs from other goods on market, because it is much cheaper than imported, due to smaller production and delivery costs. Buyers from regions with a higher level income choose products of well-known brands, regardless of their value.

In addition, the demand in the furniture market is largely influenced by fashion trends and world trends. In the context of globalization of Ukrainian producers you need to keep track of all the fashion trends that appear on the market.

In general, the main factors influencing development domestic furniture market, should include [52]:

– the structure of consumer costs (more than half of all costs are food products, which significantly limits the development of the non-food segment);

– instability of demand for furniture;

– search for markets (barriers to entry into European markets);

– dynamics of resource prices;

– development of sales in online stores;

– features of state regulation (quotas, export regulation);

– the ratio of price and quality of the range;

– availability of financial and credit resources, as well as lack of investment.

In the last few years, the demand for Ukrainian goods has started to grow, which has revived domestic producers. The signing of the association agreement also played a good role with the EU, which has opened European markets to our products. According to the State services of statistics of Ukraine, volumes of production of

domestic furniture last four years increase. Despite the difficult economic and political situation in the country, the dynamics of production is positive. Every year the market demonstrates small growth. And 2016 turned out to be the most for furniture manufacturers successful for the last 4 years.

The dynamics of furniture production in Ukraine is presented in Fig. 3.2.

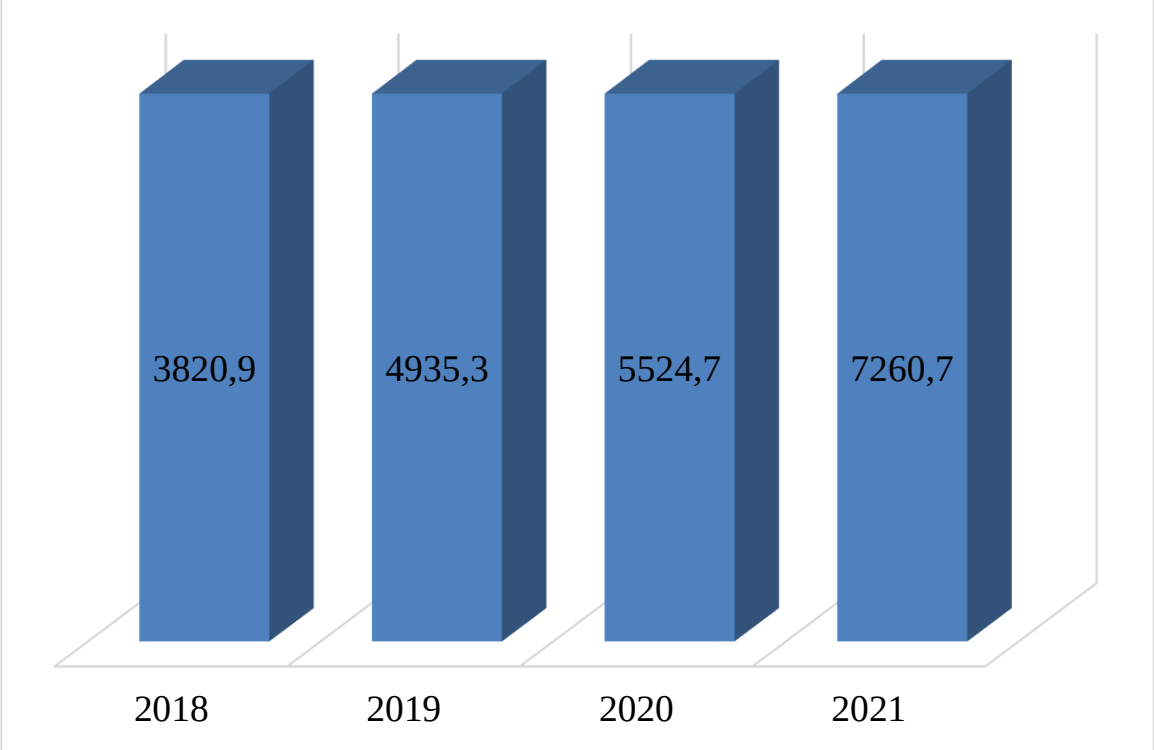

Figure 3.2 – Dynamics of furniture production volumes in Ukraine in 2018-2021, UAH million

The analysis showed that production volumes in 2013-2016 increased by almost 24%, ie by UAH 1,736 million. compared to the same period last year.

Experts say that the positive dynamics, not surprisingly, provided namely economic difficulties. The growth of the dollar has forced many Ukrainians that prefer to buy imported furniture, look in the direction of domestic manufacturers. The latter in turn to meet the requirements of buyers and remain competitive in the crisis, engaged in reviewing the range, design solutions, delivery terms, technology upgrades and more.

Today, according to experts, the market is represented on average about 3 thousand furniture manufacturers. These are large enterprises with foreign ones investments, and small local shops. There is also a small proportion of manufacturers that working in the shade. As in other areas, lately more and more attention of buyers conquer small furniture workshops that offer unique design solutions, comfortable and affordable furniture.

Indicators of furniture production for export also increased. If, for example, 2015 showed a decline (compared to a successful 2014), then in 2016 there is a positive trend again. According to the data State Statistics Service of Ukraine, production volumes of Ukrainian furniture for exports increased by almost 3% compared to the same period last year (Fig. 3.3).

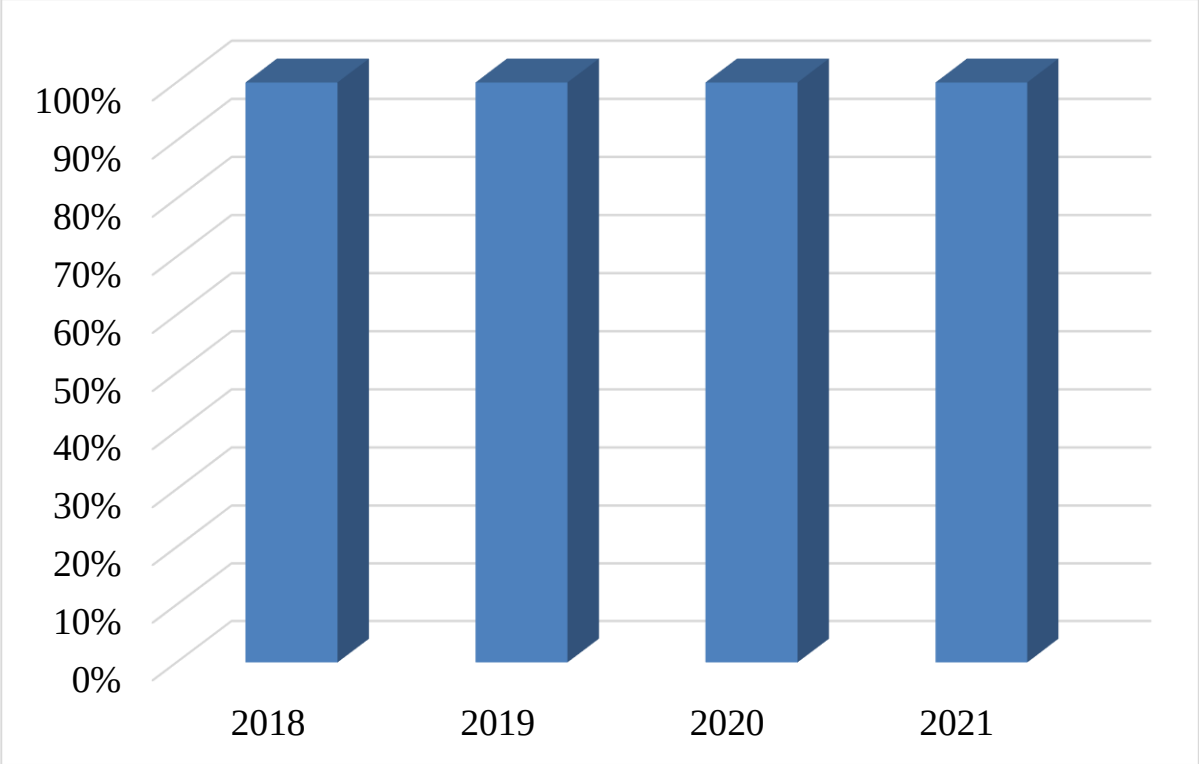

Figure 3.3 – The share of production of domestic furniture for export of the total amount in 2018-2021, UAH million

Despite the fact that the market of the Russian Federation is many domestic furniture manufacturers were forced to leave, they had a good one alternative – EU countries. Woodworking industry, in particular products furniture industry – one of

the leaders in export growth in the EU. Most of ours manufacturers export furniture to Poland, in second place – Germany.

Thus, the main risks of the modern domestic furniture market it is necessary to include, first of all, the difficult economic situation in the country, the need to find new markets after the cessation of trade with Russia (share exports to this country was 40%), rising commodity prices and energy resources, as well as reducing purchasing power.

More popular today are the products of imported manufacturers, but the domestic furniture market, at the same time, focuses on products Ukrainian enterprises. Thus, in 2015 their share for 3 years was minimal due to a sharper decline in imports than in production.

In 2016, the trend was exactly the opposite: imports were growing with declining production (Fig. 3.4, 3.5).

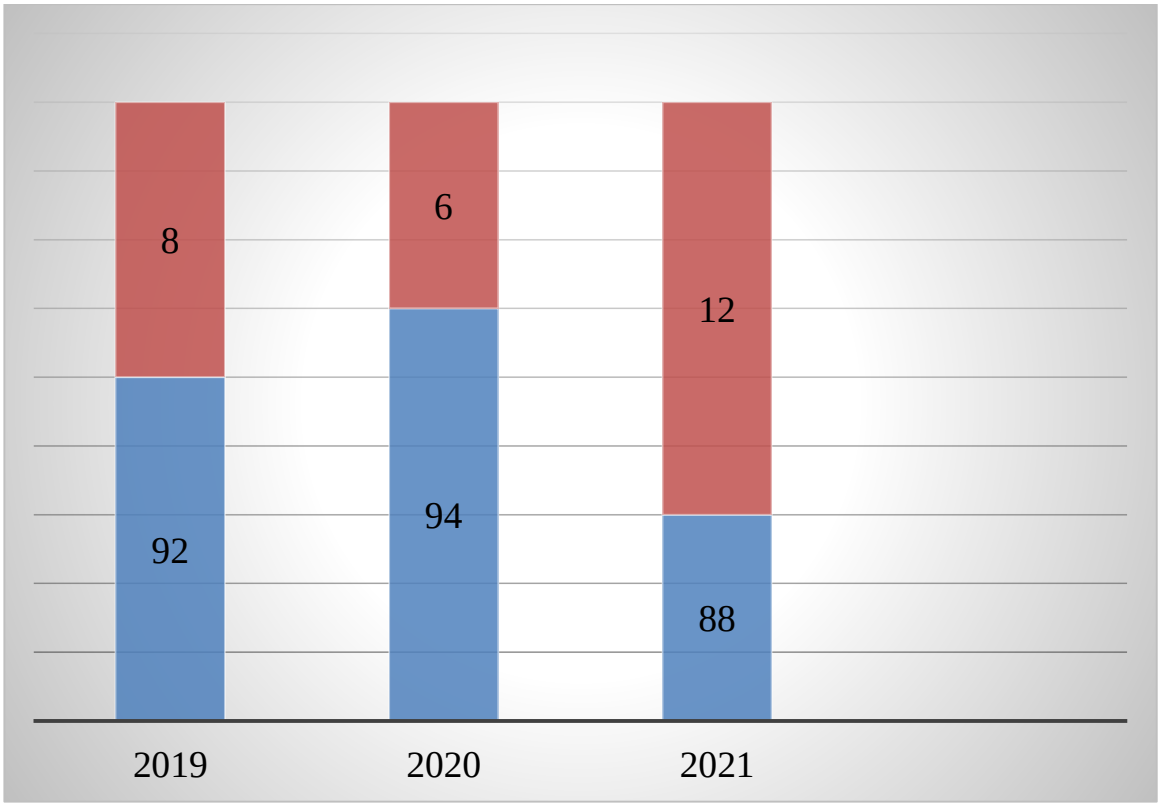

Figure 3.4 – The structure of the furniture market in Ukraine by origin in 2019-2021, %

On average, the structure of the furniture market by product segments is enough uniform. Most often, domestic business is built on the use of imported raw materials, and it is focused mainly on domestic consumer. The exception is wicker furniture – due to the peculiarities of its placement in interior and high prices this type of product is not in great demand Ukraine.

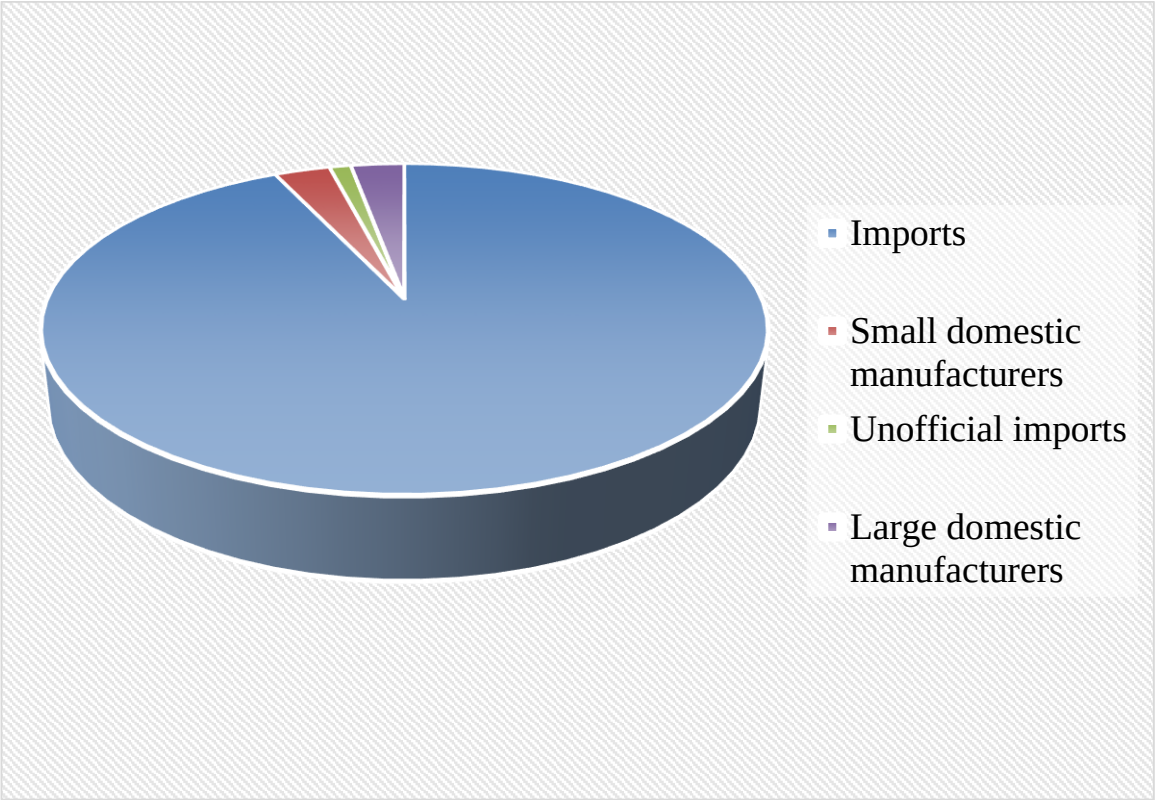

Figure 3.5 – The structure of the furniture market in Ukraine

In 2017, we can identify several notable trends Ukrainian furniture market [42].

First, the most actively developing segment of home furniture.

Second, there are more and more multi-brand furniture hypermarkets, where the consumer can see the product of several manufacturers.

The most actively growing sales channel is online. Its today used by almost all market players. Ukrainians are increasingly buying goods in the Internet, and furniture is no exception.

Ukrainian furniture manufacturers are still in dire need of good advertising. However, the market is already forcing them to leave the mass of the same type of goods side of unique offers, well-known brands.

On the Ukrainian furniture market in the near future will be one way or another to influence world trends (Fig. 3.6).

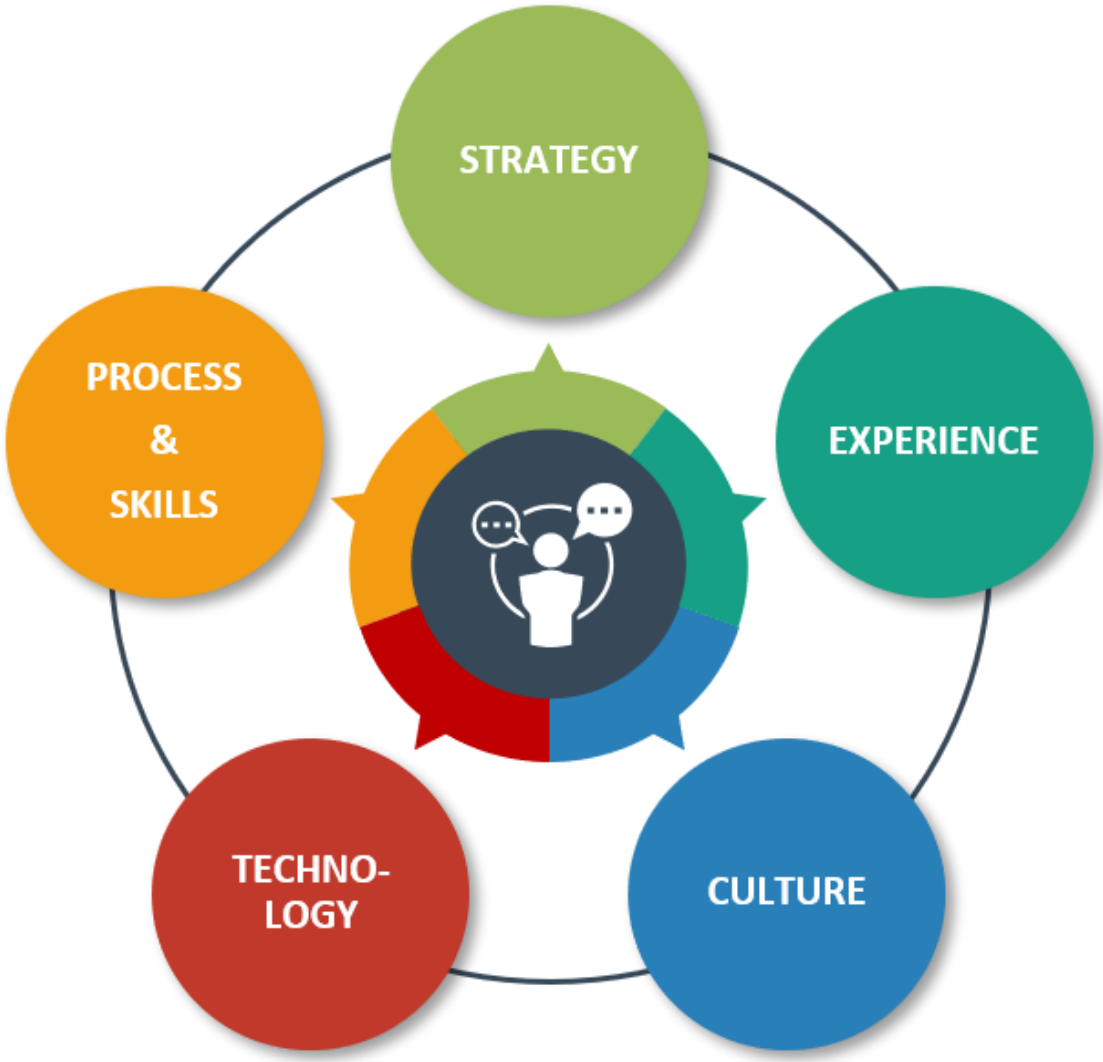

Figure 3.6 – Conceptual principles of furniture supply chain management

Experts note some particularly important:

1. In the world, freelance is developing more and more, and more and more people believe in it t is better to work at home. To do this, they try to be as comfortable as possible arrange the working space of the house. Therefore, experts

predict growing demand for home office furniture. Therefore, Ukrainian producers it is worth paying attention to this segment.

2. The popularity of multifunctional complex furniture is growing. All more appears small-sized housing for one or two people, where square meters do not allow the use of a lot of furniture.

3. The furniture segment from environmentally friendly materials will grow.

Among the main measures that would reduce risks and stimulate development furniture production in Ukraine, it is necessary to highlight the following:

1) to recognize the furniture industry of Ukraine if not a priority, then at least promising; reduce imports from China and carefully study the experience Poland, Estonia, Latvia, Lithuania; compete in design using national traditions, and improve service;

2) to invest in promising domestic research and branch education; to develop domestic production of equipment, fittings and materials;

3) develop and implement a mechanism for the sale of untreated wood for large enterprises under long-term contracts;

4) first of all to provide domestic furniture production unprocessed wood, and its export on a residual basis;

5) to recommend to furniture manufacturers to buy a plate as much as possible products from domestic manufacturers and stimulate the purchase of furniture Ukrainian producers. To do this, recommend buying at public expense furniture exclusively from Ukrainian manufacturers;

6) protect the manufacturer by all possible means of the state regulation, which requires:

– exempt from VAT on natural gas and electricity that are supplied for production needs, the main enterprises-manufacturers of chipboard, Fiberboard, plywood;

– to attribute the costs of natural gas and electricity to gross costs production cost, excluding them from the VAT tax base at product sales (critical imports);

– to restore the promissory note form of payment of VAT on imports industrial products;

– to introduce the payment of VAT by the cash method, ie upon receipt the buyer of money for the purchased goods;

– ensure timely VAT refunds to exporters – manufacturers products or abolish it altogether as a tax;

– reduce or abolish import duty rates on furniture fittings and melamine, which are not produced in Ukraine and are imported for domestic use production;

– limit the growth of imports of furniture and stoves by introducing imported duties on chipboard and fiberboard, plywood in the amount of 7%, and furniture in the amount of 10%;

– to introduce a mechanism of customs clearance of furniture under which importers must provide documents for compliance with sanitary and hygienic standards, national standards of Ukraine for each batch of furniture, stoves and joinery products imported to Ukraine;

– accelerate the reform of the technical regulation system through introduction of technical regulations on furniture;

– to restore funding for scientific and technical programs in the field of science;

– to harmonize the tariffs of railway transport for domestic transportation in accordance with the transit and impose a moratorium on them increase;

– guarantee the protection of the internal market in the process of creating a free zone trade with EU countries to ensure a level playing field in EU markets

Thus, the analysis of the furniture industry of Ukraine shows an increase in demand on domestic products, as well as opportunities for the development of the furniture market for account of rich raw materials; improving consumer, including aesthetic properties and design of furniture; development of fundamental and applied research; support of the woodworking industry by the state.

3.2 Introduction of drones for inventory of material resources

The classification of supply chain competitiveness and the definition of its attributes must be linked to a list of key (strategic) decisions in the supply chain.

Here is a list of typical strategic decisions:

– identification of key competencies and choice of chain strategy supplies;

– adaptation of the whole chain to the nature of demand and characteristics proposals;

– development of the general concept of a chain – a combination of functions and processes;

– determination of the range and degree of outsourcing;

– selection of suppliers and intermediaries in distribution;

– design of the system of movement of raw materials, materials, etc., as well as finished products;

– choice of inventory management concept;

– decisions regarding the information system, including relocation information;

– choice of principles or models of risk management in the supply chain;

– decisions regarding the relations between the participants of the chain;

– choice of cost management method;

– choice of localization of logistics facilities and their equipment;

– choice of mode of transport and routing of transportation, etc.

The relationship between the strategy of the enterprise (the leader of the enterprise network) and the strategy of the supply chain can be schematically depicted as in Fig. 3.7 In the case of consumer goods acts in distribution, not in production.

In the analysis of supply chains, and especially global supply chains, it is important to consider two phenomena:

1. General price pressure that forces supply chain leaders continuously focus on lower prices, even when competitive strategy aimed primarily at quality or delivery time;

2. Concentration of profits in one link of the value chain.

On the example of “Moidodyr” we can consider supply chain strategies (Fig. 3.7).

Figure 3.7 – Developed supply chain strategies for the company “Moidodyr”

This last phenomenon is observed in many activities, for example, in the field of personal computers is associated with microprocessors and software, in the chemical

industry – with production, not distribution, while in the case of consumer goods acts in distribution, not in production.

Mission:

– reason for existence;

– the most important values;

– branch of activity.

Business strategy:

– target customers and markets;

– areas of long-term competitive advantage, as well as key competencies;

– the role of supply chain partners;

– time frames and goals to achieve.

Operations and supply chain strategies:

– implement business strategy measures in the field of operations and supply chain;

– enable the delivery of value to target customers and markets;

– enable the deployment of key competencies in the field of operations and in supply chains

Other functional strategies:

– marketing;

–financial;

– human resources;

– research and development;

-designing.

Using the formulated list of factors influencing the formation of supply chains, you can build a general model of factors that determine supply chain strategies.

Unmanned aerial vehicles – drones – have become so firmly established in our lives that a rare news release goes without mentioning their participation in various events. They fight, search for hurricane victims, make movies, put out fires in skyscrapers, deliver blood serum to the wild mountains for a crashed tourist, and finally carefully unload hot pizza on your porch.

Remotely controlled drones have been around since the invention of the radio. The creation of the first working prototype is associated with the name of the legendary inventor Nikola Tesla. The device had not yet flown – it swam in the pool, but it regularly performed commands, which shocked the New York public in 1899. Especially the military, who tightly "saddled" this market – a hundred years ahead.

One of the most visible trends today is the use of drones for logistics purposes. Two areas prevail here: warehouse drones that read barcodes on packages, and drones for “last mile” delivery (Fig. 3.8).

Figure 3.8 – In Horse Fly technology, copters pick up cargo from vehicles

How drones are changing warehouse inventory practices.

Almost anything you own has once stood on a warehouse shelf. The task of inventorying products or goods for any manufacturer, seller and transporter is one of the most important and does not lose its relevance.

Most modern warehouses are huge spaces, under the roof of which thousands of items are stored, grouped in small batches. The flow of goods can be endless, so the principle of storing certain products has to be revised constantly. At the same time, it

is necessary to skillfully use the warehouse space. And during the period of sales, real chaos can ensue, which nevertheless should be somehow contained and controlled. Great difficulties could be observed during the period of self-isolation, when restrictions were imposed on the number of working personnel, and the warehouse employees themselves went on long sick leave.

Cons of Traditional Warehouse Management /

In order to always be aware of the latest information on the availability of products, warehouse workers, as a rule, carry out an inventory manually. Quite often, a forklift comes into play, without which it is simply impossible to get to the high shelves of the warehouse.

These methods can already be considered outdated, as well as carrying certain risks and inconveniences. For example, working at height for beginners can be extremely dangerous. Accidents are not uncommon. In addition, the inventory using lifts is slow and dreary, and the likelihood of errors due to the notorious human factor has not been canceled.

Modern warehouses are increasingly growing in height, which presents certain challenges when taking inventory using traditional manual methods.

When inventory is a time-consuming process, there are a number of other negative consequences. First of all, warehouse checks are becoming less and less frequent. This means that managers are no longer fully in control of the situation, and this will certainly affect the work of the entire warehouse and the company in the future.

Secondly, routine manual checks in one way or another threaten with a decrease in attention to all the nuances, and as a result – an increased risk of probable errors due to the “human factor”.

We will not write off the fact that any sphere of trade and industry today needs reforming, especially from the point of view of digitalization. The only question is what the new way of doing business will look like in the end. There is a certain demand today for the use of drones and artificial intelligence as a safe, relatively budgetary and efficient alternative for warehouse management.

Drones solve inventory tasks.

A young company from Budapest Aeriu decided to take the path of unmanned innovation. The startup, which turns 3 in the summer of 2021, is developing software and has already attracted the Scandinavian furniture giant and the German multinational engineering and technological development company as its main clients. The Aeriu team managed to create software for more efficient inventory of warehouses.

The principle of operation is simple. A drone (for example, the already beloved DJI Mavic 2 Pro) is piloted by warehouse workers to quickly collect data from the labels of goods lying on the shelves (Fig. 3.9, 3.10). Usually these are barcodes and indicators of the location of products in the warehouse. At the push of a button, these images are uploaded to the cloud by specially designed software for multi-step analysis. Several tools are used for inventorying at once, because despite the fact that within one company, the work of a warehouse is usually standardized, the same can hardly be said about the entire warehouse and logistics industry.

Figure 3.9 – An example of using a drone in a warehouse

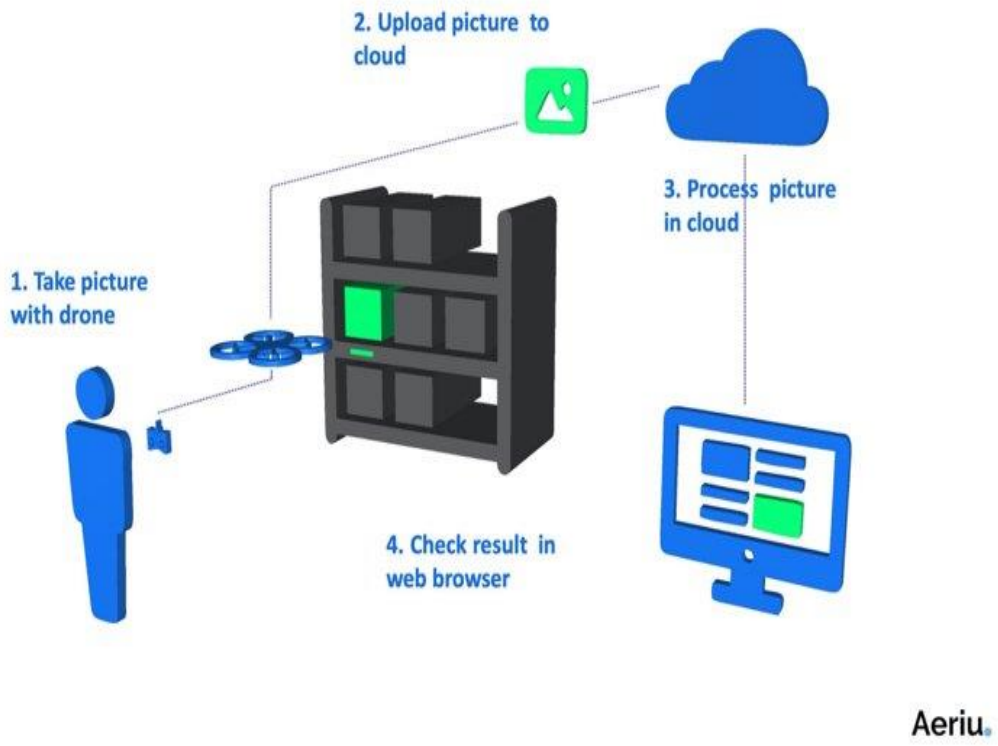

Figure 3.10 – The process of using a drone in a warehouse

Optical Character Recognition (OCR) model “reads” numbers and letters written in different languages. This information can be used to locate product packages throughout the warehouse. The model with barcode reading detects and recognizes the presence of a particular product, comparing it with the information in the archive of documents and products of the company. Aeriu also helps warehouse operators create an inventory map that clearly shows what is in the warehouse and where.

In addition to processing the data obtained from the drone, the developed neural network uses deep learning skills to solve one very important and at the same time rather difficult task – determining free space. So, the platform was taught to understand that the lack of products in one place or another in the warehouse is also extremely necessary information.

This success of the Hungarian company was made possible, among other things, thanks to the quick and easy access to the “stuffing” of DJI drones, which are functional, reliable and versatile. By relying on the quality of the design and

capabilities of the DJI drones, Aeriu said they were able to fully focus on software development.

The coronavirus pandemic has created problems for many warehouse management companies around the world. Lack of staff and demands for social distancing in the workplace have become a real problem, preventing regular inventory taking. At the same time, it was in 2020 that the indicators of Internet commerce increased, which was directly related to warehouse management. The confusion in this market threatened a number of problems and delays in the supply chain of the goods.

Whatever the national regulations for the use of heavy equipment in warehouses, it is unlikely that anyone would question the fact that inventory using drones is several times safer than the traditional manual method. In addition, launching a drone is more environmentally friendly than using a powerful forklift, which consumes about 72 kW / h, while the drone consumes 100 times less electricity!

Scanning product labels is fast thanks to the incredible capabilities of the Mavic 2 Pro. This drone is easy to use and comes with a 1 "sensor with 2x optical zoom. Tripod Flight and Shooting Mode, which limits the aircraft's top speed and stop distance, simplifies the process of piloting and performing indoor operations. According to Hungarian specialists from Aeriu, unmanned inventory is 30% faster, and the cost of the drone itself is less than 10% of the cost of the lifting system.

3.3 Economic effect of practical implementation of the proposed solutions

Consider the feasibility of introducing innovative technologies for the warehouse complex, namely the use of drones for inventory of material resources.

Risk groups for the implementation of inventory using drones are given in table. 3.1.

Table 3.1 – Risk groups when implementing inventory using drones

№	Risks	Risk characteristics	Risk evaluation,%
1	2	3	4
1	Legal risks	Risk of neglect of contractual obligations by project participants in due time and in agreed amounts.	0,25
2	Risk of exceeding the estimated cost of the project	The reasons for exceeding the estimated cost may be: design error, change in project implementation conditions, etc.	0,25
3	Delayed commissioning of the project	The reason for the delay may be the inability of the contractor to fulfill its obligations.	0,25
4	Financial risks	Contains the whole set of risks associated with financial transactions. These are currency risks of interest rate changes and inflation risks.	0,4
5	Force majeure risks	Risks that are difficult to predict: earthquakes, fires, strikes, etc.	0,2
6	Organizational risks	The risk of incorrectly chosen structure of the company, errors in its implementation.	0,5
7	Social risks	Non-acceptance by the company's staff of the new structure.	0,4
8	Qualification risks	Insufficient qualification of the company's staff, which will lead to improper functioning of the service.	0,5

Statistics on the use of drones in the warehouses of logistics companies have shown that their use has a significant economic effect. Consider options for controlling the accuracy of high-altitude storage – calculation of pallets:

1. Removing the pallet, scanning, setting the pallet, moving to the next cell. On average, it takes 3 minutes per pallet.

2. Lifting the employee to the height, scanning, moving – we can get an average result of 30 seconds on the pallet. We add all the clear risks of such a procedure. This action will involve such workers as: storekeeper, driver of loading and unloading equipment, as well as in most cases the WMS operator for the issuance and processing of tasks (Fig. 3.11). Considering the cost of using resources, we obtain a

simplified version of the calculation (without removing the pallets) of 120 pallets / h, the cost is expressed in approximately 1000 UAH / h or 50 UAH / pallet.

3. Operation of the drone in one procedure – 10 seconds, in one hour it will be able to transport 360 pallets.

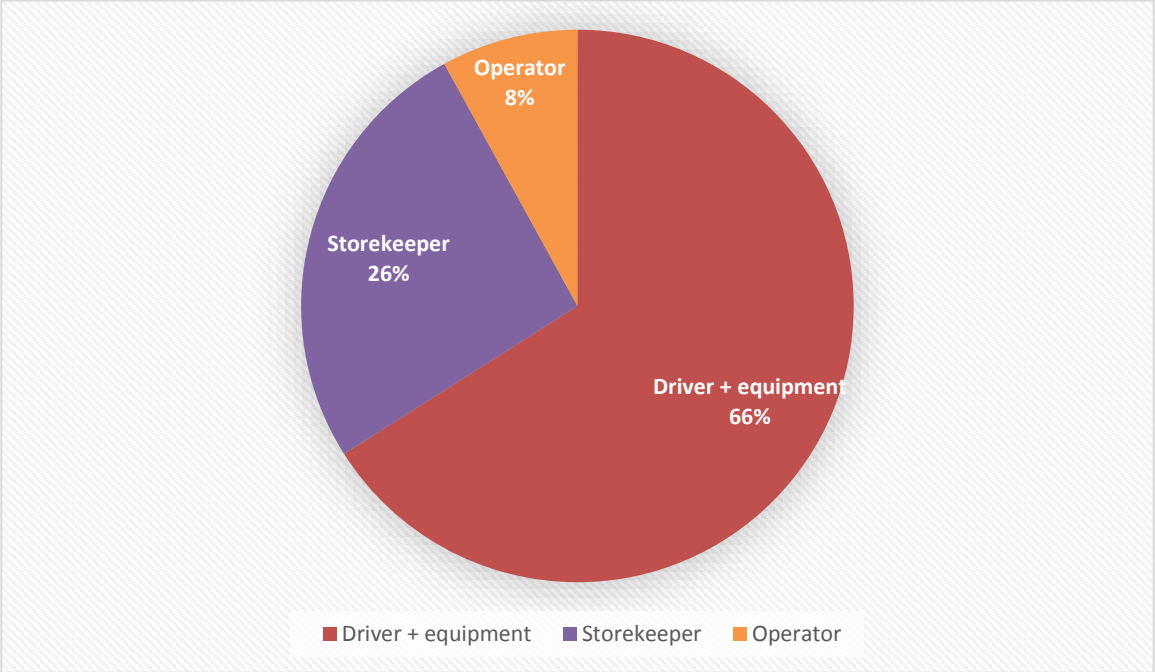

Figure 3.11 – The ratio of the cost of the process according to the first option

Practical tests and calculations have shown that even with the help of a drone on manual control, you can achieve the same speed of 120 pallets / hour. It is not necessary to attract additional resources and equipment, which eventually turns into 280 UAH / hour or 2 UAH / per pallet. Given the cost of the drone and ancillary equipment, its use will pay off in the calculation of about 30,000 pallets. And most importantly – it is possible to set routes and schedules of inspections of pallets and cells, to organize a completely autonomous process. In fig. Figure 3.12 shows the time perspective in the use of drones, compared to other options.

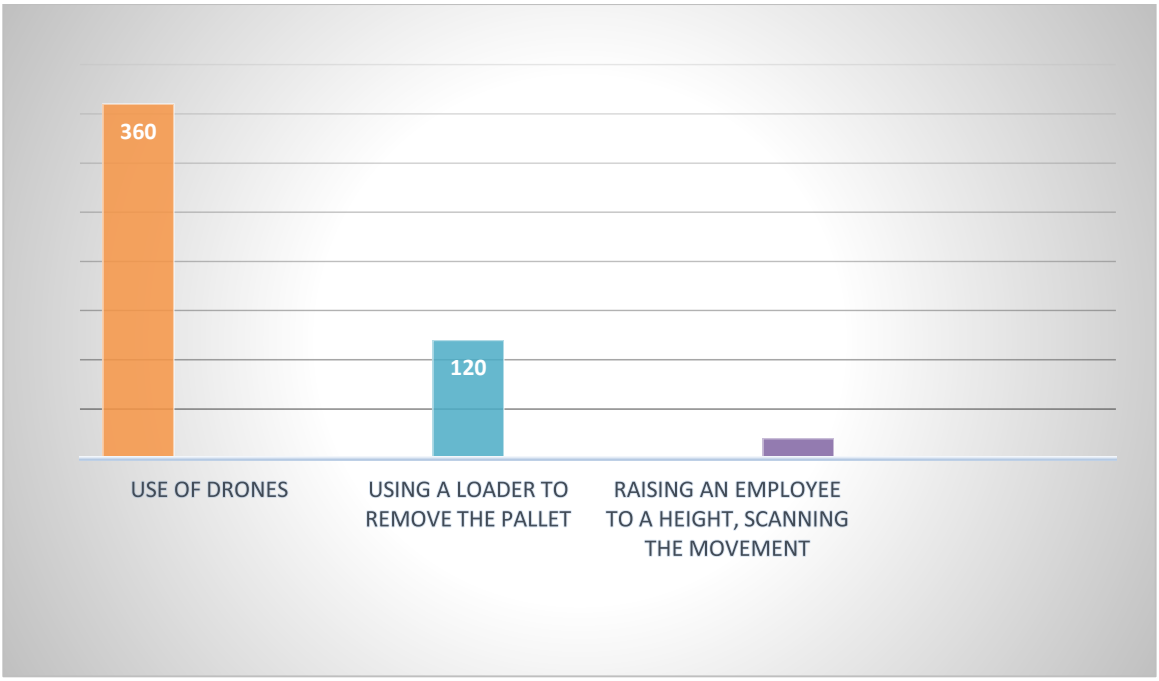

Figure 3.12 – Comparative characteristics of the duration of the inventory for different options

The MegadroneMD1 drone model was previously selected, which has the following characteristics:

– battery charge 6800 mAh LiPo;
– 1 ”CMOS camera quality;
– maximum flight time 120 minutes;
– weight 1550 grams;
– price UAH 65,000.

Based on the company's budget and the characteristics of the warehouse complex, it was decided to test five such drones for the full implementation of the aircraft system at the plant.

To do this, it is necessary that the company "Moidodyr" raised funds in the amount of 405 thousand UAH, which will ensure the quality of work in the warehouse complex, in order to meet one of the company's goals – to make a profit. Thus, we can conclude that the company can achieve high competitive positions through the proper organization of the warehouse complex and the introduction of innovative developments.

To assess the effectiveness of investment decisions in the work we will use dynamic methods, namely [38]:

– net modern value;

– profitability index of the logistics system project;

Dynamic methods are often called discount, because they are based on determining the current size of cash flows associated with the idea of implementing an investment project.

The main purpose of the net present value method is to find the difference between the investment costs of designing a logistics system and future income from the operation of this system, expressed in time-adjusted (usually before the implementation of the monetary value.

With a given discount rate, you can determine the current value of all outflows and inflows during the economic life of the logistics project, as well as compare them with each other. The result of such a comparison will be a positive or negative value (net inflow or net outflow of funds), which indicates whether the project meets the accepted discount rate.

Let I_0 (investment) – the amount of initial costs, ie the amount of investment at the beginning of the logistics project; PV (present value) – the current value of cash flow during the economic life of the project. Then the net present value (NPV) is equal to:

$$NPV=PV-I_0. \tag{3.1}$$

The accumulated amount of discount income can be determined by the formula:

$$PV = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t}, \tag{3.2}$$

where r – discount rate;

CF_t – net flow of payments (*CF* – cashflow*)* for the period *t.*

Substituting the formula for calculating PV in (3.1), we obtain:

$$NPV = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} - I_0. \tag{3.3}$$

If the net present value of the flow of payments calculated in this way has a positive sign (NPV> 0), it means that during its economic life the logistics project will reimburse the initial costs I0, provide a profit according to the standard r, as well as some reserve, equal to NPV. The negative value of NPV indicates that the set rate of return is not provided and the project is unprofitable. At NPV = 0, the project only recoups costs but does not generate revenue.

General rule of NPV: if NPV> 0, the project is accepted, otherwise it should be rejected.

The profitability index (PI) shows how many units of the current value of cash flow per unit of estimated initial costs. The following formula is used to calculate this indicator:

$$PI = \frac{PV}{I_0}. \tag{3.4}$$

If the value of the criterion PI>1, the current value of the cash flow of the project exceeds the initial investment, thus ensuring the presence of a positive value of NPV. In this case, the rate of return exceeds the set, and the project should be accepted.

At PI = 1 the value of NPV = 0, and the investment does not bring income. If PI<1, the project does not provide the specified level of profitability and should be rejected.

General rule PI: if PI>1, the project is accepted, otherwise it should be rejected.

With the introduction of the drone system, a number of investments are made. Table 3.2 calculates the contribution of investments for the introduction of drones in the company "Moidodyr".

Table 3.2 – Investments in the introduction of drones

№	Direction of investment	Cost (thousand UAH)
1	2	3
2	Purchase of drones	5x65=325
3	Implementation	30
4	Service	35
5	Staff training and support	15
6	Total	405

Based on the data, we calculate the main performance indicators of the investment project.

Let's calculate the net present value of the project at a discount rate of 8%, 15% (Tables 3.3, 3.4).

Table 3.3 – Results of calculations of net present value of the project at a discount rate of 8%

t	I_0	CFt	(1+r)t	PVt	NPV
1	-405000				-405000
2	-	165000	1,0800	152777,8	-252 222,2
3	-	170000	1,1664	145747,6	-106475
4	-	180000	1,2597	142891,2	36416,56
5	-	190000	1,3605	139654,5	176 071,14
6	-	210000	1,4693	142925,2	318996,30
Total	-405000	705000	-	581071,1	318996,30

Thus, after these calculations, we can conclude that at discount rates of 8%, 15%, this project will pay off in 4 years after implementation. The profit will be equal to UAH 318,996.30. and UAH 198412.1.

From the results obtained, calculate the profitability index at discount rates of 8%, 15%, respectively:

PI8% = 1.43;

PI15% = 1.49.

Table 3.4 – The results of calculations of the net present value of the project at a discount rate of 15%

t	I_0	CFt	(1+r)t	PVt	NPV
1	2	3	4	5	6
2	-405000				-405000
3	-	165000	1,1500	143478,3	-261521,74
4	-	170000	1,3225	128544,4	-132977,3
5	-	180000	1,5209	118351	-14625,32
6	-	190000	1,7490	108633,5	94007,2
7	-	210000	2,0114	104404,9	198412,1
Total	-405000	705000	-	603448,1	198412,1

Thus, from the obtained calculations we can conclude that the profitability index is greater than 1, ie the current value of the cash flow of the project exceeds the investment. However, it is the largest at a discount rate of 8% and is UAH 318996.30. The lowest value of the profitability index is at a discount rate of 15%. Its value reaches 198412.1 UAH.

That is, the project is cost-effective and implementation in the drone warehouse is appropriate at the enterprise.

3.4 Chapter summary

The main goal of the project was to consider the relevance and profitability of the introduction of unmanned aerial vehicles at the company "Avant logistic". To do this, it was necessary to combine all the main processes associated with the use of

drones, namely – RFID-tag system, WMS-system, direct participation of warehouse workers.

Based on the identified shortcomings, innovative technologies in the field of warehousing logistics were analyzed. The analysis of offers on the market of Ukraine was carried out, the detailed characteristic of each presented drones was carried out and among them the model for structure of the Moidodyr company – MegadroneMD1 was chosen.

The result of the project is the value of NPV – 517408.4 UAH. The project is economically feasible before deciding on its implementation.

But there are risks in introducing this system. Risk factors to consider are the following:

– identification of whole or broken containers by drone;

– single-level or multi-level storage;

– huge variations in the quality of labels with barcodes;

– limited number of hours for drone flights.

In order to reduce risks and avoid problems, you need to perform a number of operations, including:

– settings for different storage schemes of goods;

– provide the operator with a convenient instrument panel;

– improved integrated WMS system;

– close cooperation with warehousing staff and IT departments.

The evaluation of the project's effectiveness showed that the project will pay for itself in four years.

CONCLUSIONS AND RECOMMENDATIONS

In the process of studying the theoretical foundations of logistics business process management in enterprises, it was concluded that they are inextricably linked with the nature and features of logistics development. Because logistics, which is an integrated, interdisciplinary science, provides an opportunity to predict sales volumes, the cost of promoting them to the customer – the consumer, the timing of payments for shipped products, etc., as well as assess the direction and strength of business factors. – environment. We have an analysis of the main trends in world logistics. It may surprise someone, but most of these trends are observed in Ukraine.

Business process modeling is a process reflection of the company's activities so that in the future these processes can be analyzed and improved

Development of innovative projects to improve the quality of logistics services can reduce the overall costs of the enterprise. That gives the chance on the basis of the analysis of market tendencies to carry out planning of innovative activity of the enterprise. Innovative logistics innovations become effective if they are backed up by decisions and concrete actions. Innovative activity is aimed at the practical use of scientific, scientific and technical results and intellectual potential in order to obtain a new or improved product, method of production and meet the needs of society in competitive goods and services, as well as additional research and development. aimed at improving social services.

Supply Chain Management Concept (SCM) is a modern scientific direction of the organization of relations between enterprises and ensuring the customer orientation of modern business. At the initial stage of its formation, SCM was interpreted as a supplement to logistics, but today it is an independent scientific discipline that includes logistics as an important component.

Automation has allowed supply chain operations within companies to perform tasks with minimal human intervention or interaction. Automation methods vary

significantly in size, functionality, dexterity, intelligence and cost, from robotic process automation to flying vehicles with artificial intelligence.

The second chapter deals with the analysis of of the furniture market of Ukraine and identification of the main trends in its development.

The furniture market showed a positive growth. This was largely due to the increase in domestic production. One of the main trends today was the focus of mostly buyers on furniture from Ukrainian manufacturers. It was reflected the fact of increasing consumer confidence in domestic products. Today in Ukraine there are more than 3,000 furniture manufacturers. Among them there are large furniture factories that produce furniture in series, medium-sized enterprises working on individual orders and small.

The main competitive advantages, was noted, are possessed by the enterprises – leaders of the branch which work not only in the Ukrainian market, but also abroad. Small furniture stores and small industries are trying to resist large networks. The highest level of competition was observed among medium and small businesses in the furniture industry, which was focus on the economy segment.

After it we conducted an analysis of production, economic and logistics activities of the company «Moidodyr». The company «Moidodyr» is a factory, which has been producing bathroom furniture since 1999. The company «Moidodyr» produce their furniture on the modern European equipment. The factory «Moidodyr» has high quality and modern design.

All research was focused on finding shortcomings in the existing supply chain management, identifying problem situations through a SWOT analysis of both internal and external environment of the company «Moidodyr».

It was concluded, that in modern conditions the most important criterion is the automation of the supply chain aimed at attracting and retaining the most profitable customers, personalization of customer relationships, which minimizes operational, administrative and other costs, as well as information support that could make the company «Moidodyr» more competitive.

The third chapter deals with the conceptual principles of furniture supply chain management automation.

Globalization of the world economy, characterized by sharp growth competition, the rapid aging of unique products and technologies, reveals growing influence on the functioning of modern enterprises in Ukraine. These trends force them to restructure their activities, develop intensively and introduce new information technologies. The penetration of communication technologies is creating a world of global competition, where rapid change is constantly happening and innovation is becoming more important than mass products.

The processes taking place in society stimulate the emergence of a new economy, where aggregate knowledge and exchange will prevail. In these conditions, the competitiveness and viability of the enterprise will depend not so much on the availability of material resources, but on the effectiveness of their organization and management, use and presence of advanced means of communication and cooperation with customers and partners, the availability of knowledge sharing technologies. It is clear that for enterprises there is a stable hierarchical organizational structure, which they have today does not allow them to adapt flexibly to change market conditions.

Here is a list of typical strategic decisions:

– identification of key competencies and choice of chain strategy supplies;

– adaptation of the whole chain to the nature of demand and characteristics proposals;

– development of the general concept of a chain – a combination of functions and processes;

– determination of the range and degree of outsourcing;

– selection of suppliers and intermediaries in distribution;

– design of the system of movement of raw materials, materials, etc., as well as finished products;

– choice of inventory management concept;

– decisions regarding the information system, including relocation information;

– choice of principles or models of risk management in the supply chain;

– decisions regarding the relations between the participants of the chain;

– choice of cost management method;

– choice of localization of logistics facilities and their equipment;

– choice of mode of transport and routing of transportation, etc.

The relationship between the strategy of the enterprise (the leader of the enterprise network) and the strategy of the supply chain can be schematically depicted. In the case of consumer goods acts in distribution, not in production.

On the example of “Moidodyr” we can consider supply chain strategies.

Using the formulated list of factors influencing the formation of supply chains, you can build a general model of factors that determine supply chain strategies.

Unmanned aerial vehicles – drones – have become so firmly established in our lives that a rare news release goes without mentioning their participation in various events. They fight, search for hurricane victims, make movies, put out fires in skyscrapers, deliver blood serum to the wild mountains for a crashed tourist, and finally carefully unload hot pizza on your porch.

Almost anything you own has once stood on a warehouse shelf. The task of inventorying products or goods for any manufacturer, seller and transporter is one of the most important and does not lose its relevance.

Most modern warehouses are huge spaces, under the roof of which thousands of items are stored, grouped in small batches. The flow of goods can be endless, so the principle of storing certain products has to be revised constantly. At the same time, it is necessary to skillfully use the warehouse space. And during the period of sales, real chaos can ensue, which nevertheless should be somehow contained and controlled. Great difficulties could be observed during the period of self-isolation, when restrictions were imposed on the number of working personnel, and the warehouse employees themselves went on long sick leave.

Modern warehouses are increasingly growing in height, which presents certain challenges when taking inventory using traditional manual methods.

When inventory is a time-consuming process, there are a number of other negative consequences. First of all, warehouse checks are becoming less and less frequent. This means that managers are no longer fully in control of the situation, and this will certainly affect the work of the entire warehouse and the company in the future.

Secondly, routine manual checks in one way or another threaten with a decrease in attention to all the nuances, and as a result – an increased risk of probable errors due to the “human factor”.

The principle of operation is simple. A drone (for example, the already beloved DJI Mavic 2 Pro) is piloted by warehouse workers to quickly collect data from the labels of goods lying on the shelves. Usually these are barcodes and indicators of the location of products in the warehouse. At the push of a button, these images are uploaded to the cloud by specially designed software for multi-step analysis. Several tools are used for inventorying at once, because despite the fact that within one company, the work of a warehouse is usually standardized, the same can hardly be said about the entire warehouse and logistics industry.

The main goal of the project was to consider the relevance and profitability of the introduction of unmanned aerial vehicles at the company "Avant logistic". To do this, it was necessary to combine all the main processes associated with the use of drones, namely – RFID-tag system, WMS-system, direct participation of warehouse workers.

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– improved integrated WMS system;

– close cooperation with warehousing staff and IT departments.

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